**Subject: Chemistry** KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific) Answer the following questions: ( two marks for each right choice ) **1.** A molecular compound which dissolves in water and it does **not ionize**:-

<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH	<b>B.</b> C <sub>6</sub> H <sub>6</sub>	C. NH <sub>4</sub> Cl	D. HF	
<b>2.</b> An ion that forn <b>A.</b> Mg <sup>2+</sup>	ns precipitate with su <b>B.</b> Ca <sup>2+</sup>	ulfate ion, but doesn't <b>C.</b> Pb <sup>2+</sup>	form precipitate w	vith sulfide ion :-
<b>3.</b> At which of the <b>A.</b> 5M	following concentrate <b>B.</b> 1M	tions the hydrochloric	acid considered a <b>C.</b> 0.001M	strong electrolyte  D. all of
<ul><li>4. What colligative</li><li>A. vapor-pressure</li><li>C. freezing-point</li></ul>	e elevation	ayed when antifreeze <b>B.</b> boiling point of the both (B and C	elevation	cooling system?
sodium sulfate (N	$1a_2SO_4$ ) is 0.36mol, w	ch are produced by di that is the molarity of	solution?	·
<b>A.</b> 0.24	<b>B.</b> 0.12		<b>C.</b> 0.36	<b>D.</b> 0.72
<b>6.</b> The boiling poin if $(K_f = -1.86^{\circ}C/m)$	•	tion containing a non	electrolyte that fre	ezes at -3.72°C, is:
<b>A.</b> 102.04°C	<b>B.</b> 1.02°C	<b>C.</b> 101.0	O2°C	<b>D.</b> 100.51°C
<b>7.</b> In this reaction: <b>A.</b> OH <sup>-</sup> is conjugated		HCN(aq)+ OH <sup>-</sup> (aq) ,w amphoteric <b>C.</b> CN	hich of the followir ion is hydrolyzez	ng is <b>incorrect</b> ? <b>D.</b> none of then
<b>8.</b> Which of the foliation <b>A.</b> CO <sub>2</sub>	llowing oxides when <b>B.</b> CaO	reacted with water for <b>C.</b> SO <sub>3</sub>		both ( A and C )
<b>9.</b> A molecule that	donates one electro	on pair to form a cova	lent bond is:-	
<b>A.</b> BF <sub>3</sub>	<b>B.</b> NH <sub>4</sub> <sup>+</sup>	<b>C.</b> CH <sub>4</sub>	D.	NH <sub>3</sub>
<b>10.</b> An acid is used	d as a fungicide:-			
<b>A.</b> CH₃COOH	<b>B.</b> HCl	C. HNO <sub>3</sub>	D. I	H <sub>3</sub> PO <sub>4</sub>
<b>11.</b> The net ionic 6	equation for which o	f the following reaction	on is: H₃O⁺(aq)+OH⁻	(aq) ← 2H <sub>2</sub> O( <i>l</i> )?

fingerprint **A.**  $K_{w} = [H_{3}O^{+}][OH^{-}]$ 2<sup>nd</sup> Attempt Time: 3.30 hours **A.** [HCl]=0.02M A. KNO<sub>3</sub> them n of **A.** -814.1kJ/mol A. specific heat level zero). **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ **D.** both (A and B) **12.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub> (aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub> is:-**C.** H<sub>2</sub>O **D.** none of them **13.** Which theories of acids and bases belong to acids and bases conjugate? **C.** Bronsted-Lowry **D.** none of them **A.** 27 **14.** The correct order according the pOH value for the following solution is:-B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl

**15.** Which of the following is **correct** at all temperature in pure water? **B.**  $[H_3O^+][OH^-]=1x10^{-14}$ **C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ **D.** all of them. SN: 000001

16. Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**? **B.** [HCl]=0.04M **C.** the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup> D. both (B and C) 17. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct? **A.**  $[OH^{-}]=2.0x10^{-6}M$ **B.** the sea water is basic **C.**  $[OH^{-}]=5.0x10^{-9}M$ **D.** both (A and B) 18. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed? **D.** both (B and C) C. NaF 19. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material be?  $(C_p=0.07J/(g.K))$ **A.** 25°C **B.** 298K **C.** 40K **20.** In the following reaction:  $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the  $\Delta H^0_f$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively **B.** +814.1kJ/mol **C.** -634.9kJ/mol **D.** +634.9kJ/mol **21.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system. **B.** nature **D.** all of them **C.** temperature **22.** The entropy increases by:-**A.** decreasing the pressure **B.** increasing the temperature **C.** mixing gases **23.** The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-**A.** if  $T\Delta S$  value = 176kJ **B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ **D.** at all temperature **24.** Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-**A.** specific heat **B.** enthalpy of reaction **C.** enthalpy of formation **D.** enthalpy of combustion **25.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub>-is:-(place the reactants at energy A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol **26.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction? **A.** presence of catalyst **B.** changing concentration of product **C.** changing temperature **D.** changing concentration of reactant **27.** The rate law for the following hypothetical reaction:  $A + B \longrightarrow C$ , is  $R = k[A]^2[B]$ , by what factor does the rate increase if the concentration of each A and B is tripled? **D.** 8 **B.** 16 **C.** 18

A.  $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ 

A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub>

C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub>

B. HNO<sub>2</sub>

**B.** Lewis

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

**A.** H<sub>3</sub>O<sup>+</sup>

**A.** Arrhenius

<b>28.</b> By usin	g the information in the adjace	ent table	, whic	ch of th	ne following is cat	talyst?	<b>40.</b> All of the following	ng pair compounds	are structura	l isomers to each eth	her <b>except</b> :-
A. MnO <sub>2</sub>	Substance						A. pentane and 2,2-	dimethyl propane		B. hexene and cycle	ohexane
<b>B.</b> H <sub>2</sub> O <sub>2</sub>			H₂O		MnO <sub>2</sub>		C. pentane and cyclo	pentane		<b>D.</b> 1,1-dichloro etha	ane and 1,2-dichloro ethane
<b>C.</b> H <sub>2</sub> O	mass at the start of the reaction (g)	68	0	0	5		<b>41.</b> The number of hy	vdrogen atoms in th	ne 1,1-dimeth	nyl cyclopropane con	npound is equal to:-
<b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)	0	36	32	5			. 10	<b>C.</b> 8	<b>D.</b> 12	
<ul> <li>A. 0.1M He</li> <li>30. In the fewhich of fee</li> <li>A. NO is in</li> <li>31. In the feand Cl<sub>2</sub> at a</li> <li>A. 0.005</li> <li>32. In the fee</li> </ul>	ollowing reaction: 2NO+O <sub>2</sub> —ollowing is <b>correct</b> ? termediate <b>B.</b> NO <sub>3</sub> is in the sequilibrium is (0.084, 0.035, 0.05) <b>B.</b> 0.05 ollowing gaseous equilibrium is a sequilibrium is (0.084, 0.035)	at 50°C  →2NO₂,t  intermed reaction: .06) resp	the re liate PCl <sub>5</sub> - ective	C. 1M action PC Ply in 5 C. 20 167kJ	for the fast step  C. R=k[NO][O <sub>2</sub> ]  Cl <sub>3</sub> +Cl <sub>2</sub> ,the mole r L vessel, the value  D.	D. 1M HCl at 25°C is: NO₃+NO→2NO₂,  D. both(B and C) number for each of PCl₅, PCl₃ e of equilibrium constant is:-	<b>42.</b> The correct name	e for this compound ula that shows the t a <b>B.</b> empirical	d: ( CH <sub>3</sub> CH <sub>2</sub> -Cl	) according to IUPA  A. 1-ethyl-A  B. 1-ethyl-A  C. 1-methy  D. 1-methy  ent bond in organic co  C. structural form	4-methyl cyclohexane 4-methyl benzene yl-4-ethyl benzene yl-4- ethyl cyclohexane ompound:- mula  D. ionic formula
<b>B.</b> the valu	tile of $K$ at 500°C is greater thank of $K$ at both temperatures at e of $K$ at 500°C is less than the them	re equal			0°C		45. When compared  A. both have the sar  C. both dissolved in	me a functional grouwater.	up	<b>B.</b> both have th <b>D.</b> all of them	ne same boiling point
which of the A. ionic pr	lixing $Ca^{2+}$ ions with concentrate following is <b>correct</b> ? If the soduct> $K_{sp}$ <b>B.</b> ionic product following salts effect on the	solubility ct< <i>K<sub>sp</sub></i>	of Ca	CO₃ in	its saturated soluproduct= $K_{sp}$	ution is 5.3x10 <sup>-5</sup> mol/L <b>D.</b> precipitate isn't form	<ul> <li>46. Thecomp</li> <li>A. C<sub>2</sub>F<sub>4</sub></li> <li>47. Which of the foll</li> <li>A. the reaction type</li> <li>B. the alkynes don't</li> </ul>	<b>B.</b> CFCs owing is <b>incorrect</b> ? of methane gas wit	<b>C.</b> MT th chlorine ga	ВЕ	<b>D.</b> PVA
A. NaCN	B. KCI		<b>C.</b> KI	$NO_2$	D. NI	H₄Br	C. the graphite is a g	•			
	librium :- cion have ceased e reverse reaction continues			•	forward reaction	n continues verse reactions continue.	<b>D.</b> none of them		ous solutions	of carboxylic acids a	and amines are mixed is called: <b>D.</b> elimination
	h of the following situation th NH4NO₃ solution to the NH₃ so	-	not ch	_		lution to the HCN solution	<b>49.</b> The molecular fo	_		-	
	a small amount of HCl to NH3 a		`l solu			lution to the HCN solution	<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	<b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>	С	. C <sub>4</sub> H <sub>10</sub> O	<b>D.</b> C <sub>4</sub> H <sub>8</sub> O
<b>37.</b> By decr	easing pressure on the following of N2 decreases ntity of NO increases			n syste <b>B.</b> the		decreases	<b>50.</b> Which of the follows:	owing is heated wit <b>B.</b> neoprene		ns in vulcanization pr risoprene	ocess? <b>D.</b> 2-methyl-1,3 butadiene
<b>38.</b> Salts of	weak acids and weak bases ca	an produ	ce ba	sic aqu	eous solution if:-						
<b>A.</b> $K_a = K_b$	<b>B.</b> $K_a > K_b$		$C. K_b > 0$	Ka	D.	[H <sub>3</sub> O <sup>+</sup> ]>[OH <sup>-</sup> ]					
<b>39.</b> Increas	ing the percentage of branche	d-chain a	alkane	es in ga	soline causes to:	<b>!-</b>					
	e octane rating				e octane rating						
<b>C.</b> increase	e boiling point		<b>D.</b> b	oth (A	and C)						

Subject: Chemistry

Time: 3.30 hours

fingerprint

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 

2<sup>nd</sup> Attempt

B

Study year (2024-2025) (Grade twelve scientific)

#### Answer the following questions: (two marks for each right choice)

1	. The mole	cular formul	a for the eth	yl ethanoate co	ompound is :-
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**A.**  $C_4H_{10}O_2$ 

**B.** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>

**C.**  $C_4H_{10}O$ 

**D.** C<sub>4</sub>H<sub>8</sub>O

**2.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-

A. 1-butanol

**B.** propanal

**D.** butanal

**3.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-

**A.** 0.005

**B.** 0.05

**C.** 20

**D.** 200

4. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-

**A.** specific heat **B.** enthalpy of reaction **C.** enthalpy of formation

**D.** enthalpy of combustion

**5.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?

**A.** 5M

**B.** 1M

**C.** 0.001M

**D.** all of them

**6.** If 49J of energy are added to 35g of a material at  $20^{\circ}$ C, what will the final temperature of the material

be?  $(C_p=0.07J/(g.K))$ 

**A.** 25°C

**B.** 298K

**C.** 40K

**D.** 40°C

**7.** Which of the following is **correct** at all temperature in pure water?

**A.**  $K_{w} = [H_{3}O^{+}][OH^{-}]$ 

**B.**  $[H_3O^+][OH^-]=1x10^{-14}$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

**D.** all of them.

**8.** All of the following pair compounds are structural isomers to each ether **except**:-

**A.** pentane and 2,2-dimethyl propane

**B.** hexene and cyclohexane

**C.** pentane and cyclopentane

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane

**9.** Which theories of acids and bases belong to acids and bases conjugate?

**A.** Arrhenius

**B.** Lewis

**C.** Bronsted-Lowry

**D.** none of them

**10.** The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-

A. substitution

B. addition

C. condensation

**D.** elimination

**11.** At which of the following situation the reaction solid zinc with solution of HCl is faster?

**A.** 0.1M HCl at 25°C

**B.** 0.1M HCl at 50°C

C. 1M HCl at 50°C

D. 1M HCl at 25°C

**12.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system.

A. specific heat

**B.** nature

**C.** temperature

**D.** all of them

**13.** Which of the following is heated with sulfur atoms in vulcanization process?

**A.** isoprene

**B.** neoprene

**C.** poly isoprene

**D.** 2-methyl-1,3 butadiene

**14.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?

A. Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

**D.** both (A and B)

SN: 000002 **15.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**A.** 102.04°C

**B.** 1.02°C

**C.** 101.02°C

**D.** 100.51°C

**16.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol

17. The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ **B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ

**D.** at all temperature

**18.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?

**A.** [OH<sup>-</sup>]=2.0x10<sup>-6</sup>M

**B.** the sea water is basic

**C.**  $[OH^{-}]=5.0x10^{-9}M$ 

**D.** both (A and B)

19. Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?

**A.** [HCI]=0.02M

**B.** [HCl]=0.04M

C. the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>

D. both (B and C)

**20.** What colligative properties are displayed when antifreeze is added to a car's cooling system?

**A.** vapor-pressure elevation

**B.** boiling point elevation

**C.** freezing-point depression

**D.** both (B and C)

**21.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**?

**A.** OH<sup>-</sup> is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN<sup>-</sup> ion is hydrolyzez **D.** none of them

**22.** In the following reaction:  $HNO_2(aq)+H_2O(l) \rightleftharpoons NO_2(aq)+H_3O^+(aq)$ , the conjugate acid of  $NO_2$  is:-

**A.** H<sub>3</sub>O<sup>+</sup>

B. HNO<sub>2</sub>

**C.** H<sub>2</sub>O

**D.** none of them

**23.** An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-

**A.** Mg<sup>2+</sup>

**B.** Ca<sup>2+</sup>

**C.** Pb<sup>2+</sup>

**D.**Al<sup>3+</sup>

**24.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water **except**:-.

A. NaCN

B. KCl

C. KNO<sub>2</sub>

C. HNO<sub>3</sub>

D. NH<sub>4</sub>Br

**D.** H<sub>3</sub>PO<sub>4</sub>

25. An acid is used as a fungicide:-

A. CH<sub>3</sub>COOH

A. molecular formula

B. HCl

**26.** A chemical formula that shows the type of covalent bond in organic compound:-

**B.** empirical formula

C. structural formula

**D.** ionic formula

**27.** The correct name for this compound: (

CH<sub>3</sub> ) according to IUPAC system is:

**A.** 1-ethyl-4-methyl cyclohexane

**B.** 1-ethyl-4-methyl benzene

C. 1-methyl-4-ethyl benzene

**D.** 1-methyl-4- ethyl cyclohexane

<b>28.</b> The rate law for the case if the case is a case if the case if the case is a case if the case is a case if the case if the case is a case is a case if the case is a case is a case is a case is a case if the case is a case is a case is a case is a case if the case is a case is a case is a case if the case is a case is	•		$\rightarrow$ C, is R= $k$ [A] <sup>2</sup> [B], by what factor <b>D.</b> 8	does the	A. both hav	empared dimethyl ether and e e the same a functional group olved in water.		В		ave the same		
	essure on the follow 2 decreases	ing equilibrium system <b>B.</b> the o	n: N <sub>2</sub> (g)+ O <sub>2</sub> (g) ← 2NO(g) quantity of NO decreases quantities do not change		<b>42.</b> The tota	I number of ions moles which ate ( $Na_2SO_4$ ) is 0.36mol, what		ed by o	dissociati	ion 500mL an ?	aqueous soluti	on of
<b>30.</b> At equilibrium :-	Jilicreases	<b>D.</b> tile	quantities do not change			<b>B.</b> 0.12 opy increases by:-			<b>C.</b> 0.	30	<b>D.</b> 0.72	
<b>A.</b> all reaction have <b>C.</b> only the reverse r		•	orward reaction continues forward and reverse reactions con	ntinue	A. decreasi	ng the pressure <b>B.</b> increasi	ng the temp	eratui	re <b>C.</b> ı	mixing gases	<b>D.</b> all of the	m
•		eacted with water for		itiliae.		f the following is incorrect? ion type of methane gas with	chlorine ga	s is add	dition			
<b>A.</b> CO <sub>2</sub>	<b>B.</b> CaO	<b>C.</b> SO <sub>3</sub>	<b>D.</b> both ( A and C )			es don't have geometric form	_	3 13 44	artion			
<b>32.</b> When 50mL of 0. the following salts n	•	ık acid titrated with 50	mL of 0.1M potassium hydroxide,	which of		nite is a good electrical condu						
<b>A.</b> KNO <sub>3</sub>	B. KF	C. NaF	D. both (B and C)		<b>45.</b> The corr	ect order according the pOH v	alue for the	follov	ving solu	tion is:-		
<b>33.</b> Salts of weak acid <b>A.</b> $K_a = K_b$	ds and weak bases can $\mathbf{B}$ . $K_a > K_b$	an produce basic aque  C. $K_b > K_a$	ous solution if:- <b>D.</b> [H₃O⁺]>[OH⁻]			3COOK>NH4NO3 (>NaCl>NH4NO3				•CH₃COOK OOK>NaCl		
	that occurs by one		which of the following doesn't ef	ffect on	<b>46.</b> The <b>A.</b> C <sub>2</sub> F <sub>4</sub>	compounds contribute to <b>B.</b> CFCs	the destruct <b>C.</b> MTI		ozone ir	the upper at <b>D.</b> PVA	•	
<ul><li>A. presence of cata</li><li>C. changing tempera</li></ul>	•		concentration of product		<b>47.</b> The num <b>A.</b> 6	ber of hydrogen atoms in the <b>B.</b> 10	1,1-dimeth C. 8	yl cycl	opropano <b>D.</b> 12	•	s equal to:-	
<b>35.</b> Increasing the pe <b>A.</b> increase octane r <b>C.</b> increase boiling p	ating	d-chain alkanes in gas <b>B.</b> decrease <b>D.</b> both (A a	octane rating			king Ca <sup>2+</sup> ions with concentrate following is <b>correct</b> ? If the seduct> <i>K</i> <sub>Sp</sub> <b>B.</b> ionic product	olubility of C	aCO₃		urated solutio		ol/L
•		n pair to form a covale <b>C.</b> CH <sub>4</sub>				llowing reaction: 2NO+O₂ — lowing is <b>correct</b> ?	•2NO₂ ,the r	eactio	n for the	fast step is: N	NO₃+NO <del></del> >2N	O <sub>2</sub> ,
		es in water and it doe  C. NH <sub>4</sub> Cl			<b>A.</b> NO is int <b>50.</b> By using	ermediate $\mathbf{B}$ . NO <sub>3</sub> is in the information in the adjace	ntermediate			[NO][O <sub>2</sub> ] wing is cataly	<b>D.</b> both(B st?	and C)
		•	+ CO <sub>2</sub> (g), what is the $\Delta H_f^0$ value	for CaO?	A. MnO <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub> H <sub>2</sub> O		MnO <sub>2</sub>	,		
_		-	.5, -1207.6) kJ/mol respectively	ioi cao:	<b>B.</b> H <sub>2</sub> O <sub>2</sub>	mass at the start of the reaction (g)	68 0	0	5			
<b>A.</b> -814.1kJ/mol	<b>B.</b> +814.1kJ		<b>D.</b> +634.9k.	J/mol	<b>C.</b> H <sub>2</sub> O <b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)	0 36	32	5			
	500°C is greater thar both temperatures a	the value of <i>K</i> at 700 re equal	→ 2CO+O <sub>2</sub> , which of the following	g is <b>true</b> ?	<b>D.</b> 02							
<b>40.</b> At which of the fo	olution to the NH₃ so	olution B	adding KCN solution to the HCN s	olution								
C. adding a small an	nount of HCI to NH <sub>3</sub> a	and NH <sub>4</sub> Cl solution D	. all of them									

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH Subject: Chemistry fingerprint **13.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific) 2<sup>nd</sup> Attempt Time: 3.30 hours Answer the following questions: ( two marks for each right choice ) 1. If 49J of energy are added to 35g of a material at 20°C , what will the final temperature of the material be?  $(C_p=0.07J/(g.K))$ **A.** 25°C **B.** 298K **C.** 40K **D.** 40°C **2.** In this reaction:  $CN^{-}(aq) + H_2O(l) \iff HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**? **A.** OH is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN ion is hydrolyzez **D.** none of them **3.** The......compounds contribute to the destruction of ozone in the upper atmosphere. B. CFCs A. C<sub>2</sub>F<sub>4</sub>C. MTBE D. PVA **4.** A chemical formula that shows the type of covalent bond in organic compound:-A. molecular formula **B.** empirical formula C. structural formula **D.** ionic formula **5.** When compared dimethyl ether and ethanol, which of the following is **correct**? **B.** both have the same boiling point A. both have the same a functional group **C.** both dissolved in water. **D.** all of them **6.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-**A.** 0.005 **B.** 0.05 **C.** 20 **D.** 200 **7.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\Delta H_f^0$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively **A.** -814.1kJ/mol **B.** +814.1kJ/mol **C.** -634.9kJ/mol **D.** +634.9kJ/mol 8. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). **A.** 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol **9.** Which theories of acids and bases belong to acids and bases conjugate? **D.** none of them **A.** Arrhenius **B.** Lewis C. Bronsted-Lowry **10.** Which of the following is **incorrect**? **A.** the reaction type of methane gas with chlorine gas is addition B. the alkynes don't have geometric formula **C.** the graphite is a good electrical conductor **D.** none of them **11.** A molecule that donates one electron pair to form a covalent bond is:- $\mathbf{C}$ .  $\mathsf{CH}_4$ **A.** BF<sub>3</sub> B. NH<sub>4</sub><sup>+</sup> D. NH<sub>3</sub>

**12.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-

**D.** 12

**C.** 8

if	$(K_f = -1.86^{\circ}C/m) (K_b =$	0.51°C/m)			
	102.04°C	<b>B.</b> 1.02°C	<b>C.</b> 101.02°C	<b>D.</b> 100	
14.	SN The net ionic equa	: 000003 tion for which of the	e following reaction is: H₃O⁺	(aq)+OH⁻(aq) <b>←</b>	<b>⇒</b> 2H <sub>2</sub> O( <i>l</i> )?
A.	Ba(OH) <sub>2</sub> (aq)+H <sub>2</sub> SO <sub>4</sub>	ı(aq) <b>→</b>	B. Sr(OH)₂(aq)+HCl(aq)-	<b>→</b>	
C.	Zn(s)+HCl(aq) →		<b>D.</b> both ( A and B )		
	Suppose that 20ml llowing is correct?	of 0.01M Ca(OH) <sub>2</sub>	is required to neutralize 10n	nL of HCl solution	on, which of the
A.	[HCI]=0.02M	<b>B.</b> [HCI]=0.04M	<b>C.</b> the spectator ions are	Ca <sup>2+</sup> and Cl <sup>-</sup>	<b>D.</b> both (B and C)
	Salts of weak acids $K_a = K_b$	and weak bases can <b>B.</b> $K_a > K_b$	n produce basic aqueous sol <b>C.</b> $K_b > K_a$	ution if:- <b>D.</b> [H <sub>3</sub> O <sup>+</sup> ]>	>[OH <sup>-</sup> ]
17.			us solutions of carboxylic aci  C. condensation	ds and amines a	-
A.	Increasing the percincrease octane ratincrease boiling poi	ting	d-chain alkanes in gasoline c <b>B.</b> decrease octane <b>D.</b> both (A and C)		
	The following reachif $T\Delta S$ value = 176k		$kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs $e > 176kJ$ <b>C.</b> if $T\Delta S$ value		/:- at all temperature
20.	Which of the follow	wing oxides when re	eacted with water forms acid	d solution?	
	CO <sub>2</sub>	<b>B.</b> CaO	<b>C.</b> SO <sub>3</sub>		( A and C )
21.	In the reaction th	at occurs by one d	lirection(forward), which o	of the followin	g doesn't effect on
	e rate of reaction?	•	, ,,		
A.	presence of cataly	yst	B. changing concer	itration of pro	duct
C.	changing temperat	ure	<b>D.</b> changing concentra	ation of reactan	it
22.	At equilibrium :-				
A.	all reaction have ce	ased	<b>B.</b> only the forward	I reaction conti	nues
C.	only the reverse rea	action continues	<b>D.</b> both the forwar	d and reverse r	eactions continue.
	An acid is used as a CH <sub>3</sub> COOH	a fungicide:- <b>B.</b> HCl	<b>C.</b> HNO₃	<b>D.</b> H <sub>3</sub> PO <sub>4</sub>	
	All of the following NaCN	salts effect on the <b>B.</b> KCl	H₃O <sup>+</sup> and OH <sup>-</sup> concentration <b>C.</b> KNO₂	when added to <b>D.</b> NH <sub>4</sub> Br	o water <b>except</b> :
A.	All of the following pentane and 2,2-di pentane and cyclop	methyl propane	e structural isomers to each <b>B.</b> hexene and o <b>D.</b> 1,1-dichloro	cyclohexane	-dichloro ethane
A.	adding NH <sub>4</sub> NO <sub>3</sub> sol	ution to the NH₃ sol	e pH do not change?  ution <b>B.</b> adding  nd NH <sub>4</sub> Cl solution <b>D.</b> all of		to the HCN solution

**A.** 6

**B.** 10

<b>27.</b> An ion t	that forms precipitate with sulf	ate ior		doesn't f	orm precipit <b>D.</b> Al <sup>3+</sup>	ate with sulfide ion :-	<b>41.</b> A molecular <b>A.</b> C <sub>2</sub> H <sub>5</sub> OH	compound w		ves in water and it	does <b>not ioniz</b>		
J	ollowing reaction: HNO2(aq)+H			₂⁻(aq)+H		conjugate acid of NO <sub>2</sub> - is:-	<b>42.</b> The entropy			<b>C.</b> 14114C1	<b>D.</b> 1		
<b>A.</b> H <sub>3</sub> O <sup>+</sup>	B. HNO <sub>2</sub>		C	. H <sub>2</sub> O		<b>D.</b> none of them	A. decreasing t	the pressure	<b>B.</b> increas	sing the temperati	ure <b>C.</b> mixin	g gases	<b>D.</b> all of them
<b>29.</b> The mo <b>A.</b> $C_4H_{10}O_2$	lecular formula for the ethyl et <b>B.</b> $C_4H_8O_2$	thanoa		npound i C <sub>4</sub> H <sub>10</sub> O		<b>D.</b> C <sub>4</sub> H <sub>8</sub> O	<b>43.</b> In the follow which of follow	_		→2NO <sub>2</sub> ,the reacti	on for the fast	step is: NC	O₃+NO→2NO <sub>2</sub> ,
<b>30.</b> The rate	e law for the following hypothe	etical r	eactior	n: A +B —	→C , is R= <i>k</i> [	A] <sup>2</sup> [B], by what factor does the	A. NO is interm	nediate	<b>B.</b> $NO_3$ is	intermediate	<b>C.</b> R= <i>k</i> [NO][	O <sub>2</sub> ]	<b>D.</b> both(B and C)
rate increa	se if the concentration of each	A and	B is tr	ipled?			<b>44.</b> Amount of 6	energy require	ed to raise t	he temperature o	f one gram of a	substance	e by one Celsius degree
<b>A.</b> 27	<b>B.</b> 16	(	<b>C.</b> 18		<b>D.</b> 8		(1°C) or one ke						
<b>31.</b> In the fo	ollowing gaseous equilibrium s	ystem:	2CO <sub>2</sub> +	+167kJ <b>∓</b>	<b>≥</b> 2CO+O <sub>2</sub> ,	which of the following is <b>true</b> ?				c. enthalpy			alpy of combustion
	e of K at 500°C is greater than			<i>K</i> at 700°	C			e following is	heated with	n sulfur atoms in v	_		
	e of K at both temperatures ar	•		70000			A. isoprene	<b>B.</b> neo	prene	<b>C.</b> poly isopr	ene	<b>D.</b> 2-me	ethyl-1,3 butadiene
<b>C.</b> the valu <b>D.</b> none of	e of K at 500°C is less than the	value	of K at	/00°C			<b>46.</b> The correct	name for this	compound	:( CH₃ )ac	cording to IUPA	•	
							-31						yclohexane
	rect order according the pOH v	alue fo		-							B. 1-ethyl-	•	
	H₃COOK>NH4NO₃ K>NaCl>NH4NO₃				<mark>NaCl&gt;CH₃CO</mark> CH₃COOK>N						C. 1-methy	•	cyclohexane
							47 Whan 50ml	of 0.114 m on		ĊH₂-CH₃		-	
<b>A.</b> 0.1M H(	h of the following situation the Cl at 25°C <b>B.</b> 0.1M HCl a				ith solution ( Cl at 50°C	<b>D.</b> 1M HCl at 25°C	the following s		-	ak acid titrated wi	th Sumt of U.1r	vi potassiu	ım hydroxide, which of
							A. KNO <sub>3</sub>	-	KF	<b>C.</b> NaF	[	<b>D.</b> both (B	and C)
<b>A.</b> 5M	h of the following concentration <b>B.</b> 1M	ns the	riyaro		cia consider 2. 0.001M	<b>D.</b> all of them		hot conner m	netal is dinne	ed in cool water t		-	as heat, the direction of
	al number of ions moles which	ara nr	oduco				·		• • • • • • • • • • • • • • • • • • • •	differences b	<b>.</b>		•
	fate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what	•		•		me an aqueous solution of	A. specific hea		. nature		erature	•	of them
<b>A.</b> 0.24	<b>B.</b> 0.12	15 1110	molan	11, 01 301	<b>C.</b> 0.36	<b>D.</b> 0.72	<b>49.</b> What colliga	ative propertion	es are displa	ayed when antifre	eze is added to	a car's co	oling system?
<b>36</b> . By using	g the information in the adjace	nt tahl	le whi	ch of the	following is		A. vapor-press		•	<b>B.</b> boiling point			0 ,
<b>A.</b> MnO <sub>2</sub>			<u> </u>			cutaryst.	C. freezing-poi	nt depression		<b>D.</b> both (B and	C )		
<b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H <sub>2</sub> O	O <sub>2</sub> M	nO <sub>2</sub>		<b>50.</b> Which of th	e following is	correct at a	II temperature in	pure water?		
<b>C.</b> H <sub>2</sub> O	mass at the start of the reaction (g)	68	0		5		<b>A.</b> $K_w = [H_3O^+][O$	)H-]		<b>B.</b> [H <sub>3</sub> O <sup>+</sup>	][OH <sup>-</sup> ]=1x10 <sup>-14</sup>		
<b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)	0	36	32	5		<b>C.</b> [H <sub>3</sub> O <sup>+</sup> ]= [OH <sup>1</sup>	]=1x10 <sup>-7</sup> M		<b>D.</b> all o	f them.		
<b>37.</b> By decr	easing pressure on the following	ng equ	ilibriun	n system	: N <sub>2</sub> (g)+ O <sub>2</sub> (g	g) <b>←</b> 2NO(g)							
_	ntity of N₂ decreases	1				O decreases							
<b>C.</b> the quar	ntity of NO increases			<b>D.</b> the o	quantities do	not change							
	ixing Ca <sup>2+</sup> ions with concentrat												
	ne following is <b>correct</b> ? If the se												
A. ionic pro	,	,			roduct=K <sub>sp</sub>	<b>D.</b> precipitate isn't form							
•	H of sea water at 25°C is equal				_								
<b>A.</b> [OH <sup>-</sup> ]=2.				-	H <sup>-</sup> ]=5.0x10 <sup>-9</sup>								
	ng to IUPAC system the compo	ound:(0			-								
A. 1-butan	ol <b>B.</b> propanal		C	<b>C.</b> butano	ne	<b>D.</b> butanal							

**Subject: Chemistry** KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH fingerprint MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific) 2<sup>nd</sup> Attempt Time: 3.30 hours Answer the following questions: (two marks for each right choice) 1. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-**A.** Mg<sup>2+</sup> **B.** Ca<sup>2+</sup> **C.** Pb<sup>2+</sup> **D.**Al<sup>3+</sup> **2.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-**B.** 10 **C.** 8 **D.** 12 **3.** The molecular formula for the ethyl ethanoate compound is :-**A.** C<sub>4</sub>H<sub>10</sub>O<sub>2</sub> **B.** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub> **C.**  $C_4H_{10}O$  $D. C_4H_8O$ **4.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**? **A.** OH is conjugate base **B.**  $H_2O$  is amphoteric **C.** CN ion is hydrolyzez **D.** none of them **5.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, whi of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L **A.** ionic product> $K_{sp}$ **B.** ionic product  $< K_{Sp}$ **C.** ionic product= $K_{sp}$ **D.** precipitate isn't form **6.** The rate law for the following hypothetical reaction: A+B  $\longrightarrow$  C, is R=k[A]<sup>2</sup>[B], by what factor does the rate increase if the concentration of each A and B is tripled? **A.** 27 **B.** 16 **C.** 18 **D.** 8 7. According to IUPAC system the compound: (CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-A. 1-butanol **B.** propanal **C.** butanone D. butana **8.** The correct order according the pOH value for the following solution is:-A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub> B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub> D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl **9.** Which of the following is heated with sulfur atoms in vulcanization process? D. 2-methyl-1,3 butadiene **A.** isoprene **C.** poly isoprene **B.** neoprene **10.** Which theories of acids and bases belong to acids and bases conjugate? **A.** Arrhenius **B.** Lewis C. Bronsted-Lowry **D.** none of them 11. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction energy transfer is determined by the.....differences between the objects within system. **A.** specific heat **B.** nature **C.** temperature **D.** all of them **12.** What colligative properties are displayed when antifreeze is added to a car's cooling system? A. vapor-pressure elevation **B.** boiling point elevation C. freezing-point depression D. both (B and C) **13.** A molecular compound which dissolves in water and it does **not ionize**:-A. C<sub>2</sub>H<sub>5</sub>OH C. NH<sub>4</sub>Cl D. HF **B.** C<sub>6</sub>H<sub>6</sub> **14.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub> (aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub> is:-

**C.** H<sub>2</sub>O

**D.** none of them

: \	<b>15.</b> Which of the following is <b>correct</b> at all temperature in pure water?
	<b>A.</b> $K_W = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-14}$
	<b>C.</b> $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ <b>D.</b> all of them.
IJ	SN: 000004  16. Thecompounds contribute to the destruction of ozone in the upper atmosphere.
	<b>A.</b> C <sub>2</sub> F <sub>4</sub> <b>B.</b> CFCs <b>C.</b> MTBE <b>D.</b> PVA
	17. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy
	change for reverse reaction equals -35kJ/mol , the value of E <sub>a</sub> is:-(place the reactants at energy level zero).  A. 65kJ/mol  B65kJ/mol  C. 35kJ/mol  D. 135kJ/mol
	<ul> <li>18. A chemical formula that shows the type of covalent bond in organic compound:-</li> <li>A. molecular formula B. empirical formula C. structural formula D. ionic formula</li> </ul>
	19. A molecule that donates one electron pair to form a covalent bond is:-
	<b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub>
ich	<b>20.</b> In the following reaction: $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is: $NO_3+NO \longrightarrow 2NO_2$ , which of following is <b>correct</b> ?
	<b>A.</b> NO is intermediate <b>B.</b> NO <sub>3</sub> is intermediate <b>C.</b> $R=k[NO][O_2]$ <b>D.</b> both(B and C)
1	21. Which of the following is incorrect?
9	A. the reaction type of methane gas with chlorine gas is addition
	B. the alkynes don't have geometric formula
	C. the graphite is a good electrical conductor
	<b>D.</b> none of them
	<b>22.</b> All of the following salts effect on the H <sub>3</sub> O <sup>+</sup> and OH <sup>-</sup> concentration when added to water <b>except</b> : <b>A.</b> NaCN <b>B.</b> KCl <b>C.</b> KNO <sub>2</sub> <b>D.</b> NH <sub>4</sub> Br
	<b>23.</b> In the following reaction: $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the $\Delta H^0_f$ value for CaO? If the $\Delta H^0_f$ value for each of $CO_2$ and $CaCO_3$ equal to ( -393.5, -1207.6) kJ/mol respectively <b>A.</b> -814.1kJ/mol <b>B.</b> +814.1kJ/mol <b>C.</b> -634.9kJ/mol <b>D.</b> +634.9kJ/mol
ı of	<ul> <li>24. In the following gaseous equilibrium system: 2CO₂+167kJ → 2CO+O₂, which of the following is true?</li> <li>A. the value of K at 500°C is greater than the value of K at 700°C</li> <li>B. the value of K at both temperatures are equal</li> <li>C. the value of K at 500°C is less than the value of K at 700°C</li> <li>D. none of them</li> </ul>
	25. Increasing the percentage of branched-chain alkanes in gasoline causes to:-
	A. increase octane rating  B. decrease octane rating
	C. increase boiling point D. both (A and C)
	<b>26.</b> If the pH of sea water at 25°C is equal to 8.3, which of the following is <b>correct</b> ? <b>A.</b> [OH <sup>-</sup> ]=2.0x10 <sup>-6</sup> M <b>B.</b> the sea water is basic <b>C.</b> [OH <sup>-</sup> ]=5.0x10 <sup>-9</sup> M <b>D.</b> both (A and B)
	<b>27.</b> At which of the following situation the pH do not change?
	A. adding NH <sub>4</sub> NO <sub>3</sub> solution to the NH <sub>3</sub> solution  B. adding KCN solution to the HCN solution  C. adding a small amount of HCl to NH <sub>3</sub> and NH <sub>4</sub> Cl solution  D. all of them

B. HNO<sub>2</sub>

**A.** H<sub>3</sub>O<sup>+</sup>

<b>8.</b> If 49J of energy are added to 35g of a ma				weak acids ar	nd weak bases ca	•		queous		J. O+1∕[O⊔-1	
be? $(C_p=0.07J/(g.K))$ <b>A.</b> 25°C <b>9.</b> The net ionic equation for which of the form		40K <b>D.</b> 40°C OH⁻(aq) ← 2H <sub>2</sub> O( <i>l</i> )?	<b>A.</b> <i>K</i> <sub>a</sub> = <i>K</i> <sub>b</sub> <b>42.</b> Suppose	that 20mL o	<b>B.</b> $K_a > K_b$ f 0.01M Ca(OH) <sub>2</sub>		$K_b > K_a$ If to ne	utralize 1	_	H₃O⁺]>[OH⁻] solution, wh	
<b>A.</b> Ba(OH) <sub>2</sub> (aq)+H <sub>2</sub> SO <sub>4</sub> (aq) →	B. Sr(OH)₂(aq)+HCl(aq)→		following is	correct?							
<b>C.</b> Zn(s)+HCl(aq) →	<b>D.</b> both ( A and B )		<b>A.</b> [HCl]=0.0	02M <b>B.</b>	[HCI]=0.04M	C. the	pectat	or ions a	re Ca <sup>2+</sup> and C	l- <b>D.</b> l	both (B and C)
<b>0.</b> The correct name for this compound: (	CH₃ ) according to IUPAC <b>A.</b> 1-ethyl-4-r	system is: nethyl cyclohexane	<b>43.</b> The read <b>A.</b> substitut		urs when aqueou <b>B.</b> addition	us solutior		rboxylic ndensati		ines are mi <b>D.</b> elimina	
	\ /	methyl benzene 4-ethyl benzene	<b>44.</b> Which o <b>A.</b> CO <sub>2</sub>		ng oxides when re <b>B.</b> CaO		h wate C. SO₃	r forms a		e both ( A and	dC)
	CH <sub>2</sub> -CH <sub>3</sub> <b>D.</b> 1-methyl-	4- ethyl cyclohexane	<b>45.</b> The follo	owing reactio	n: NH <sub>4</sub> Cl(s) +176	$kJ \longrightarrow NH_{i}$	(g)+HC	l(g), occ	urs spontane	eously:-	
<b>1.</b> Amount of energy required to raise the t	emperature of one gram of a s	ubstance by one Celsius degree			<b>B.</b> if TΔS value						temperature
(1°C) or one kelvin (1K) is:-			<b>46</b> . In the re	eaction that	occurs by one o	direction(	orwar	d) whic	h of the foll	owing doe	sn't effect on
A. specific heat B. enthalpy of reaction	C. enthalpy of formation	<b>D.</b> enthalpy of combustion	the rate of		occurs by one o		Oi Wai	aj, wiiic	in or the ron	ownig doc	on ceneer on
<b>2.</b> The boiling point of an aqueous solution if $(K_f = -1.86^{\circ}\text{C/m})$ $(K_b = 0.51^{\circ}\text{C/m})$	containing a nonelectrolyte that	at freezes at -3.72°C, is:	A. presenc	e of catalyst			_	_	centration on tration of re	•	
<b>A.</b> 102.04°C <b>B.</b> 1.02°C	<b>C.</b> 101.02°C	<b>D.</b> 100.51°C				<b>5.</b> 0	i iui igii i	6 concer	ici acioni or re	actant	
<b>3.</b> By decreasing pressure on the following	equilibrium system: N <sub>2</sub> (g)+ O <sub>2</sub> (g	g) ← 2NO(g)	47. The entr	ng the pressu	•	ing the ten	nerati	ıre C	. mixing gase	s <b>D</b> all c	of them
A. the quantity of N <sub>2</sub> decreases	<b>B.</b> the quantity of N	O decreases					•				
C. the quantity of NO increases	<b>D.</b> the quantities do	not change	<b>A.</b> 0.1M HC		ving situation the <b>B.</b> 0.1M HCl a			nc with s M HCl a		on is faster? <b>D.</b> 1M HCl	
<b>4.</b> At which of the following concentrations	the hydrochloric acid consider	ed a strong electrolyte?									at 25 C
<b>A.</b> 5M <b>B.</b> 1M	<b>C.</b> 0.001M	D. all of them		the informat	tion in the adjace	ent table, v	hich o	t the foll	owing is cata	llyst?	
<b>5.</b> When compared dimethyl ether and eth	anol, which of the following is o	correct?	<b>A.</b> MnO <sub>2</sub> <b>B.</b> H <sub>2</sub> O <sub>2</sub>	Sul	bstance	H <sub>2</sub> O <sub>2</sub> H <sub>2</sub>	O O2	MnO <sub>2</sub>			
A. both have the same a functional group	<b>B.</b> both have the	same boiling point	<b>C.</b> H <sub>2</sub> O	mass at the sta	rt of the reaction (g)	68	0	5			
C. both dissolved in water.	<b>D.</b> all of them		<b>D.</b> O <sub>2</sub>	mass at the en	d of the reaction (g)	0 3	6 32	5			
6. At equilibrium :-  A. all reaction have ceased	B. only the forward read	tion continues	1		ous equilibrium r (0.084, 0.035, 0.						each of PCl <sub>5</sub> ,PCl <sub>3</sub> um constant is:-
<b>C.</b> only the reverse reaction continues		reverse reactions continue.	<b>A.</b> 0.005		<b>B.</b> 0.05		C.	20	D. 2	200	
<b>7.</b> When 50mL of 0.1M monoprotic weak a the following salts may be formed?	1 - 65										
<b>A.</b> KNO <sub>3</sub> <b>B.</b> KF	C. NaF D.	both (B and C)									
<b>8.</b> The total number of ions moles which ar sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is	the molarity of solution?	·									
<b>A.</b> 0.24 <b>B.</b> 0.12	<b>C.</b> 0.36	<b>D.</b> 0.72									
<b>9.</b> An acid is used as a fungicide:-											
A. CH₃COOH B. HCI	C. HNO <sub>3</sub>	<b>D.</b> H <sub>3</sub> PO <sub>4</sub>									
<b>0.</b> All of the following pair compounds are s	structural isomers to each ethe	r <b>except</b> :-									
A. pentane and 2,2-dimethyl propane	<b>B.</b> hexene and cycloh										
C. pentane and cyclopentane	<b>D.</b> 1,1-dichloro ethan	e and 1,2-dichloro ethane									

Subject: Chemistry MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific)



2<sup>nd</sup> Attempt Time: 3.30 hours

**D.** 8

D. PVA





D. both (B and C)

## Answer the following questions: (two marks for each right choice)

<b>1.</b> The reaction that o	occurs when aqueous so	plutions of carboxylic acids and	l amines are mixed is called:-
A. substitution	<b>B.</b> addition	C. condensation	<b>D.</b> elimination

**2.** The molecular formula for the ethyl ethanoate compound is :-

- **A.** C<sub>4</sub>H<sub>10</sub>O<sub>2</sub> **B.** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub> **C.**  $C_4H_{10}O$ **D.** C<sub>4</sub>H<sub>8</sub>O
- **3.** The rate law for the following hypothetical reaction:  $A+B \longrightarrow C$ , is  $R=k[A]^2[B]$ , by what factor does the rate increase if the concentration of each A and B is tripled?
- **A.** 27 **B.** 16 **C.** 18

**B.** CFCs

- **4.** A chemical formula that shows the type of covalent bond in organic compound:-
- A. molecular formula **B.** empirical formula C. structural formula **D.** ionic formula

C. MTBE

C. the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>

- **5.** The.....compounds contribute to the destruction of ozone in the upper atmosphere.
- **6.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the
- **B.** [HCl]=0.04M 7. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-
- **A.** Mg<sup>2+</sup> **B.** Ca<sup>2+</sup> **C.** Pb<sup>2+</sup> **D.**Al<sup>3+</sup>
- **8.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
- **A.** the quantity of N<sub>2</sub> decreases **B.** the quantity of NO decreases
- **C.** the quantity of NO increases **D.** the quantities do not change
- **9.** At which of the following situation the reaction solid zinc with solution of HCl is faster?
- **A.** 0.1M HCl at 25°C **B.** 0.1M HCl at 50°C C. 1M HCl at 50°C D. 1M HCl at 25°C
- **10.** When compared dimethyl ether and ethanol, which of the following is correct?
- **A.** both have the same a functional group **B.** both have the same boiling point
- **C.** both dissolved in water. **D.** all of them
- 11. Which theories of acids and bases belong to acids and bases conjugate?
- **A.** Arrhenius **B.** Lewis **C.** Bronsted-Lowry
- 12. Salts of weak acids and weak bases can produce basic aqueous solution if:-
- **A.**  $K_a = K_b$ **B.**  $K_a > K_b$ C.  $K_b > K_a$ **D.**  $[H_3O^+] > [OH^-]$
- **13.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\Delta H^0_f$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively
- **A.** -814.1kJ/mol
- **B.** +814.1kJ/mol
- **C.** -634.9kJ/mol
- **D.** +634.9kJ/mol

**D.** none of them

- **14.** At which of the following situation the pH do not change?
- A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution
- **B.** adding KCN solution to the HCN solution
- C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution D. all of them
- SN: 000005 15. The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-
- **A.** if  $T\Delta S$  value = 176kJ **B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ **D.** at all temperature
- **16.** All of the following pair compounds are structural isomers to each ether **except**:-
- A. pentane and 2,2-dimethyl propane
  - **B.** hexene and cyclohexane

**C.** pentane and cyclopentane

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane

D. NH<sub>3</sub>

- 17. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material be?  $(C_p=0.07J/(g.K))$ **A.** 25°C **B.** 298K **C.** 40K
- 18. In the following gaseous equilibrium reaction:  $PCl_5 \leftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-**A.** 0.005 **C.** 20 **B.** 0.05 **D.** 200
- **19.** A molecule that donates one electron pair to form a covalent bond is:-
- A. BF<sub>3</sub> B. NH<sub>4</sub><sup>+</sup> **C.** CH₄
- **20.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?
- **A.** 5M **D.** all of them **B.** 1M **C.** 0.001M
- **21.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?
- **A.**  $[OH^{-}]=2.0x10^{-6}M$ **B.** the sea water is basic
- **C.**  $[OH^{-}]=5.0\times10^{-9}M$ D. both (A and B)
- **22.** What colligative properties are displayed when antifreeze is added to a car's cooling system?
- **A.** vapor-pressure elevation
- **B.** boiling point elevation
- **C.** freezing-point depression
- **D.** both (B and C)
- 23. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-
- **A.** specific heat **B.** enthalpy of reaction **C.** enthalpy of formation **D.** enthalpy of combustion

- **24.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L
- **A.** ionic product> $K_{sp}$
- **B.** ionic product $< K_{sp}$
- **C.** ionic product= $K_{SD}$
- **D.** precipitate isn't form

- **25.** The correct name for this compound: (
- CH<sub>3</sub> ) according to IUPAC system is: **A.** 1-ethyl-4-methyl cyclohexane
  - B. 1-ethyl-4-methyl benzene
  - **C.** 1-methyl-4-ethyl benzene
  - **D.** 1-methyl-4- ethyl cyclohexane
- **26.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?
- **A.** presence of catalyst

**B.** changing concentration of product

**C.** changing temperature

**D.** changing concentration of reactant

A. C<sub>2</sub>F<sub>4</sub>

following is **correct**?

**A.** [HCl]=0.02M

<b>?7.</b> The boiling	g point of an aqueous soluti	on containi	ng a r	nonelect	rolyte that freezes at -3.72°C, is:	<b>40.</b> Which of the fo	ollowing ox	xides when reacted w	vith water forms acid so	olution?	
if ( $K_f$ = -1.86°C	$/m$ ) ( $K_b$ = 0.51°C $/m$ )					A. CO <sub>2</sub>	<b>B.</b> Ca	aO	<b>C.</b> SO <sub>3</sub>	D. both	( A and C )
<b>A.</b> 102.04°C	<b>B.</b> 1.02°C	(	<b>C.</b> 101	02°C	<b>D.</b> 100.51°C	<b>41.</b> Which of the fo	ollowing is	heated with sulfur at	toms in vulcanization p	rocess?	
<b>28.</b> A molecula	ar compound which dissolve	es in water	and it	does <b>n</b> o	ot ionize:-	A. isoprene	<b>B.</b> neo	pprene C. p	ooly isoprene	<b>D.</b> 2-met	hyl-1,3 butadiene
<b>A.</b> $C_2H_5OH$	<b>B.</b> $C_6H_6$	C. NH <sub>4</sub> Cl			D. HF	<b>42.</b> In the following	g gaseous e	equilibrium system: 2	2CO₂+167kJ <b>←</b> 2CO+0	$D_2$ , which of	the following is <b>true</b> ?
change for relevel zero).  10. In the follo	A. 65kJ/mol owing reaction: 2NO+O <sub>2</sub>	5kJ/mol , th <b>B.</b> -65kJ/	ne va ′mol	lue of E	uals 100kJ/mol and the enthalpy  a⁻ is:-(place the reactants at energy  C. 35kJ/mol  be fast step is: NO₃+NO→2NO₂,	B. the value of K a C. the value of K a D. none of them	it both tem	greater than the value of the properties of the		sos to:	
	wing is <b>correct</b> ?			<b>2</b> D	//Notice 1	A. increase octane		e of brancheu-chain a	<b>B.</b> decrease octane ra		
A. NO is inter	· ·	ntermediate			$=k[NO][O_2]$ <b>D.</b> both(B and C)	C. increase boiling			<b>D.</b> both (A and C)	tilig	
	ne information in the adjace	ent table, w	hich c	of the fol	llowing is catalyst?			HNO*(3a)+H*O()	NO <sub>2</sub> (aq)+H <sub>3</sub> O⁺(aq), t	he conjugate	a acid of NO. is:
A. MnO <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub> H <sub>2</sub> O	o o	MnO <sub>2</sub>	2	<b>A.</b> H <sub>3</sub> O <sup>+</sup>		<b>B.</b> HNO₂	<b>C.</b> H <sub>2</sub> O		none of them
<b>B.</b> H <sub>2</sub> O <sub>2</sub> r	nass at the start of the reaction (g)	68 0	0	5					rature in pure water?	2	
	mass at the end of the reaction (g)	0 36	32	5		<b>A.</b> $K_w = [H_3O^+][OH^-]$		correct at an temper	<b>B.</b> $[H_3O^+][OH^-]=1\times10^{-14}$	4	
<b>2</b> . The numb	er of hydrogen atoms in the	1 1-dimeth	nyl cy	clopropa	ene compound is equal to:-	<b>C.</b> [H <sub>3</sub> O <sup>+</sup> ]= [OH <sup>-</sup> ]=1			<b>D.</b> all of them.		
<b>A.</b> 6		<b>C.</b> 8	.,,		12	<b>46.</b> At equilibrium	:-				
3. The entro	by increases by:-					A. all reaction hav			<b>B.</b> only the forward re	eaction conti	inues
•	•	ing the tem	perat	ure <b>C</b>	C. mixing gases D. all of them	C. only the reverse	e reaction (	continues	<b>D.</b> both the forward a	and reverse r	eactions continue.
					of 0.1M potassium hydroxide, which of			•	the following solution		
the following	salts may be formed?					A. NaCl>CH₃COOK			B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub>		
A. KNO <sub>3</sub>	<b>B.</b> KF	<b>C.</b> N	NaF		<b>D.</b> both (B and C)	C. CH₃COOK>NaCl			<b>D.</b> NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK		
	number of ions moles which e (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what	-	•		ation 500mL an aqueous solution of on?	<b>48.</b> In this reaction <b>A.</b> OH <sup>-</sup> is conjugate		• • • • • • • • • • • • • • • • • • • •	OH <sup>-</sup> (aq) ,which of the <b>C.</b> CN <sup>-</sup> ion is hydro	_	incorrect? none of them
<b>A.</b> 0.24	<b>B.</b> 0.12			C.	0.36 <b>D.</b> 0.72	<b>49.</b> According to IU	JPAC syste	m the compound:(CF	H <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -COH), is cal	led:-	
<b>6.</b> An acid is	used as a fungicide:-				/ / / /	A. 1-butanol	В.	. propanal	C. butanone	<b>D.</b> k	outanal
<b>A.</b> CH₃COOH	<b>B.</b> HCl	С. Н	NO <sub>3</sub>		<b>D.</b> H <sub>3</sub> PO <sub>4</sub>	<b>50.</b> All of the follow	νing salts ε	effect on the H₃O⁺ an	d OH <sup>-</sup> concentration w	hen added to	o water <b>except</b> :
•	er is determined by the	differe	nces		gy is transferred as heat, the direction on the objects within system. <b>D.</b> all of them	A. NaCN		B. KCI	C. KNO <sub>2</sub>	<b>D.</b> NH <sub>4</sub> Br	
88. Which of	the following is <b>incorrect</b> ?										
<b>A.</b> the reaction <b>B.</b> the alkynes	n type of methane gas with don't have geometric form e is a good electrical condu	nula	as is a	ddition							
<b>9.</b> The net ion	nic equation for which of th	e following	react	ion is: H	$_3O^+(aq)+OH^-(aq) \longrightarrow 2H_2O(l)$ ?						
<b>A.</b> Ba(OH) <sub>2</sub> (ac	ı)+H₂SO₄(aq) →	<b>B.</b> Sr(C	)H)₂(a	q)+HCl(a	aq)						
<b>C.</b> Zn(s)+HCl(a	nq)	<b>D.</b> both	h ( A a	and B )							

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH Subject: Chemistry fingerprint MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION F **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific) 2<sup>nd</sup> Attempt Time: 3.30 hours Answer the following questions: ( two marks for each right choice ) **1.** The molecular formula for the ethyl ethanoate compound is :-**A.**  $C_4H_{10}O_2$ **B.** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub> C. C<sub>4</sub>H<sub>10</sub>O **D.** C<sub>4</sub>H<sub>8</sub>O **2.** Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-**A.** specific heat **B.** enthalpy of reaction **C.** enthalpy of formation **D.** enthalpy of combustion **3.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ? **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ **A.** Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$ C.  $Zn(s)+HCl(aq) \longrightarrow$ **D.** both (A and B) 4. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system. **A.** specific heat **B.** nature **C.** temperature **D.** all of them **5.** The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-**A.** substitution **B.** addition **C.** condensation **D.** elimination **6.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-**D.** butanal A. 1-butanol **B.** propanal **C.** butanone 7. Which of the following oxides when reacted with water forms acid solution? A. CO<sub>2</sub>B. CaO **C.** SO<sub>3</sub> D. both (A and C) 8. The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72 $^{\circ}$ C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ **A.** 102.04°C **C.** 101.02°C D. 100.51°C **B.** 1.02°C CH<sub>3</sub> ) according to IUPAC system is: **9.** The correct name for this compound: ( A. 1-ethyl-4-methyl cyclohexane B. 1-ethyl-4-methyl benzene C. 1-methyl-4-ethyl benzene **D.** 1-methyl-4- ethyl cyclohexane **10.** After mixing Ca<sup>2+</sup> ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M,

**12.** By using the information in the adjacent table, which of the following is catalyst? A. MnO<sub>2</sub> Substance  $H_2O_2$ H<sub>2</sub>O O<sub>2</sub> MnO<sub>2</sub> **B.** H<sub>2</sub>O<sub>2</sub> 5 68 0 0 mass at **greatent of the** eaction (g) **C.** H<sub>2</sub>O 32 mass at the end of the reaction (g) 36 **D.**  $O_2$ **13.** Which of the following is heated with sulfur atoms in vulcanization process? **A.** isoprene **B.** neoprene **C.** poly isoprene **D.** 2-methyl-1,3 butadiene **14.** In the following gaseous equilibrium reaction:  $PCl_5 \leftarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-**A.** 0.005 **B.** 0.05 **C.** 20 **D.** 200 15. The total number of ions moles which are produced by dissociation 500mL an agueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution? **A.** 0.24 **B.** 0.12 **C.** 0.36 **D.** 0.72 **16.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-**B.** 10 **C.** 8 **D.** 12 **A.** 6 **17.** At which of the following situation the reaction solid zinc with solution of HCl is faster? **A.** 0.1M HCl at 25°C **B.** 0.1M HCl at 50°C C. 1M HCl at 50°C **D.** 1M HCl at 25°C **18.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-A. increase octane rating **B.** decrease octane rating **C.** increase boiling point **D.** both (A and C) **19.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**? **A.** the value of *K* at 500°C is greater than the value of *K* at 700°C **B.** the value of K at both temperatures are equal **C.** the value of K at  $500^{\circ}$ C is less than the value of K at  $700^{\circ}$ C **D.** none of them **20.** In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ , which of following is **correct**? D. both(B and C) **A.** NO is intermediate **B.** NO<sub>3</sub> is intermediate **C.**  $R = k[NO][O_2]$ 21. A molecular compound which dissolves in water and it does not ionize:-A. C<sub>2</sub>H<sub>5</sub>OH **B.**  $C_6H_6$ C. NH<sub>4</sub>Cl **22.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**? **A.**  $[OH^{-}]=2.0\times10^{-6}M$ **B.** the sea water is basic **C.**  $[OH^{-}]=5.0x10^{-9}M$ **D.** both (A and B) 23. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material be?  $(C_p=0.07J/(g.K))$ **B.** 298K **D.** 40°C **A.** 25°C **C.** 40K **24.** The entropy increases by:-**A.** decreasing the pressure **B.** increasing the temperature **C.** mixing gases **D.** all of them **25.** Which of the following is **correct** at all temperature in pure water?

**11.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

**C.** the graphite is a good electrical conductor

**D.** none of them

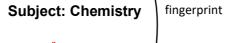
**A.**  $K_W = [H_3O^+][OH^-]$  **C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

ature in pure water? **B.**  $[H_3O^+][OH^-]=1x10^{-14}$  **D.** all of them.

<b>6.</b> A molecule that donates one e <b>A.</b> BF <sub>3</sub> <b>B.</b> $NH_4^+$	lectron pair to form a covale	nt bond is:- <b>D.</b> NH <sub>3</sub>		<b>41.</b> Thecompo	ounds contribute to th <b>B.</b> CFCs	e destruction of ozon <b>C.</b> MTBE	e in the upper at <b>D.</b> PVA	mosphere.
_	$LS$ value > 176kJ C. if $T\Delta S$	•	- t all temperature	<b>42.</b> All of the following <b>A.</b> pentane and 2,2-d <b>C.</b> pentane and cyclo	imethyl propane	<b>B.</b> hexene a	and cyclohexane	ot:- L,2-dichloro ethane
8. An acid is used as a fungicide:- A. CH₃COOH B. HCl	C. HNO <sub>3</sub>	<b>D.</b> H <sub>3</sub> PO <sub>4</sub>		<b>43.</b> Salts of weak acid	s and weak bases can	produce basic aqueou	ıs solution if:-	
<b>9.</b> The correct order according th <b>A.</b> NaCl>CH $_3$ COOK>NH $_4$ NO $_3$ <b>C.</b> CH $_3$ COOK>NaCl>NH $_4$ NO $_3$	<b>B.</b> NH <sub>4</sub> NO <sub>3</sub> >	g solution is:- NaCl>CH₃COOK CH₃COOK>NaCl			lution to the NH₃ solut	tion <b>B.</b> a	dding KCN solutio	D <sup>+</sup> ]>[OH <sup>-</sup> ] on to the HCN solution
<ul> <li>An ion that forms precipitate value</li> <li>A. Mg<sup>2+</sup></li> <li>B. Ca<sup>2+</sup></li> <li>What colligative properties are</li> </ul>	<b>C.</b> Pb <sup>2+</sup>	<b>D.</b> Al <sup>3+</sup>		<b>45.</b> Suppose that 20m following is <b>correct</b> ?		required to neutralize	e 10mL of HCl sol	
<b>A.</b> vapor-pressure elevation <b>C.</b> freezing-point depression	<b>B.</b> boiling point eleve. <b>D.</b> both (B and C)	vation		<b>46.</b> Which theories of			conjugate?	D. both (B and C)
<ul><li>2. By decreasing pressure on the</li><li>A. the quantity of N<sub>2</sub> decreases</li><li>C. the quantity of NO increases</li></ul>	<b>B.</b> the o	n: $N_2(g) + O_2(g) \iff 2NO$ quantity of NO decrease quantities do not chang	es	<ul><li>A. Arrhenius</li><li>47. When 50mL of 0.1 the following salts many</li></ul>	•	C. Bronsted-Lower acid titrated with 50m	•	<b>D.</b> none of them ium hydroxide, which of
3. In this reaction: CN <sup>-</sup> (aq)+ H <sub>2</sub> O(a A. OH <sup>-</sup> is conjugate base B. H <sub>2</sub> (			ncorrect? one of them	<b>A.</b> KNO <sub>3</sub> <b>48.</b> A chemical formula <b>A.</b> molecular formula			<b>D.</b> both (Interpretation of the property of t	•
<b>4.</b> At equilibrium :- <b>A.</b> all reaction have ceased <b>C.</b> only the reverse reaction conti	•	forward reaction conting forward and reverse re		<b>49.</b> In the reaction the the rate of reaction	•	ection(forward), wh	ich of the follow	ving doesn't effect on
<b>5.</b> In a reaction, the value of the change for reverse reaction equ		•		A. presence of catal C. changing temperate	•	B. changing co D. changing conc	ncentration of pentration of reac	
level zero).  A. 65kJ/m  6. All of the following salts effect	•	<b>C.</b> 35kJ/mol tration when added to	<b>D.</b> 135kJ/mol water <b>except</b> :		each of CO <sub>2</sub> and CaO	CO₃ equal to ( -393.5	, -1207.6) kJ/mo	the $\Delta H_f^0$ value for CaO? I respectively
<b>A.</b> NaCN <b>B.</b> KC <b>7.</b> The rate law for the following	_	<b>D.</b> NH <sub>4</sub> Br	what factor door the	<b>A.</b> -814.1kJ/mol	<b>B.</b> +814.1kJ/m	ol <b>C.</b> -634	.9kJ/mol	<b>D.</b> +634.9kJ/mol
rate increase if the concentration <b>A.</b> 27 <b>B.</b> 16		D. 8	what factor does the					
<b>8.</b> In the following reaction: HNO <b>A.</b> $H_3O^+$ <b>B.</b> HN			acid of $NO_2^-$ is:-					
<ol> <li>When compared dimethyl ether</li> <li>both have the same a function</li> <li>both dissolved in water.</li> </ol>	al group B. bo	following is <b>correct?</b> oth have the same boili Il of them	ng point					
<b>0.</b> At which of the following conc <b>A.</b> 5M <b>B.</b> 18	•	acid considered a strong C. 0.001M	g electrolyte?  D. all of them					

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General Examinations for Preparatory Stage

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane





	is for Preparatory Stage 25) (Grade twelve scien	المعتمى هدريس كورات	tempt Time:3	.30 hours
Answer the fol	lowing questions: ( two	marks for each right cl	noice )	
	•	tion: $PCl_5 \longrightarrow PCl_3 + Cl_2$ , t ) respectively in 5L vess <b>C.</b> 20		equilibrium constant is
<ol> <li>In the following ga</li> <li>A. the value of K at</li> <li>B. the value of K at</li> </ol>		em: $2CO_2 + 167kJ \longrightarrow 2CO_2 + 167kJ$ ie value of $K$ at $700^{\circ}C$ equal		
<b>3.</b> The boiling point of if $(K_f = -1.86^{\circ}\text{C}/m)$ ( <i>K</i> <b>A.</b> 102.04°C	-	containing a nonelectrol  C. 101.02°C		at -3.72°C, is:
<b>4.</b> All of the following <b>A.</b> NaCN	g salts effect on the H₃C <b>B.</b> KCl	$O^+$ and $OH^-$ concentration <b>C.</b> KNO <sub>2</sub>	n when added to <b>D.</b> NH <sub>4</sub> Br	o water <b>except</b> :
following is <b>correct A.</b> [HCl]=0.02M <b>6.</b> In this reaction: Cl	? <b>B.</b> [HCl]=0.04M N <sup>-</sup> (aq)+ H <sub>2</sub> O( <i>l</i> ) ←→ HCN(	<b>C.</b> the spectator ions a aq)+ OH <sup>-</sup> (aq) , which of t	re Ca <sup>2+</sup> and Cl <sup>-</sup> the following is	D. both (B and C) incorrect?
_	wing is <b>correct</b> at all ter	oteric C. CN <sup>-</sup> ion is hoperature in pure water B. [H <sub>3</sub> O <sup>+</sup> ][OH <sup>-</sup> ]=1x D. all of them.	?	none of them
<b>A.</b> Arrhenius	<b>B.</b> Lewis	to acids and bases conjugate C. Bronsted-Lowry		<b>D.</b> none of them
<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH	<b>B.</b> C <sub>6</sub> H <sub>6</sub>	water and it does <b>not i</b> C. NH <sub>4</sub> Cl	D. HF	
<b>10.</b> A molecule that <b>A.</b> BF <sub>3</sub>	donates one electron pa <b>B.</b> NH4 <sup>+</sup>	air to form a covalent bo	ond is:- <b>D.</b> NH₃	
<b>11.</b> A chemical form <b>A</b> . molecular formu		of covalent bond in org mula <b>C.</b> structur		:- <b>D.</b> ionic formula
<b>12.</b> All of the followi <b>A.</b> pentane and 2,2-		structural isomers to ea	ch ether <b>excep</b> t d cyclohexane	t:-

<ul> <li>13. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by thedifferences between the objects within system.</li> <li>A. specific heat B. nature C. temperature D. all of them SN: 000007</li> <li>14. By decreasing pressure on the following equilibrium system: N₂(g)+ O₂(g) → 2NO(g)</li> <li>A. the quantity of N₂ decreases B. the quantity of NO decreases</li> <li>C. the quantities do not change</li> <li>15. The following reaction: NH₄Cl(s) +176kJ → NH₃(g)+HCl(g), occurs spontaneously:-</li> <li>A. if TΔS value = 176kJ B. if TΔS value &gt; 176kJ C. if TΔS value &lt; 176kJ D. at all temperature</li> <li>16. What colligative properties are displayed when antifreeze is added to a car's cooling system?</li> <li>A. vapor-pressure elevation B. boiling point elevation</li> </ul>
C. freezing-point depression  D. both (B and C)
17. The molecular formula for the ethyl ethanoate compound is :-
<b>A.</b> $C_4H_{10}O_2$ <b>B.</b> $C_4H_8O_2$ <b>C.</b> $C_4H_{10}O$ <b>D.</b> $C_4H_8O$
<b>18.</b> In the following reaction: 2NO+O <sub>2</sub> → 2NO <sub>2</sub> , the reaction for the fast step is: NO <sub>3</sub> +NO → 2NO <sub>2</sub> , which of following is <b>correct</b> ?
<b>A.</b> NO is intermediate <b>B.</b> NO <sub>3</sub> is intermediate <b>C.</b> $R=k[NO][O_2]$ <b>D.</b> both(B and C)
<b>19.</b> The net ionic equation for which of the following reaction is: $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?
A. $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ B. $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$
C. $Zn(s)+HCl(aq) \longrightarrow$ D. both ( A and B )
<ul> <li>20. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:</li> <li>A. substitution</li> <li>B. addition</li> <li>C. condensation</li> <li>D. elimination</li> </ul>
<b>21.</b> An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :- <b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>
<b>22.</b> In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol , the value of E <sub>a</sub> is:-(place the reactants at energy level zero). <b>A.</b> 65kJ/mol <b>B.</b> -65kJ/mol <b>C.</b> 35kJ/mol <b>D.</b> 135kJ/mol
<ul> <li>23. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-</li> <li>A. specific heat B. enthalpy of reaction C. enthalpy of formation D. enthalpy of combustion</li> </ul>
24. In the reaction that occurs by one direction(forward), which of the following doesn't effect on
the rate of reaction?
A. presence of catalyst  B. changing concentration of product
C. changing temperature D. changing concentration of reactant
<b>25.</b> The rate law for the following hypothetical reaction: $A + B \longrightarrow C$ , is $R = k[A]^2[B]$ , by what factor does the
rate increase if the concentration of each A and B is tripled?
<b>A.</b> 27 <b>B.</b> 16 <b>C.</b> 18 <b>D.</b> 8

**C.** pentane and cyclopentane

44
41. Which of the following is incorrect?  A. the reaction type of methane gas with chlorine gas is addition
B. the alkynes don't have geometric formula
C. the graphite is a good electrical conductor D. none of them
<b>42.</b> At which of the following concentrations the hydrochloric acid considered a strong electrolyte?
<b>A.</b> 5M <b>B.</b> 1M <b>C.</b> 0.001M <b>D.</b> all of them
43. Which of the following oxides when reacted with water forms acid solution?
<b>A.</b> $CO_2$ <b>B.</b> $CaO$ <b>C.</b> $SO_3$ <b>D.</b> both ( A and C )
<b>44.</b> The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-
A. 6 B. 10 C. 8 D. 12
45. The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution?
<b>A.</b> 0.24 <b>B.</b> 0.12 <b>C.</b> 0.36 <b>D.</b> 0.72
<b>46.</b> According to IUPAC system the compound:(CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -COH), is called:-
A. 1-butanol B. propanal C. butanone D. butanal
<b>47.</b> The correct name for this compound: ( ÇH₃ ) according to IUPAC system is:
A. 1-ethyl-4-methyl cyclohexane
B. 1-ethyl-4-methyl benzene
C. 1-methyl-4-ethyl benzene
CH <sub>2</sub> -CH <sub>3</sub> <b>D.</b> 1-methyl-4- ethyl cyclohexane
48. At equilibrium :-
A. all reaction have ceased B. only the forward reaction continues
C. only the reverse reaction continues  D. both the forward and reverse reactions continue.
<b>49.</b> The entropy increases by:-
A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them
<b>50.</b> By using the information in the adjacent table, which of the following is catalyst?
A. MnO <sub>2</sub> Substance H <sub>2</sub> O <sub>2</sub> H <sub>2</sub> O O <sub>2</sub> MnO <sub>2</sub>
B. H <sub>2</sub> O <sub>2</sub> mass at the start of the reaction (g) 68 0 0 5
C. H <sub>2</sub> O  mass at the start of the reaction (g) 0 36 32 5  mass at the end of the reaction (g) 0 36 32 5
f

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION



Subject: Chemistry



fingerprint

2<sup>nd</sup> Attempt Time: 3.30 hours

## Answer the following questions: (two marks for each right choice)

1.	What col	ligative	properties	are displa	yed whe	en antif	reeze is a	dded	to a car	's cool	ing system?	,

**A.** vapor-pressure elevation

**General Examinations for Preparatory Stage** 

Study year (2024-2025) (Grade twelve scientific)

**B.** boiling point elevation

**C.** freezing-point depression

D. both (B and C)

**2.** A molecule that donates one electron pair to form a covalent bond is:-

**A.** BF<sub>3</sub>

B. NH<sub>4</sub><sup>+</sup>

**C.** CH<sub>4</sub>

D. NH<sub>3</sub>

**3.** A chemical formula that shows the type of covalent bond in organic compound:-

A. molecular formula

**B.** empirical formula

C. structural formula

**D.** ionic formula

**4.** All of the following pair compounds are structural isomers to each ether **except**:-

**A.** pentane and 2,2-dimethyl propane

**B.** hexene and cyclohexane

**C.** pentane and cyclopentane

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane

**5.** At which of the following situation the reaction solid zinc with solution of HCl is faster?

**A.** 0.1M HCl at 25°C

**B.** 0.1M HCl at 50°C

C. 1M HCl at 50°C

D. 1M HCl at 25°C

**6.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?

**A.** Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

**D.** both (A and B)

**7.** The following reaction: NH<sub>4</sub>Cl(s) +176kJ  $\longrightarrow$  NH<sub>3</sub>(g)+HCl(g), occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ

**B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ

**D.** at all temperature

**8.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub> (aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub> is:-

**A.** H<sub>3</sub>O<sup>+</sup>

B. HNO<sub>2</sub>

**C.** H<sub>2</sub>O

D. none of them

**9.** At equilibrium :-

A. all reaction have ceased

**B.** only the forward reaction continues

**C.** only the reverse reaction continues

**D.** both the forward and reverse reactions continue.

**10.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ 

A. the quantity of N<sub>2</sub> decreases

**B.** the quantity of NO decreases

**C.** the quantity of NO increases

**D.** the quantities do not change

11. In the reaction that occurs by one direction(forward), which of the following doesn't effect on

the rate of reaction?

**A.** presence of catalyst

**B.** changing concentration of product

**C.** changing temperature

**D.** changing concentration of reactant

**12.** The correct name for this compound: (

) according to IUPAC system is:

A. 1-ethyl-4-methyl cyclohexane

B. 1-ethyl-4-methyl benzene

C. 1-methyl-4-ethyl benzene

D. 1-methyl-4- ethyl cyclohexane

13. A molecular compound which dissolves in water and it does not ionize:-

A. C<sub>2</sub>H<sub>5</sub>OH

**B.**  $C_6H_6$ 

C. NH<sub>4</sub>Cl

D. HF

**14.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte? **A.** 5M **B.** 1M **C.** 0.001M **D.** all of the

**15.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is:

if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**A.** 102.04°C

B. 1.02°C

**C.** 101.02°C

**D.** 100.51°C

**16.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-

**A.** increase octane rating

**B.** decrease octane rating

**C.** increase boiling point

**D.** both (A and C)

17. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct?

**A.** [OH<sup>-</sup>]=2.0x10<sup>-6</sup>M

**B.** the sea water is basic

**C.**  $[OH^{-}]=5.0\times10^{-9}M$ 

**D.** both (A and B)

**D.** all of them

**18.** Which of the following is heated with sulfur atoms in vulcanization process?

A. isoprene

**B.** neoprene

**C.** poly isoprene

**D.** 2-methyl-1,3 butadiene

**19.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?

**A.** [HCl]=0.02M

**B.** [HCl]=0.04M

C. the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>

20. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material

**D.** both (B and C)

**D.** 40°C

be?  $(C_p=0.07J/(g.K))$ 

**C.** 40K

21. Which of the following oxides when reacted with water forms acid solution?

**A.** 25°C

A.CO<sub>2</sub>

B. CaO

 $\mathbf{C.} SO_3$ 

**B.** 298K

**D.** both ( A and C )

**22.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

C. the graphite is a good electrical conductor

**D.** none of them

23. Salts of weak acids and weak bases can produce basic aqueous solution if:-

**A.**  $K_a = K_b$ 

**A.** Mg<sup>2+</sup>

**B.**  $K_a > K_b$ 

**B.** Ca<sup>2+</sup>

**C.**  $K_b > K_a$ 

**D.**  $[H_3O^+] > [OH^-]$ 

**24.** The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-

A. substitution

**B.** addition

**C.** condensation

**25.** An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion: **D.**Al<sup>3+</sup>

**26.** The entropy increases by:-

A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them

**C.** Pb<sup>2+</sup>

**D.** elimination

**27.** When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

C. NaF

D. both (B and C)

<b>28.</b> After mixing Ca <sup>2+</sup> ions with concentration 2.4x10 which of the following is <b>correct</b> ? If the solubility of <b>A.</b> ionic product> $K_{Sp}$ <b>B.</b> ionic product< $K_{Sp}$	of $CaCO_3$ in its saturated solution is 5.3x1	
29. The rate law for the following hypothetical react rate increase if the concentration of each A and B is A. 27 B. 16 C. 18 30. In the following gaseous equilibrium system: 2C A. the value of K at 500°C is greater than the value B. the value of K at both temperatures are equal C. the value of K at 500°C is less than the value of K D. none of them	is tripled?  18  D. 8 $CO_2+167kJ \stackrel{*}{\longleftarrow} 2CO+O_2$ , which of the fole of $K$ at $700^{\circ}C$	A. CH <sub>3</sub> COOH B. HCl C. HNO <sub>3</sub> D. H <sub>3</sub> PO <sub>4</sub> 42. Which theories of acids and bases belong to acids and bases conjugate?
mass at the start of the reaction (g)  C. H <sub>2</sub> O  D. O <sub>2</sub> mass at the end of the reaction (g)  Mass at the start of the reaction (g)  Mass at the end of the reaction (g)  Mass at the end of the reaction (g)  Mass at the end of the feature in the p.1-dimeter in the p	A2O O2 MnO2 0 0 5 36 32 5  Athyl cyclopropane compound is equal to D. 12  PCl <sub>5</sub> PCl <sub>3</sub> +Cl <sub>2</sub> , the mole number for extively in 5L vessel, the value of equilibria C. 20 D. 200  B-CH <sub>2</sub> -CH <sub>2</sub> -COH), is called: C. butanone D. butanal which of the following is correct?  B. both have the same boiling por D. all of them  Ot change?  B. adding KCN solution to the solution D. all of them  tion energy equals 100kJ/mol and the the value of E <sub>a</sub> is:-(place the reactant dJ/mol C. 35kJ/mol D.  OH-(aq) , which of the following is incorrect C. CN- ion is hydrolyzez D. none of	A. 0.24  45. Thecompounds contribute to the destruction of ozone in the upper atmosphere.  A. C <sub>2</sub> F <sub>4</sub> B. CFCs  C. MTBE  D. PVA  46. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the
<b>A.</b> $K_{w} = [H_{3}O^{+}][OH^{-}]$ <b>B.</b>	<b>B.</b> [H <sub>3</sub> O <sup>+</sup> ][OH <sup>-</sup> ]=1x10 <sup>-14</sup> <b>D.</b> all of them.	

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH Subject: Chemistry fingerprint **14.** Which of the following is heated with sulfur atoms in vulcanization process? MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION A. isoprene **B.** neoprene **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific) 2<sup>nd</sup> Attempt Time:3.30 hours Answer the following questions: (two marks for each right choice) 1. Which of the following is **correct** at all temperature in pure water? **A.** vapor-pressure elevation **A.**  $K_W = [H_3O^+][OH^-]$ **B.**  $[H_3O^+][OH^-]=1\times10^{-14}$ **C.** freezing-point depression **C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ **D.** all of them. **2.** A molecular compound which dissolves in water and it does **not ionize**:- $B. C_4H_8O_2$ **A.**  $C_4H_{10}O_2$ A. C<sub>2</sub>H<sub>5</sub>OH **B.**  $C_6H_6$ C. NH<sub>4</sub>Cl D. HF **3.** All of the following pair compounds are structural isomers to each ether **except**:the rate of reaction? **A.** pentane and 2,2-dimethyl propane **B.** hexene and cyclohexane A. presence of catalyst **C.** pentane and cyclopentane **D.** 1,1-dichloro ethane and 1,2-dichloro ethane C. changing temperature **4.** A molecule that donates one electron pair to form a covalent bond is:-**A.** BF<sub>3</sub> B. NH<sub>4</sub><sup>+</sup> **C.** CH<sub>4</sub> D. NH<sub>3</sub> **B.** addition A. substitution **5.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**? **20.** An acid is used as a fungicide:-**A.**  $[OH^{-}]=2.0x10^{-6}M$ D. both (A and B) **B.** the sea water is basic **C.**  $[OH^{-}]=5.0\times10^{-9}M$ A. CH<sub>3</sub>COOH B. HCl **6.** Which of the following oxides when reacted with water forms acid solution? D. both (A and C) **A.** CO<sub>2</sub> B. CaO **C.** SO<sub>3</sub> 7. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy **A.** 0.24 **B.** 0.12 change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol **A.** 5M **B.** 1M **8.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-A. increase octane rating **B.** decrease octane rating **C.** increase boiling point **D.** both (A and C) A. specific heat **B.** nature **9.** At equilibrium :-A. all reaction have ceased **B.** only the forward reaction continues **C.** only the reverse reaction continues **D.** both the forward and reverse reactions continue. **A.** ionic product> $K_{SD}$ **10.** The rate law for the following hypothetical reaction: A +B  $\longrightarrow$  C, is R=k[A]<sup>2</sup>[B], by what factor does the rate increase if the concentration of each A and B is tripled? **A.** 27 **B.** 16 **C.** 18 **D.** 8 **A.** -814.1kJ/mol 11. Which theories of acids and bases belong to acids and bases conjugate? **A.** Arrhenius **B.** Lewis C. Bronsted-Lowry **D.** none of them **A.** 6 **B.** 10 **12.** The correct order according the pOH value for the following solution is:-A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub> B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK A. molecular formula C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub> D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl **13.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ **B.** Ca<sup>2+</sup> **A.** Mg<sup>2+</sup> **A.** the quantity of N<sub>2</sub> decreases **B.** the quantity of NO decreases C. the quantity of NO increases **D.** the quantities do not change

**C.** poly isoprene **D.** 2-methyl-1,3 butadiene **15.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-SN: 000009 **A.** 1-butanol **B.** propanal **C.** butanone **D.** butanal **16.** What colligative properties are displayed when antifreeze is added to a car's cooling system? **B.** boiling point elevation D. both (B and C) 17. The molecular formula for the ethyl ethanoate compound is: **C.** C<sub>4</sub>H<sub>10</sub>O **D.**  $C_4H_8O$ 18. In the reaction that occurs by one direction(forward), which of the following doesn't effect on **B.** changing concentration of product **D.** changing concentration of reactant **19.** The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-**C.** condensation **D.** elimination C. HNO<sub>3</sub> **D.** H<sub>3</sub>PO<sub>4</sub> 21. The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution? **C.** 0.36 **D.** 0.72 **22.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte? **C.** 0.001M **D.** all of them **23.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system. **C.** temperature **D.** all of them **24.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L **B.** ionic product  $< K_{sp}$ **C.** ionic product= $K_{SD}$ **D.** precipitate isn't form **25.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\triangle H^0_f$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively **B.** +814.1kJ/mol **C.** -634.9kJ/mol **D.** +634.9kJ/mol **26.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-**C.** 8 **D.** 12 **27.** A chemical formula that shows the type of covalent bond in organic compound:-**B.** empirical formula **C.** structural formula **D.** ionic formula 28. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion: **C.** Pb<sup>2+</sup> **D.**Al<sup>3+</sup>

<b>29.</b> In the following reaction <b>A.</b> H <sub>3</sub> O <sup>+</sup>	: HNO <sub>2</sub> (aq)+H <sub>2</sub> O( <i>l</i> ) <b>B.</b> HNO <sub>2</sub>	←→ $NO_2^-(aq)+H_3O^+(aq)$ , t <b>C.</b> $H_2O$	he conjugate acid of NO <sub>2</sub> - is:- <b>D.</b> none of them	<b>42.</b> By using <b>A.</b> MnO <sub>2</sub>	g the information in the adjace	ent table,	, whic	ch of the	e follo	wing is catalys	t?
			e final temperature of the material	<b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance		H <sub>2</sub> O	_	/InO <sub>2</sub>		
be? $(C_p=0.07J/(g.K))$	<b>A.</b> 25°C		<b>C.</b> 40K <b>D.</b> 40°C	<b>C.</b> H <sub>2</sub> O	mass at the start of the reaction (g)	68	0	0	5		
<ul> <li>31. Amount of energy require (1°C) or one kelvin (1K) is:-</li> <li>A. specific heat B. enthale</li> <li>32. In this reaction: CN<sup>-</sup>(aq)+</li> <li>A. OH<sup>-</sup> is conjugate base</li> <li>33. At which of the following</li> </ul>	red to raise the term of reaction  H <sub>2</sub> O( <i>l</i> ) → HCN(a <b>B.</b> H <sub>2</sub> O is amphote  g situation the reaction <b>B.</b> 0.1M HCl at 50°  yl ether and ethan  nctional group	nperature of one gram of  C. enthalpy of formation  (q)+ OH <sup>-</sup> (aq) ,which of the eric C. CN <sup>-</sup> ion is hydro ction solid zinc with solution  C. 1M HCl at 50°C  (ol), which of the following  B. both have the	D. enthalpy of combustion following is incorrect? blyzez D. none of them on of HCl is faster? D. 1M HCl at 25°C is correct? the same boiling point	<ul> <li>43. In the formand Cl<sub>2</sub> at α. 0.005</li> <li>44. In the formal which of formal A. NO is in</li> <li>45. The following A. if TΔS variables</li> </ul>		*2NO <sub>2</sub> ,t intermed ikJ $\longrightarrow$ N e > 176kJ is requir	ective the re liate IH <sub>3</sub> (g)	ely in 5L C. 20 action f +HCl(g) C. if TΔ: neutra	or the R=k[  , occu S value llize 10	I, the value of OD. 200 If fast step is: NO NO][O2] Its spontaneous	equilibrium constant is  O <sub>3</sub> +NO—→2NO <sub>2</sub> ,  D. both(B and C)  sly:- D. at all temperature
A. Ba(OH) <sub>2</sub> (aq)+H <sub>2</sub> SO <sub>4</sub> (aq) – C. Zn(s)+HCl(aq) $\longrightarrow$	<b></b>	B. Sr(OH)₂(aq)+HCl(aq)— D. both ( A and B )		<b>47.</b> When 5	OmL of 0.1M monoprotic wea		•				·
<b>36.</b> All of the following salts <b>A.</b> NaCN	effect on the H₃O⁺ <b>B.</b> KCl	and OH <sup>-</sup> concentration w	hen added to water <b>except</b> : <b>D.</b> NH <sub>4</sub> Br	A. KNO <sub>3</sub>	ng salts may be formed?  B. KF  weak acids and weak bases ca		<b>C.</b> Nal		eous so	<b>D.</b> both (B	and C)
<b>37.</b> The boiling point of an a if $(K_f = -1.86^{\circ}\text{C}/m)$ $(K_b = 0.51^{\circ}\text{A. }102.04^{\circ}\text{C}$	•	ontaining a nonelectrolyte  C. 101.02°C	that freezes at -3.72°C, is:  D. 100.51°C	<b>A.</b> <i>K</i> <sub>a</sub> = <i>K</i> <sub>b</sub> <b>49.</b> Which	<b>B.</b> $K_a > K_b$ of the following is <b>incorrect</b> ?	C	C. K <sub>b</sub> >	Ka			) <sup>†</sup> ]>[OH <sup>-</sup> ]
<ul> <li>38. In the following gaseous</li> <li>A. the value of K at 500°C is</li> <li>B. the value of K at both ter</li> <li>C. the value of K at 500°C is</li> <li>D. none of them</li> </ul>	greater than the value of the sequence of the	value of K at 700°C ual	O <sub>2</sub> , which of the following is <b>true</b> ?	B. the alky C. the grap D. none of	ropy increases by:-	nula uctor				miving gasos	<b>D.</b> all of them
<b>39.</b> At which of the following <b>A.</b> adding NH₄NO₃ solution <b>C.</b> adding a small amount of	to the NH <sub>3</sub> solution	<b>B.</b> adding k	CCN solution to the HCN solution em	A. decreas	ing the pressure <b>B.</b> increas	ing the te	empe	rature	C. I	mixing gases	<b>D.</b> all of them
<b>40.</b> Thecompounds of <b>A.</b> C <sub>2</sub> F <sub>4</sub> <b>B.</b> CFC		destruction of ozone in the	e upper atmosphere. <b>D.</b> PVA								
<b>41.</b> The correct name for thi	s compound: (	B. 1-ethyl C. 1-meth	PAC system is:  -4-methyl cyclohexane  I-4-methyl benzene  nyl-4-ethyl benzene  nyl-4- ethyl cyclohexane								

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH **Subject: Chemistry** fingerprint MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 2<sup>nd</sup> Attempt Study year (2024-2025) (Grade twelve scientific) Time: 3.30 hours Answer the following questions: ( two marks for each right choice ) 1. Which theories of acids and bases belong to acids and bases conjugate? **A.** Arrhenius **B.** Lewis **C.** Bronsted-Lowry **D.** none of them **2.** In the following gaseous equilibrium reaction:  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_5$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant **A.** 0.005 **B.** 0.05 **C.** 20 **D.** 200 **3.** After mixing Ca<sup>2+</sup> ions with concentration 2.4x10<sup>-4</sup>M and CO<sub>3</sub><sup>2-</sup> ions with concentration 1.2x10<sup>-4</sup>M, whi of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L **A.** ionic product> $K_{sp}$ **B.** ionic product  $< K_{sp}$ **C.** ionic product= $K_{sp}$ **D.** precipitate isn't form **4.** At equilibrium :-A. all reaction have ceased **B.** only the forward reaction continues **C.** only the reverse reaction continues **D.** both the forward and reverse reactions continue. **5.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte? **A.** 5M **B.** 1M **C.** 0.001M **D.** all of them **6.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction o energy transfer is determined by the.....differences between the objects within system. A. specific heat **C.** temperature **B.** nature **D.** all of them **7.** The correct name for this compound: ( CH<sub>3</sub> ) according to IUPAC system is: A. 1-ethyl-4-methyl cyclohexane B. 1-ethyl-4-methyl benzene C. 1-methyl-4-ethyl benzene D. 1-methyl-4- ethyl cyclohexane ĊH₂-CH₃ **8.** An acid is used as a fungicide:-A. CH<sub>3</sub>COOH C. HNO<sub>3</sub> **B.** HCl **D.** H<sub>3</sub>PO<sub>4</sub> **9.** At which of the following situation the reaction solid zinc with solution of HCl is faster? **A.** 0.1M HCl at 25°C **B.** 0.1M HCl at 50°C C. 1M HCl at 50°C **D.** 1M HCl at 25°C **10.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water **except**:-. A. NaCN B. KCI C. KNO<sub>2</sub> **D.** NH₄Br **11.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub>-(aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub>- is:-**A.** H<sub>3</sub>O<sup>+</sup> B. HNO<sub>2</sub> **C.** H<sub>2</sub>O **D.** none of them **12.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**C.** 101.02°C

**D.** 100.51°C

	$(aq)+H_2SO_4(aq) \longrightarrow$				+HCl(aq	) <del></del>
<b>C.</b> Zn(s)+H0	Cl(aq) —→ SN: 000010	D.	both (	A an	dB)	
<b>14.</b> At whic	n of the following situation th	e pH do	not ch	nange	?	
_	NH₄NO₃ solution to the NH₃ so					ng KCN solution to the HCN solution
C. adding a	small amount of HCl to NH <sub>3</sub> a	and NH <sub>4</sub>	Cl solu	ition	<b>D.</b> all c	of them
<b>15.</b> By using	the information in the adjac	ent tabl	e, whic	ch of	the follo	wing is catalyst?
<b>A.</b> MnO <sub>2</sub> <b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>	
<b>C.</b> H <sub>2</sub> O	mass at the start of the reaction (g)	68	0	0	5	
<b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)	0	36	32	5	
<b>16.</b> When c	ompared dimethyl ether and	ethanol	, which	n of t	ne follov	ving is <b>correct</b> ?
	ve the same a functional grou					ave the same boiling point
C. both dis	solved in water.			D	. all of th	nem
<b>17.</b> The	compounds contribute to	the de	structio	on of	ozone ir	n the upper atmosphere.
<b>A.</b> C <sub>2</sub> F <sub>4</sub>	B. CFCs		. MTBE			D. PVA
18. By decr	easing pressure on the follow	ing equi	ilihriun	n svst	em: Na(	g)+ O₂(g) → ≥ 2NO(g)
	ntity of N <sub>2</sub> decreases	ing cqui	iibiiaii	-		ity of NO decreases
	ntity of NO increases				•	tities do not change
			•		•	_
	ule that donates one electron	n pair to			alent bo	
<b>A.</b> BF <sub>3</sub>	<b>B.</b> NH <sub>4</sub> <sup>+</sup>		<b>C.</b> C	.H4		D. NH <sub>3</sub>
	ropy increases by:-					
A. decreas	ng the pressure <b>B.</b> increas	ing the	tempe	ratur	e <b>C.</b>	mixing gases <b>D.</b> all of them
<b>21.</b> What co	olligative properties are displa	yed wh	en ant	ifree	e is add	ed to a car's cooling system?
A. vapor-p	ressure elevation	<b>B.</b> bo	iling p	oint e	elevation	ı
C. freezing	-point depression	<b>D.</b> bo	oth (B a	nd C	)	
<b>22.</b> Which o	of the following is <b>correct</b> at a	ll tempe	erature	in pı	ıre wate	er?
	_	·			OH <sup>-</sup> ]=1x	
<b>A.</b> $K_w = [H_3O]$			_		_	
<b>A.</b> $K_w = [H_3O]$ <b>C.</b> $[H_3O^+] =$	[OH <sup>-</sup> ]=1x10 <sup>-7</sup> M			וט ווג	them.	
<b>C.</b> $[H_3O^+]=$ <b>23.</b> In the f	ollowing reaction: CaCO <sub>3</sub> (s) value for each of CO <sub>2</sub> and (	CaCO₃ e	kJ →	CaO	(s)+ CC	
<b>C.</b> $[H_3O^+]=$ <b>23.</b> In the f  If the $\Delta H^0_f$ <b>A.</b> -814.1kJ	ollowing reaction: CaCO <sub>3</sub> (s) value for each of CO <sub>2</sub> and ( /mol <b>B.</b> +814.1kJ	CaCO₃ e /mol	kJ → equal t	CaO o ( -3 C. f cark	(s)+ CC 393.5, -1 -634.9k	J/mol D. +634.9kJ/mol cids and amines are mixed is called:
<b>C.</b> $[H_3O^+]=$ <b>23.</b> In the f If the $\Delta H^0_f$ <b>A.</b> -814.1kJ <b>24.</b> The rea <b>A.</b> substitu	ollowing reaction: CaCO <sub>3</sub> (s) value for each of CO <sub>2</sub> and C /mol <b>B.</b> +814.1kJ ction that occurs when aqueo	CaCO₃ e /mol ous solut	kJ → equal t tions of C.	CaO o ( -3 C. f cark	(s)+ CC 393.5, -1 -634.9k. poxylic a densatio	J/mol D. +634.9kJ/mol cids and amines are mixed is called:  D. elimination
<b>C.</b> $[H_3O^+]=$ <b>23.</b> In the f If the $\Delta H^0_f$ <b>A.</b> -814.1kJ <b>24.</b> The rea <b>A.</b> substitu	ollowing reaction: CaCO <sub>3</sub> (s) value for each of CO <sub>2</sub> and Company mol  B. +814.1kJ ction that occurs when aqueous tion  B. addition  hber of hydrogen atoms in the	CaCO₃ e /mol ous solut	kJ → equal t tions of C.	CaO o ( -3 C. f cark	(s)+ CC 393.5, -1 -634.9k. poxylic a densatio	L207.6) kJ/mol respectively  J/mol  D. +634.9kJ/mol  cids and amines are mixed is called:  D. elimination  e compound is equal to:-

**A.** 102.04°C

**B.** 1.02°C

<b>7.</b> When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?	<b>41.</b> The correct order according the pOH value for the following solution is:- <b>A.</b> NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> <b>B.</b> NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK
A. KNO <sub>3</sub> B. KF C. NaF D. both (B and C)	C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl
<b>8.</b> In this reaction: $CN^{-}(aq) + H_{2}O(l) \longrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is <b>incorrect</b> ? <b>A.</b> $OH^{-}$ is conjugate base <b>B.</b> $H_{2}O$ is amphoteric <b>C.</b> $CN^{-}$ ion is hydrolyzez <b>D.</b> none of them	<ul><li>42. Increasing the percentage of branched-chain alkanes in gasoline causes to:-</li><li>A. increase octane rating</li><li>B. decrease octane rating</li></ul>
<b>9.</b> The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution?	<ul><li>C. increase boiling point</li><li>D. both (A and C)</li><li>43. The molecular formula for the ethyl ethanoate compound is :-</li></ul>
<b>A.</b> 0.24 <b>B.</b> 0.12 <b>C.</b> 0.36 <b>D.</b> 0.72	<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> <b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> <b>C.</b> C <sub>4</sub> H <sub>10</sub> O <b>D.</b> C <sub>4</sub> H <sub>8</sub> O
<b>0.</b> Suppose that 20mL of 0.01M Ca(OH)₂ is required to neutralize 10mL of HCl solution, which of the following is <b>correct</b> ?	<b>44.</b> An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion: <b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>
<b>A.</b> [HCI]=0.02M <b>B.</b> [HCI]=0.04M <b>C.</b> the spectator ions are Ca <sup>2+</sup> and Cl <sup>-</sup> <b>D.</b> both (B and C)	<b>45.</b> In the reaction that occurs by one direction(forward), which of the following doesn't effect on
1. A chemical formula that shows the type of covalent bond in organic compound:-	the rate of reaction?
A. molecular formula B. empirical formula C. structural formula D. ionic formula	A. presence of catalyst  B. changing concentration of product
2. Which of the following is incorrect?	C. changing temperature D. changing concentration of reactant
A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula	<b>46.</b> In the following gaseous equilibrium system: 2CO <sub>2</sub> +167kJ → 2CO+O <sub>2</sub> , which of the following is <b>true</b> ?
C. the graphite is a good electrical conductor	<b>A.</b> the value of $K$ at 500°C is greater than the value of $K$ at 700°C <b>B.</b> the value of $K$ at both temperatures are equal
<b>D.</b> none of them	<b>C.</b> the value of <i>K</i> at 500°C is less than the value of <i>K</i> at 700°C
<b>3.</b> The rate law for the following hypothetical reaction: A +B $\longrightarrow$ C, is R= $k$ [A] <sup>2</sup> [B], by what factor does the	D. none of them
rate increase if the concentration of each A and B is tripled?	47. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy
<b>A.</b> 27 <b>B.</b> 16 <b>C.</b> 18 <b>D.</b> 8	change for reverse reaction equals -35kJ/mol , the value of E <sub>a</sub> - is:-(place the reactants at energy
<b>4.</b> According to IUPAC system the compound:(CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -COH), is called:-	level zero). <b>A.</b> 65kJ/mol <b>B.</b> -65kJ/mol <b>C.</b> 35kJ/mol <b>D.</b> 135kJ/mol
A. 1-butanol B. propanal C. butanone D. butanal	<b>48.</b> Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree
5. Which of the following oxides when reacted with water forms acid solution?	(1°C) or one kelvin (1K) is:-
<b>A.</b> $CO_2$ <b>B.</b> $CaO$ <b>C.</b> $SO_3$ <b>D.</b> both ( A and C )	A. specific heat B. enthalpy of reaction C. enthalpy of formation D. enthalpy of combustion
<b>6.</b> If the pH of sea water at 25°C is equal to 8.3, which of the following is <b>correct</b> ?	<b>49.</b> Salts of weak acids and weak bases can produce basic aqueous solution if:-
<b>A.</b> [OH <sup>-</sup> ]=2.0x10 <sup>-6</sup> M <b>B.</b> the sea water is basic <b>C.</b> [OH <sup>-</sup> ]=5.0x10 <sup>-9</sup> M <b>D.</b> both (A and B)	<b>A.</b> $K_a = K_b$ <b>B.</b> $K_a > K_b$ <b>C.</b> $K_b > K_a$ <b>D.</b> $[H_3O^+] > [OH^-]$
7. All of the following pair compounds are structural isomers to each ether except:-	<b>50.</b> In the following reaction: $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is: $NO_3+NO \longrightarrow 2NO_2$ ,
A. pentane and 2,2-dimethyl propane  B. hexene and cyclohexane  C. pentane and cyclopentane  D. 1,1-dichloro ethane and 1,2-dichloro ethane	which of following is <b>correct</b> ? <b>A.</b> NO is intermediate <b>B.</b> NO <sub>3</sub> is intermediate <b>C.</b> R= $k$ [NO][O <sub>2</sub> ] <b>D.</b> both(B and C)
8. Which of the following is heated with sulfur atoms in vulcanization process?	A. NO is intermediate  B. NO3 is intermediate  C. N-A[NO][O2]
A. isoprene B. neoprene C. poly isoprene D. 2-methyl-1,3 butadiene	
<b>9.</b> A molecular compound which dissolves in water and it does <b>not ionize</b> :-	
<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH <b>B.</b> C <sub>6</sub> H <sub>6</sub> <b>C.</b> NH <sub>4</sub> Cl <b>D.</b> HF	
<b>0.</b> The following reaction: $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-	
<b>A.</b> if $T\Delta S$ value = 176kJ <b>B.</b> if $T\Delta S$ value > 176kJ <b>C.</b> if $T\Delta S$ value < 176kJ <b>D.</b> at all temperature	

**B.** -65kJ/mol

**C.** 35kJ/mol

**D.** 135kJ/mol

level zero).

100

A. 65kJ/mol

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH Subject: Chemistry MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION General Examinations for Preparatory Stage Study year (2024-2025) (Grade twelve scientific)  Study year (2024-2025) (Grade twelve scientific)	<ul> <li>13. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?</li> <li>A. KNO<sub>3</sub></li> <li>B. KF</li> <li>C. NaF</li> <li>D. both (B and C)</li> <li>SN: 000011</li> <li>14. Increasing the percentage of branched-chain alkanes in gasoline causes to:-</li> </ul>
Answer the following questions: ( two marks for each right choice )	<ul><li>14. Increasing the percentage of branched-chain alkanes in gasoline causes to:-</li><li>A. increase octane rating</li><li>B. decrease octane rating</li></ul>
<ul> <li>When compared dimethyl ether and ethanol, which of the following is correct?</li> <li>A. both have the same a functional group</li> <li>B. both have the same boiling point</li> <li>C. both dissolved in water.</li> <li>D. all of them</li> </ul>	<ul> <li>C. increase boiling point</li> <li>D. both (A and C)</li> <li>15. Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is correct?</li> </ul>
In the following gaseous equilibrium reaction: $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ , the mole number for each of $PCl_5$ , $PCl_3$ and $Cl_2$ at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-	<ul> <li>A. [HCl]=0.02M</li> <li>B. [HCl]=0.04M</li> <li>C. the spectator ions are Ca<sup>2+</sup> and Cl<sup>-</sup></li> <li>D. both (B and C)</li> <li>16. By decreasing pressure on the following equilibrium system: N₂(g)+ O₂(g) ← 2NO(g)</li> </ul>
A. 0.005  B. 0.05  C. 20  D. 200  According to IUPAC system the compound:(CH <sub>3</sub> -CH <sub>2</sub> -COH), is called:-	A. the quantity of N <sub>2</sub> decreases  B. the quantity of NO decreases  C. the quantity of NO increases  D. the quantities do not change
A. 1-butanol B. propanal C. butanone D. butanal	17. Which theories of acids and bases belong to acids and bases conjugate?
<ul> <li>A. the reaction type of methane gas with chlorine gas is addition</li> <li>B. the alkynes don't have geometric formula</li> <li>C. the graphite is a good electrical conductor</li> <li>D. none of them</li> </ul>	<ul> <li>A. Arrhenius</li> <li>B. Lewis</li> <li>C. Bronsted-Lowry</li> <li>D. none of them</li> <li>18. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct?</li> <li>A. [OH<sup>-</sup>]=2.0x10<sup>-6</sup>M</li> <li>B. the sea water is basic</li> <li>C. [OH<sup>-</sup>]=5.0x10<sup>-9</sup>M</li> <li>D. both (A and B)</li> <li>19. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion:-</li> <li>A. Mg<sup>2+</sup></li> <li>B. Ca<sup>2+</sup></li> <li>C. Pb<sup>2+</sup></li> <li>D.Al<sup>3+</sup></li> </ul>
The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution?  A. 0.24  B. 0.12  C. 0.36  D. 0.72	<ul> <li>20. At which of the following situation the pH do not change?</li> <li>A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution</li> <li>B. adding KCN solution to the HCN solution</li> <li>C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution</li> <li>D. all of them</li> </ul>
Which of the following is <b>correct</b> at all temperature in pure water? <b>A.</b> $K_W = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-7} M$ <b>D.</b> all of them.	<ul> <li>21. In the following reaction: 2NO+O₂ → 2NO₂ , the reaction for the fast step is: NO₃+NO→2NO₂ , which of following is correct?</li> <li>A. NO is intermediate</li> <li>B. NO₃ is intermediate</li> <li>C. R=k[NO][O₂]</li> <li>D. both(B and C)</li> </ul>
<ul> <li>Which of the following is heated with sulfur atoms in vulcanization process?</li> <li>A. isoprene</li> <li>B. neoprene</li> <li>C. poly isoprene</li> <li>D. 2-methyl-1,3 butadiene</li> <li>In the following reaction: HNO₂(aq)+H₂O(l) → NO₂⁻(aq)+H₃O⁺(aq), the conjugate acid of NO₂⁻ is:-</li> </ul>	<ul> <li>At which of the following concentrations the hydrochloric acid considered a strong electrolyte?</li> <li>A. 5M</li> <li>B. 1M</li> <li>C. 0.001M</li> <li>D. both(B and C)</li> <li>D. both(B and C)</li> <li>D. both(B and C)</li> <li>D. all of them</li> </ul>
A. $H_3O^+$ B. $HNO_2$ C. $H_2O$ D. none of them  A. $B_3$ B. $NH_4^+$ C. $C_3$ C. $C_4$ D. $C_4$ D. $C_5$ D. $C_6$ D.	23. The correct name for this compound: ( CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl cyclohexane  B. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene
<ul> <li>O. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by thedifferences between the objects within system.</li> <li>A. specific heat</li> <li>B. nature</li> <li>C. temperature</li> <li>D. all of them</li> </ul>	T <sub>CH2</sub> -CH <sub>3</sub> D. 1-methyl-4- ethyl cyclohexane  24. A chemical formula that shows the type of covalent bond in organic compound:-  A. molecular formula B. empirical formula C. structural formula D. ionic formula
<ol> <li>The correct order according the pOH value for the following solution is:-</li> <li>NaCl&gt;CH<sub>3</sub>COOK&gt;NH<sub>4</sub>NO<sub>3</sub></li> <li>NH<sub>4</sub>NO<sub>3</sub>&gt;NaCl&gt;CH<sub>3</sub>COOK</li> <li>NH<sub>4</sub>NO<sub>3</sub>&gt;CH<sub>3</sub>COOK&gt;NaCl</li> </ol>	<b>25.</b> If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material be? $(C_p=0.07J/(g.K))$ <b>A.</b> 25°C <b>B.</b> 298K <b>C.</b> 40K <b>D.</b> 40°C
2. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E <sub>a</sub> is:-(place the reactants at energy level zero)  A 65kJ/mol  B -65kJ/mol  C 35kJ/mol  D 135kJ/mol	<b>26.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster? <b>A.</b> 0.1M HCl at 25°C <b>B.</b> 0.1M HCl at 50°C <b>C.</b> 1M HCl at 50°C <b>D.</b> 1M HCl at 25°C

27 The not is	onic aguation for which of	the following reaction is	s: H₃O⁺(aq)+OH⁻(aq) ←→ 2H₂O(/)?	11 The molecular f	ormula for the ethyl ethar	acata compound is:	
	q)+H <sub>2</sub> SO <sub>4</sub> (aq) →	B. Sr(OH) <sub>2</sub> (aq)+H		<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	B. C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>	<b>C.</b> C <sub>4</sub> H <sub>10</sub> O	<b>D.</b> C <sub>4</sub> H <sub>8</sub> O
<b>C.</b> Zn(s)+HCl(		<b>D.</b> both ( A and B		<b>42.</b> At equilibrium :-		3. 34. 103	2.54.00
<b>28.</b> The boilin	<b>28.</b> The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if $(K_f = -1.86^{\circ}\text{C/m})$ $(K_b = 0.51^{\circ}\text{C/m})$				ceased reaction continues	•	rd reaction continues ard and reverse reactions continue.
<b>A.</b> 102.04°C	<b>B.</b> 1.02°C	<b>C.</b> 101.02°0	<b>D.</b> 100.51°C	<b>43.</b> Amount of ener	gy required to raise the te	mperature of one gran	n of a substance by one Celsius degree
<b>29.</b> The numb <b>A.</b> 6	per of hydrogen atoms in t  B. 10	he 1,1-dimethyl cyclopro	opane compound is equal to:- <b>D.</b> 12	(1°C) or one kelvin  A. specific heat	(1K) is:-  3. enthalpy of reaction	<b>C.</b> enthalpy of format	ion <b>D.</b> enthalpy of combustion
<b>30.</b> A molecul	lar compound which disso	lves in water and it does	s not ionize:-	<b>44.</b> In the following	g reaction: CaCO <sub>3</sub> (s)+ 179	9.2kJ → CaO (s)+ CO	$O_2(g)$ , what is the $\Delta H^0_f$ value for CaO?
<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH	<b>B.</b> C <sub>6</sub> H <sub>6</sub>	<b>C.</b> NH <sub>4</sub> Cl	D. HF	If the $\Delta H^0_f$ value for	or each of CO <sub>2</sub> and CaCO	o₃ equal to ( -393.5, -1	L207.6) kJ/mol respectively
<b>31.</b> The	compounds contribute	to the destruction of ozo	one in the upper atmosphere.	<b>A.</b> -814.1kJ/mol	<b>B.</b> +814.1kJ/mol	<b>C.</b> -634.9k.	<b>D.</b> +634.9kJ/mol
<b>A.</b> C <sub>2</sub> F <sub>4</sub>	B. CFCs	<b>C.</b> MTBE	<b>D.</b> PVA	<b>45.</b> The rate law for	the following hypothetica	al reaction: $A + B \longrightarrow C$ ,	is $R=k[A]^2[B]$ , by what factor does the
	owing gaseous equilibriur of K at 500°C is greater th	•	≥ 2CO+O <sub>2</sub> , which of the following is <b>true</b> ?	rate increase if the A. 27	concentration of each A a <b>B.</b> 16	nd B is tripled? <b>C.</b> 18	<b>D.</b> 8
<b>B.</b> the value of	of $K$ at both temperatures of $K$ at 500°C is less than t	are equal		A. NaCN	B. KCI	C. KNO <sub>2</sub>	on when added to water <b>except</b> : <b>D.</b> NH <sub>4</sub> Br
					•	•	cids and amines are mixed is called:-
<b>A.</b> $K_a = K_b$	eak acids and weak bases <b>B.</b> $K_a > K_b$	can produce basic aque $\mathbf{C}$ . $K_b > K_a$	ous solution if:- <b>D.</b> $[H_3O^+] > [OH^-]$	A. substitution	<b>B.</b> addition	C. condensatio	
						ction(forward), which	of the following doesn't effect on
	igative properties are disp ssure elevation	<b>B.</b> boiling point elev	s added to a car's cooling system?	the rate of reaction <b>A.</b> presence of cat		B changing conc	entration of product
		<b>D.</b> both (B and C)	ation	C. changing temper	•	<b>D.</b> changing concent	•
	ppy increases by:-						ns with concentration 1.2x10 <sup>-4</sup> M ,
	•	asing the temperature	C. mixing gases D. all of them				urated solution is 5.3x10 <sup>-5</sup> mol/L
	the information in the adja			<b>A.</b> ionic product> $K_s$		•	
<b>A.</b> MnO <sub>2</sub>				<b>50.</b> An acid is used a	ıs a fungicide:-		
<b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance		nO <sub>2</sub>	<b>A.</b> CH₃COOH	B. HCl	C. HNO₃	<b>D.</b> H <sub>3</sub> PO <sub>4</sub>
<b>C.</b> H <sub>2</sub> O	mass at the start of the reaction (		5				
<b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g	3) 0 36 32	5				
<b>37.</b> Which of t <b>A.</b> CO <sub>2</sub>	the following oxides wher <b>B.</b> CaO	reacted with water form <b>C.</b> SO <sub>3</sub>	ms acid solution? <b>D.</b> both ( A and C )				
	following pair compounds and 2,2-dimethyl propane		o each ether <b>except</b> :- e and cyclohexane				
C. pentane a	nd cyclopentane	<b>D.</b> 1,1-dic	hloro ethane and 1,2-dichloro ethane				
<b>39.</b> The follow	wing reaction: NH <sub>4</sub> Cl(s) +1	76kJ → NH <sub>3</sub> (g)+HCl(g),	occurs spontaneously:-				
<b>A.</b> if TΔS valu	ue = 176kJ <b>B.</b> if T∆S va	ue > 176kJ <b>C.</b> if TΔS	value < 176kJ <b>D.</b> at all temperature				
<b>40.</b> In this rea	action: $CN^{-}(aq)+ H_2O(l) \longleftarrow$	• HCN(aq)+ OH⁻(aq) ,whi	ch of the following is <b>incorrect</b> ?				
	• • • • • • • • • • • • • • • • • • • •		n is hydrolyzez <b>D.</b> none of them				
1				ı			

Subject: Chemistry MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 

Study year (2024-2025) (Grade twelve scientific)



fingerprint

2<sup>nd</sup> Attempt Time: 3.30 hours

# Answer the following questions: ( two marks for each right choice )

1. Salts of	weak acids and	l weak bases can	produce basic	aqueous solution if:-
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**A.**  $K_a = K_b$ 

**B.**  $K_a > K_b$ 

C.  $K_b > K_a$ 

**D.**  $[H_3O^+] > [OH^-]$ 

**2.** An acid is used as a fungicide:-

A. CH<sub>3</sub>COOH

C. HNO<sub>3</sub>

**D.** H<sub>3</sub>PO<sub>4</sub>

**3.** The following reaction: NH<sub>4</sub>Cl(s) +176kJ  $\longrightarrow$  NH<sub>3</sub>(g)+HCl(g), occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ

**B.** if T $\Delta$ S value > 176kJ

**C.** if  $T\Delta S$  value < 176kJ

**D.** at all temperature

**4.** The molecular formula for the ethyl ethanoate compound is :-

**A.**  $C_4H_{10}O_2$ 

**B.** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>

C. C<sub>4</sub>H<sub>10</sub>O

**D.**  $C_4H_8O$ 

**5.** In the following gaseous equilibrium reaction:  $PCl_5 \leftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-

**A.** 0.005

**B.** 0.05

**C.** 20

**D.** 200

**6.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \iff 2NO(g)$ 

**A.** the quantity of  $N_2$  decreases

**B.** the quantity of NO decreases

**C.** the quantity of NO increases

**D.** the quantities do not change

7. By using the information in the adjacent table, which of the following is catalyst?

A. MnO<sub>2</sub>

**B.**  $H_2O_2$ 

**D.** O<sub>2</sub>

**C.** H<sub>2</sub>O

Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>
mass at the start of the reaction (g)	68	0	0	5
mass at the end of the reaction (g)	0	36	32	5

**8.** A molecule that donates one electron pair to form a covalent bond is:-

**A.** BF<sub>3</sub>

**B.** NH<sub>4</sub><sup>+</sup>

**C.** CH<sub>4</sub>

D. NH<sub>3</sub>

9. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

B. KF

C. NaF

D. both (B and C)

**10.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is:

if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

100

**A.** 102.04°C

**B.** 1.02°C

C. 101.02°C

**D.** 100.51°C

**11.** At which of the following situation the pH do not change?

A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution

B. adding KCN solution to the HCN solution

C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution D. all of them

**12.** A molecular compound which dissolves in water and it does **not ionize**:-

A. C<sub>2</sub>H<sub>5</sub>OH

**B.**  $C_6H_6$ 

C. NH<sub>4</sub>Cl

D. HF

**13.** At equilibrium :-

A. all reaction have ceased

**B.** only the forward reaction continues

**C.** only the reverse reaction continues

**D.** both the forward and reverse reactions continue.

SN: 000012 **14.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**?

**A.** the value of K at 500°C is greater than the value of K at 700°C

**B.** the value of *K* at both temperatures are equal

**C.** the value of K at 500°C is less than the value of K at 700°C

**D.** none of them

**15.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?

**A.**  $[OH^{-}]=2.0x10^{-6}M$ 

**B.** the sea water is basic

**C.**  $[OH^{-}]=5.0\times10^{-9}M$ 

**D.** both (A and B)

**16.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \iff 2H_2O(l)$ ?

A. Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

**C.**  $Zn(s)+HCl(aq) \longrightarrow$ 

**D.** both (A and B)

17. In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ , which of following is correct?

A. NO is intermediate

**B.** NO<sub>3</sub> is intermediate

**C.**  $R = k[NO][O_2]$ 

**D.** both(B and C)

**18.** In the following reaction:  $HNO_2(aq)+H_2O(l) \longrightarrow NO_2(aq)+H_3O^+(aq)$ , the conjugate acid of  $NO_2$  is:-

A. H<sub>3</sub>O<sup>+</sup>

B. HNO<sub>2</sub>

**C.** H<sub>2</sub>O

**D.** none of them

**19.** Which of the following is **correct** at all temperature in pure water?

**A.**  $K_w = [H_3O^+][OH^-]$ 

**B.**  $[H_3O^+][OH^-]=1x10^{-14}$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

**D.** all of them.

**20.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-

A. 1-butanol

**B.** propanal

**C.** butanone

**D.** butanal

**21.** The rate law for the following hypothetical reaction: A +B  $\longrightarrow$  C, is R=k[A]<sup>2</sup>[B], by what factor does the rate increase if the concentration of each A and B is tripled?

**A.** 27

**B.** 16

**C.** 18

**D.** 8

**22.** All of the following pair compounds are structural isomers to each ether **except**:-

A. pentane and 2,2-dimethyl propane

**B.** hexene and cyclohexane

**C.** pentane and cyclopentane

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane

**23.** Which of the following is heated with sulfur atoms in vulcanization process?

A. isoprene

**B.** neoprene

**C.** poly isoprene

**D.** 2-methyl-1,3 butadiene

**24.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water **except**:-. D. NH<sub>4</sub>Br

A. NaCN

B. KCl

C. KNO<sub>2</sub>

25. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-

**A.** Mg<sup>2+</sup>

**B.** Ca<sup>2+</sup>

**C.** Pb<sup>2+</sup>

**D.**Al<sup>3+</sup>

**26.** The.....compounds contribute to the destruction of ozone in the upper atmosphere.

**A.**  $C_2F_4$ 

**B.** CFCs

C. MTBE

D. PVA

19. The number of hydrogen atoms in the 1.1 dimethyl cyclopropane compound is equal to: A. 6 B. 10 C. 8 D. 12  M. Which of the following oxides when reacted with water forms acid solution? A. Co <sub>2</sub> B. CaO C. 5O <sub>8</sub> D. both (A and C.)  M. Atter mixing Ga* ions with concentration 2.4x10*M and CO <sub>2</sub> * ions with concentration 1.2x10*M, which of the following is correct? the solubility of CaCO <sub>2</sub> in its saturated solution is 5.3±10*mol/L. A. ionic product-K <sub>16</sub> B. ionic product-K <sub>16</sub> C. ionic product-K <sub>16</sub> D. precipitate isn't form the following is correct?  A. the reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is calleding the following is incorrect?  A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  M. When compared dimethyl ether and ethanol, which of the following is incorrect?  A. both have the same a functional group  B. both have the same boiling point  C. both dissolved in water.  D. all of them  14. The correct name for this compound: {CH <sub>1</sub> CH <sub>1</sub> } accepted when antifreere is added to a car's cooling system?  A. vapor-pressure elevation  B. bening point elevation  B. bening point elevation  C. the graphite is a good electrical conductor  D. none of them  14. When compared dimethyl ether and ethanol, which of the following is correct?  A. both have the same a functional group  B. both have the same boiling point  C. both dissolved in water.  D. all of them  15. If 491 of energy are added to 35g of a material at 20°C, what will the final temperature of the material at 20°C, what will the final temperature of the material electron of the following is correct?  A. D. I. H. H. Cl at 50°C  C. J. M. H. Cl at 50°C  D. J. M. H. Cl at 50°C  C. J. M. H. Cl at 50°C  D. J. M. Cl at 50°C	7. At which of the following concentrations the hydrochloric acid considered a strong electrolyte?	41. Which theories of acids and bases belong to acids and bases conjugate?
A. 0.24 B. 0.12 C. 0.36 D. 0.072  19. The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:  A. 6 B. 10 C. 8 D. 12  10. Which of the following oxides when reacted with water forms acid solution?  A. CO, B. CaO C. SO; D. beth (A and C.)  11. After mixing (3r²-ions with concentration 2.440°M and CO)*ions with concentration 1.2410°M, which of the following is correct? If the solubility of CaCO; in its staturated solution is 5. 3310°mol/L.  A. incirc product-Xia, B. ionic product-Xia, C. ionic product-Xia, D. precipitate isn't form bethe following is correct?  A. the reaction that occurs when aqueous solutions of carbowilic acids and amines are mixed is called:  A. which of the following is incorrect?  A. the reaction type of methane gas with chlorine gas is addition  C. condensation  D. elimination  C. the graphite is a good electrical conductor  D. none of them  45. What colligative properties are displayed when amifreres a sed dad to a car's cooling system?  A. both have the same a functional group  B. both have the same boiling point  C. both dissolved in water.  D. all of them  46. A chemical formula B. empirical formula  C. therefore the contract of the following is incorrect?  A. Out HClia 25°C  B. Out HClia 45°C  C. 1M HClia 50°C  D. both (B and C.)  A. The entropy increases by:  A. Presence of clatalyst  B. changing concentration of product  C. CHickODK-NaH-NO)  D. Nhi-NO-SH-CCH-CODK-NaCl  49. In the reaction that occurs by one direction florward, which of the following is correct?  A. Duth HClia 25°C  B. Duth HClia 50°C  C. 1M HClia 50°C  D. both (B and C.)  A. Ectivation of the ordination of the contraction of evaluation of ereaty of called the value of Ethics following is correct?  A. Line following is correct?  A. HClia 50°C  C. HClia 50°C Signal 50°C  D. both (B and C.)  B. HCl	<b>A.</b> 5M <b>B.</b> 1M <b>C.</b> 0.001M <b>D.</b> all of them	A. Arrhenius B. Lewis C. Bronsted-Lowry D. none of them
19. The number of hydrogen atoms in the 1,1 dimethyl cyclopropane compound is equal to: A. 6 B. 10 C. 8 D. 12  10. Which of the following soides when reacted with water forms acid solution? A. Co, B. CaO C. So, D. both (A and C.)  11. After mixing Ca <sup>2+</sup> ions with concentration 2.4x10 <sup>-4</sup> M and CO2 <sup>2+</sup> ions with concentration 1.2x10 <sup>-4</sup> M, which of the following is correct? If the solubility of CaCO <sub>2</sub> in its saturated solution is 5.3x10 <sup>-2</sup> mol/L.  12. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called-the authority of the following is incorrect?  A. the reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called-the.  13. Which of the following is incorrect?  A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  14. When compared dimethyl ether and ethanol, which of the following is correct?  D. none of them  14. When compared dimethyl ether and ethanol, which of the following is correct?  D. all of them  15. If 49 and C.)  16. At which of the following shutation the reaction solid zinc with solution of HCl is faster?  C. the graphite is a specific ketermined by the	sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution?	
A. 6 B. 10 C. 8 D. 12  10. Which of the following poxides when recreted with water forms acid solution?  A. Co2 B. CaO C. SO3 D. both (A and C)  11. After mixing Ca <sup>2+</sup> lons with concentration 2.4x10 <sup>4</sup> M and CO2 <sup>3+</sup> lons with concentration 1.2x10 <sup>4</sup> M, which of the following is correct? If the solubility of CaCO3 in its saturated solution is 5.3x10 <sup>4</sup> mol/L.  A. lonic product-K <sub>w</sub> B. Lonic product-K <sub>w</sub> C. Condensation D. elimination  12. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:  A. substitution B. addition C. condensation D. elimination  13. Which of the following is incorrect?  A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  C. the graphite is a good electrical conductor  D. none of them  44. When compared dimethyl ether and ethanol, which of the following is correct?  A. both have the same a functional group  B. both have the same boiling point  C. both dissolved in water.  D. all of them  45. If 49 of energy are added to 3 Sg of a material at 20°C, what will the final temperature of the material between C. 40°C C. 10°C C. 1	<b>A.</b> 0.24 <b>B.</b> 0.12 <b>C.</b> 0.36 <b>D.</b> 0.72	<b>43.</b> If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of
A. CO <sub>2</sub> B. CaO C. SO <sub>3</sub> D. both (A and C)  11. After mixing Ca <sup>2*</sup> ions with concentration 2.4x10 <sup>4</sup> M and CO <sub>2</sub> <sup>2*</sup> ions with concentration 1.2x10 <sup>4</sup> M, which of the following is correct? If the solubility of CaCOs in its saturated solution is 5.3x10 <sup>2</sup> mol/L  A. ionic product-K <sub>w</sub> D. ionic product-K <sub>w</sub> D. precipitate isn't form  12. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called: A. substitution B. addition C. condensation  13. Which of the following is incorrect? A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  14. When compared dimethyl ether and ethanol, which of the following is orrect? A. both have the same a functional group B. b. both have the same boiling point  15. If 491 of energy are added to 35g of a material at 20°C, what will the final temperature of the material be? (C <sub>p</sub> =0.071/(g,K)) A. 0.1M HCl at 25°C B. 0.298K C. 40K D. 40°C C. 1. methyl-4-ethyl cyclohexane  45. What colligative properties are displayed when antifreeze is added to a car's cooling system? A. vapor pressure elevation C. freezing-point depression D. both (8 and C)  45. What colligative properties are displayed when antifreeze is added to a car's cooling system? A. vapor pressure elevation C. freezing-point depression D. both (8 and C)  46. A chemical formula that shows the type of covalent bond in organic compound: A. molecular formula B. empirical formula C. structural formula D. ionic formula C. the tructural formula D. ionic formula C. the tructural formula D. ionic formula D. ionic formula C. the correct order according the pDH value for the following solution is: A. NaCiCH <sub>C</sub> CO(SN-NaCiD-NH <sub>A</sub> NO <sub>3</sub> B. Nh <sub>A</sub> NO <sub>3</sub> >CH <sub>C</sub> CO(SN-NaCiD-H <sub>C</sub> CO(SN-NaCiD		
A. olnic product × K <sub>sp</sub> B. ionic product × K <sub>sp</sub> C. ionic product × K <sub>sp</sub> D. precipitate isn't form 12. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called: A. substitution B. addition C. condensation D. elimination 33. Which of the following is incorrect?  A. the reaction type of methane gas with chlorine gas is addition B. the alkynes don't have geometric formula  C. the graphite is a good electrical conductor D. none of them  A. when compared dimethyl ether and ethanol, which of the following is correct?  A. both have the same a functional group B. both have the same boiling point C. both dissolved in water. D. all of them  15. If 491 of energy are added to 35g of a material at 20°C, what will the final temperature of the material be? (C <sub>p</sub> =0.071/J(g, K)) A. 25°C B. 298K C. 40K D. 40°C  A. O. IM HCl at 25°C B. 0.1M HCl at 50°C C. 1M HCl at 50°C D. 1M Hcl at 25°C  A. O. IM HCl at 25°C B. 0.1M HCl at 50°C C. 1M HCl at 50°C D. 1M Hcl at 25°C  A. (HCl)=0.02M B. [HCl]=0.04M C. the spectator ions are Ca²-and Cl D. both (B and Cl)  S. If the ΔH <sup>0</sup> y value for each of CO <sub>2</sub> and CaCO <sub>3</sub> equal to (-334.9k/mol D. +634.9k/mol	<b>A.</b> $CO_2$ <b>B.</b> $CaO$ <b>C.</b> $SO_3$ <b>D.</b> both ( A and C ) <b>1.</b> After mixing $Ca^{2+}$ ions with concentration $2.4x10^{-4}M$ and $CO_3^{2-}$ ions with concentration $1.2x10^{-4}M$ ,	A. 1-ethyl-4-methyl cyclohexane B. 1-ethyl-4-methyl benzene
A. substitution B. addition C. condensation D. elimination at Substitution B. addition C. condensation D. elimination D. elim		$CH_2-CH_3$ <b>D.</b> 1-methyl-4- ethyl cyclohexane
46. A chemical formula that shows the type of covalent bond in organic compound:  A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  C. the graphite is a good electrical conductor  D. none of them  47. The entropy increases by:  A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them  48. The correct order according the pOH value for the following isolution is:-  A. Nacl>CH <sub>3</sub> CO(K>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >Nacl>CH <sub>5</sub> COOK  C. both dissolved in water.  D. all of them  48. The correct order according the pOH value for the following solution is:-  A. Nacl>CH <sub>3</sub> CO(K>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >Nacl>CH <sub>5</sub> COOK  C. CH <sub>5</sub> CO(K>Nacl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>5</sub> COOK>Nacl  49. In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?  A. presence of catalyst  B. changing concentration of product  C. changing temperature  D. changing concentration of reactant  D. in a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E <sub>5</sub> is:-(place the reactants at energy level zero).  A. 65kl/mol  B. +814.1kl/mol  C. structural formula  D. ionic formula  A. molecular formula  B. empirical formula  B. empirical formula  C. structural formula  D. ionic formula  A. molecular formula  B. empirical formula  B. empirical formula  D. ionic formula  C. structural formula  D. ionic formula  17. The entropy increases by:-  A. decreasing the pressure  B. increasing the temperature C. mixing gases  D. all of them  48. The correct order according the pOH value for the following solution is:-  A. Nacl>CH <sub>3</sub> CO(K>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >Nacl>CH <sub>5</sub> CO(K>Nacl  49. In the reaction that occurs by one direction(forward), which of the following doesn't effect on the reaction of product  C. chagging temperature  D. changing concentration of product  C. chagging temperature  D. changing concentration of product  D. io	· · · · · · · · · · · · · · · · · · ·	A. vapor-pressure elevation B. boiling point elevation
A. both have the same a functional group  B. both have the same boiling point  C. both dissolved in water.  D. all of them  B. both have the same boiling point  C. both dissolved in water.  D. all of them  D. all of them  C. CH <sub>3</sub> COOK>NaCl>H <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl  49. In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction?  A. NaCl>CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl  49. In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction?  A. Presence of catalyst  B. changing concentration of product  C. changing temperature  D. changing concentration of reactant  50. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E <sub>3</sub> - is:-(place the reactants at energy level zero).  A. 65kJ/mol  B. +814.1kJ/mol  B. +814.1kJ/mol  B. both have the same boiling point  C. CH <sub>3</sub> COOK>NACl>H <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK>NaCl>NaCl>NaCl>NaCl>NaCl>NaCl>NaCl>NaCl	A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  C. the graphite is a good electrical conductor	<ul> <li>46. A chemical formula that shows the type of covalent bond in organic compound:-</li> <li>A. molecular formula B. empirical formula C. structural formula D. ionic formula</li> <li>47. The entropy increases by:-</li> </ul>
C. both dissolved in water.  D. all of them  C. $CH_3COOK>NaCl>NH_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>NaCl>NH_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>NaCl>NH_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl>Nh_4NO_3$ D. $NH_4NO_3>CH_3COOK>NaCl}$	4. When compared dimethyl ether and ethanol, which of the following is correct?	48. The correct order according the pOH value for the following solution is:-
<b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>49.</b> In the reaction that occurs by one direction (forward), which of the following doesn't effect on the rate of reaction? <b>50.</b> In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of $E_a^{-1}$ is:-(place the reactants at energy level zero). <b>60.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster? <b>61.</b> A. 0.1M HCl at 25°C <b>63.</b> A. 0.1M HCl at 25°C <b>64.</b> A. 0.1M HCl at 25°C <b>65.</b> In M HCl at 25°C <b>67.</b> Suppose that 20mL of 0.01M Ca(OH) <sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following doesn't effect on that occurs by one direction (forward), which of the following doesn't effect on that occurs by one direction (forward) and the final temperature of catalyst <b>69.</b> In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol <b>60.</b> In the reaction (forward), which of the following doesn't effect on the rate of reaction? <b>60.</b> In a reaction, the value of the forward activation energy equals 100kJ/mol and	A. both have the same a functional group B. both have the same boiling point	A. NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK
the? $(C_p=0.07J/(g.K))$ A. $25^{\circ}C$ B. $298K$ C. $40K$ D. $40^{\circ}C$ B. $40^{\circ}C$ B. $40^{\circ}C$ B. $40^{\circ}C$ B. $40^{\circ}C$ B. $40^{\circ}C$ A. $40^{\circ}C$ B. $40^{\circ}C$	C. both dissolved in water.  D. all of them	C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl
<ul> <li>A. 0.1M HCl at 25°C</li> <li>B. 0.1M HCl at 50°C</li> <li>C. 1M HCl at 50°C</li> <li>D. 1M HCl at 25°C</li> <li>Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is correct?</li> <li>A. [HCl]=0.02M</li> <li>B. [HCl]=0.04M</li> <li>C. the spectator ions are Ca<sup>2+</sup> and Cl<sup>-</sup></li> <li>D. both (B and C)</li> <li>B. In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ → CaO (s)+ CO<sub>2</sub>(g), what is the ΔH<sup>0</sup><sub>f</sub> value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively</li> <li>A814.1kJ/mol</li> <li>B. +814.1kJ/mol</li> <li>D. 1M HCl at 25°C</li> <li>D. 1 a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub><sup>-</sup> is:-(place the reactants at energy level zero).</li> <li>A. 65kJ/mol</li> <li>B65kJ/mol</li> <li>D. 135kJ/mol</li> <li>D. 135kJ/mol</li> <li>D. 135kJ/mol</li> <li>D. 4634.9kJ/mol</li> </ul>		<b>49.</b> In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?
following is <b>correct</b> ?  A. [HCl]=0.02M B. [HCl]=0.04M C. the spectator ions are Ca <sup>2+</sup> and Cl <sup>-</sup> D. both (B and C)  B. In the following reaction: CaCO <sub>3</sub> (s)+ 179.2kJ $\longrightarrow$ CaO (s)+ CO <sub>2</sub> (g), what is the $\triangle H^0_f$ value for each of CO <sub>2</sub> and CaCO <sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively  A814.1kJ/mol B. +814.1kJ/mol C634.9kJ/mol D. +634.9kJ/mol		
<b>38.</b> In the following reaction: $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the $\Delta H^0_f$ value for CaO? If the $\Delta H^0_f$ value for each of $CO_2$ and $CaCO_3$ equal to (-393.5, -1207.6) kJ/mol respectively <b>A.</b> -814.1kJ/mol <b>B.</b> +814.1kJ/mol <b>C.</b> -634.9kJ/mol <b>D.</b> +634.9kJ/mol	following is correct?	change for reverse reaction equals -35kJ/mol , the value of E <sub>a</sub> is:-(place the reactants at energy
If the $\Delta H^0_f$ value for each of CO <sub>2</sub> and CaCO <sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively <b>A.</b> -814.1kJ/mol <b>B.</b> +814.1kJ/mol <b>C.</b> -634.9kJ/mol <b>D.</b> +634.9kJ/mol		level zero).  A. 65kJ/mol  B65kJ/mol  C. 35kJ/mol  D. 135kJ/mol
	If the $\Delta H_f^0$ value for each of $CO_2$ and $CaCO_3$ equal to ( -393.5, -1207.6) kJ/mol respectively	
<ul> <li>Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-</li> <li>A. specific heat B. enthalpy of reaction C. enthalpy of formation D. enthalpy of combustion</li> </ul>	(1°C) or one kelvin (1K) is:-	
10. Increasing the percentage of branched-chain alkanes in gasoline causes to:-	<b>0.</b> Increasing the percentage of branched-chain alkanes in gasoline causes to:-	
A. increase octane rating B. decrease octane rating C. increase boiling point D. both (A and C)		

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH MINISTRY OF EDUCATION

**Subject: Chemistry** 

HIGH COMMITTEE OF THE GENERAL EXAMINATION

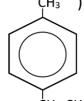


**General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific)



# Answer the following questions: (two marks for each right choice)

**1.** The correct name for this compound: (



CH<sub>3</sub> ) according to IUPAC system is:

- **A.** 1-ethyl-4-methyl cyclohexane
- B. 1-ethyl-4-methyl benzene
- C. 1-methyl-4-ethyl benzene
- **D.** 1-methyl-4- ethyl cyclohexane

2. If 49J of energy are added to 35g of a material at  $20^{\circ}$ C, what will the final temperature of the material be?  $(C_p=0.07J/(g.K))$ **A.** 25°C **B.** 298K **C.** 40K **D.** 40°C

**3.** The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution?

**A.** 0.24

**B.** 0.12

**C.** 0.36

**D.** 0.72

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**4.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

**C.** the graphite is a good electrical conductor

**D.** none of them

**5.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?

**A.** presence of catalyst

**B.** changing concentration of product

**C.** changing temperature

**D.** changing concentration of reactant

**6.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-

**A.** 6

**B.** 10

**C.** 8

**D.** 12

**7.** In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ , which of following is correct?

**A.** NO is intermediate

**B.** NO<sub>3</sub> is intermediate

C.  $R=k[NO][O_2]$ 

D. both(B and C)

**8.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**?

**A.**  $OH^{-}$  is conjugate base **B.**  $H_{2}O$  is amphoteric **C.**  $CN^{-}$  ion is hydrolyzez **D.** none of them

**9.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?

**A.**  $[OH^{-}]=2.0x10^{-6}M$ 

**B.** the sea water is basic

**C.**  $[OH^{-}]=5.0\times10^{-9}M$ 

**D.** both (A and B)

**10.** Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-

A. specific heat B. enthalpy of reaction C. enthalpy of formation

**D.** enthalpy of combustion

**11.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?

**A.** 5M

**B.** 1M

**C.** 0.001M

**D.** all of them

**12.** Which of the following is heated with sulfur atoms in vulcanization process? A. isoprene **C.** poly isoprene **D.** 2-methyl-1,3 butadiene **B.** neoprene **13.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M , SN: 000013 which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L **B.** ionic product $< K_{SD}$ **A.** ionic product> $K_{sp}$ **C.** ionic product= $K_{sp}$ **D.** precipitate isn't form **14.** At equilibrium :-A. all reaction have ceased **B.** only the forward reaction continues **C.** only the reverse reaction continues **D.** both the forward and reverse reactions continue. **15.** A chemical formula that shows the type of covalent bond in organic compound:-**A.** molecular formula **B.** empirical formula **D.** ionic formula **C.** structural formula **16.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ? A.  $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ **C.**  $Zn(s)+HCl(aq) \longrightarrow$ **D.** both (A and B) **17.** The entropy increases by:-A. decreasing the pressure **B.** increasing the temperature **C.** mixing gases **D.** all of them **18.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \longleftrightarrow 2NO(g)$ A. the quantity of N<sub>2</sub> decreases **B.** the quantity of NO decreases C. the quantity of NO increases **D.** the quantities do not change **19.** The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-**A.** if  $T\Delta S$  value = 176kJ **B.** if  $T\Delta S$  value > 176kJ **C.** if T $\Delta$ S value < 176kJ **20.** The......compounds contribute to the destruction of ozone in the upper atmosphere.

**D.** at all temperature

A. C<sub>2</sub>F<sub>4</sub>

B. CFCs

C. MTBE

D. PVA

**21.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system.

A. specific heat

**B.** nature

**C.** temperature

**D.** all of them

**22.** Which theories of acids and bases belong to acids and bases conjugate?

**A.** Arrhenius

**B.** Lewis

**C.** Bronsted-Lowry

**D.** none of them

**23.** When compared dimethyl ether and ethanol, which of the following is **correct**?

**A.** both have the same a functional group

**B.** both have the same boiling point

**C.** both dissolved in water.

**D.** all of them

**24.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**A.** 102.04°C

**B.** 1.02°C

**C.** 101.02°C

**D.** 100.51°C

**25.** What colligative properties are displayed when antifreeze is added to a car's cooling system?

**A.** vapor-pressure elevation

**B.** boiling point elevation

**C.** freezing-point depression

D. both (B and C)

_		+ 179.2kJ → CaO (s)+ C		•		n of the following situation th	•	o not ch	•		
If the $\Delta H^0_f$ value for <b>A.</b> -814.1kJ/mol	or each of CO <sub>2</sub> and ( <b>B.</b> +814.1kJ	CaCO₃ equal to ( -393.5, - /mol	•	respectively <b>D.</b> +634.9kJ/mol	· ·	$1H_4NO_3$ solution to the NH <sub>3</sub> s small amount of HCl to NH <sub>3</sub>		4Cl solut		ding KCN solution to the HCN I of them	solution
	.1M monoprotic wea	ak acid titrated with 50mL	of 0.1M potassiu	m hvdroxide. which of	<b>41.</b> By using	the information in the adjac	cent tab	le, whic	h of the fo	llowing is catalyst?	
the following salts r	•		, ,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	A. MnO <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H <sub>2</sub> O	O <sub>2</sub> MnO <sub>2</sub>		
A. KNO <sub>3</sub>	B. KF	<b>C.</b> NaF	<b>D.</b> both (B a	and C)	<b>B.</b> H <sub>2</sub> O <sub>2</sub>	mass at the start of the reaction (g)		0	0 5		
<b>28.</b> The reaction that <b>A.</b> substitution	t occurs when aqueo <b>B.</b> addition	ous solutions of carboxylic C. condensation		are mixed is called:- elimination	<b>C.</b> H <sub>2</sub> O <b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)		36	32 5		
<b>29.</b> Suppose that 20 following is <b>correct</b>		is required to neutralize 1	LOmL of HCl solut	ion, which of the	<b>42.</b> The mol <b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	ecular formula for the ethyl B. C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>	ethanoa		pound is :- <sub>1</sub> H <sub>10</sub> O	<b>D.</b> C <sub>4</sub> H <sub>8</sub> O	
<b>A.</b> [HCl]=0.02M	<b>B.</b> [HCl]=0.04M	C. the spectator ions a	re Ca <sup>2+</sup> and Cl <sup>-</sup>	D. both (B and C)	<b>43.</b> Which o	of the following is <b>correct</b> at a	all temp	erature	in pure wa	ter?	
<b>80.</b> Increasing the pe	· ·	ed-chain alkanes in gasoline <b>B.</b> decrease octa			<b>A.</b> $K_w = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-14}$ <b>C.</b> $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ <b>D.</b> all of them.						
<b>C.</b> increase boiling p	ooint	<b>D.</b> both (A and 0	<b>C)</b>						oesn't forn	n precipitate with sulfide ion :	-
<b>31.</b> In a reaction, the	e value of the forwa	ard activation energy equ	uals 100kJ/mol a	and the enthalpy	<b>A.</b> Mg <sup>2+</sup>	<b>B.</b> Ca <sup>2+</sup>	C. Pl	) <sup>2+</sup>		<b>D.</b> Al <sup>3+</sup>	
change for reverse	e reaction equals -3	$5kJ/mol$ , the value of $E_a$	is:-(place the re	eactants at energy		is used as a fungicide:-					
level zero).	<b>A.</b> 65kJ/mol	<b>B.</b> -65kJ/mol	<b>C.</b> 35kJ/mol	<b>D.</b> 135kJ/mol	<b>A.</b> CH₃COO			C. HNO		<b>D.</b> H <sub>3</sub> PO <sub>4</sub>	
<b>22.</b> According to IUP	AC system the comp	ound:(CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -COH),	is called:-							l <sub>2</sub> ,the mole number for each o	
A. 1-butanol	B. propanal	<b>C.</b> butanone	D.	butanal	and Cl <sub>2</sub> at 6	equilibrium is (0.084, 0.035, 0 <b>B.</b> 0.05	).06) res	pective	ly in 5L ves <b>C.</b> 20	sel, the value of equilibrium c <b>D.</b> 200	onstant is:
<b>A.</b> the value of <i>K</i> at	500°C is greater than	system: $2CO_2+167kJ {\longleftarrow} 2$ in the value of $K$ at $700^{\circ}C$	CO+O <sub>2</sub> , which of	the following is <b>true</b> ?		n of the following situation th				solution of HCl is faster?	5°C
	both temperatures a	re equal e value of <i>K</i> at 700°C									, C
<b>D.</b> none of them	500 C is less than the	e value of K at 700 C			<b>48.</b> The correct order according the pOH value for the following solution is:- <b>A.</b> NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> <b>B.</b> NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK						
	owing oxides when r	eacted with water forms a	ocid colution?		C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl						
<b>A.</b> CO <sub>2</sub>	<b>B.</b> CaO	<b>C.</b> SO <sub>3</sub>		( A and C )	<b>49.</b> A molec	ule that donates one electro	n pair to	o form a	covalent l	oond is:-	
		are structural isomers to ea			<b>A.</b> BF <sub>3</sub>	<b>B.</b> NH <sub>4</sub> <sup>+</sup>		<b>C.</b> C		D. NH <sub>3</sub>	
A. pentane and 2,2- C. pentane and cycl	dimethyl propane	<b>B.</b> hexene an	d cyclohexane	2-dichloro ethane		e law for the following hypotl se if the concentration of eac				C, is $R=k[A]^2[B]$ , by what facto	r does the
	•	res in water and it does <b>no</b> C. NH <sub>4</sub> Cl			<b>A.</b> 27	<b>B.</b> 16		<b>C.</b> 18		<b>D.</b> 8	
		$H_2O(l) \longleftrightarrow NO_2^-(aq)+H_3O^+($ <b>C.</b> $H_2O$	aq), the conjugat	e acid of NO <sub>2</sub> - is:-							
_	ng salts effect on the	e H₃O <sup>+</sup> and OH <sup>-</sup> concentrati	on when added t	o water <b>except</b> :							
A. NaCN	B. KCI	C. KNO <sub>2</sub>	<b>D.</b> NH <sub>4</sub> Br	- 1							
<b>39.</b> Salts of weak aci	ds and weak bases ca	an produce basic aqueous	solution if:-								
<b>A.</b> $K_a = K_b$	<b>B.</b> $K_a > K_b$	<b>C.</b> $K_b > K_a$	<b>D.</b> [H₃O <sup>+</sup> ]	]>[OH <sup>-</sup> ]							
					I						

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 

Study year (2024-2025) (Grade twelve scientific)

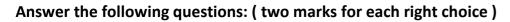


2<sup>nd</sup> Attempt Time: 3.30 hours

Subject: Chemistry



fingerprint



<ol> <li>Which of the following is correct at all temperature in</li> </ol>
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**A.**  $K_W = [H_3O^+][OH^-]$ 

**B.**  $[H_3O^+][OH^-]=1x10^{-14}$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

**D.** all of them.

**2.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**A.** 102.04°C

**B.** 1.02°C

**C.** 101.02°C

**D.** 100.51°C

**3.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol

**4.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water **except**:-.

A. NaCN

B. KCI

C. KNO<sub>2</sub>

**D.** NH₄Br

**5.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L

**A.** ionic product> $K_{SD}$ 

**B.** ionic product  $< K_{SD}$ 

**C.** ionic product= $K_{SD}$ 

**D.** precipitate isn't form

**6.** The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ

**B.** if T $\Delta$ S value > 176kJ **C.** if T $\Delta$ S value < 176kJ

D. at all temperature

7. Salts of weak acids and weak bases can produce basic aqueous solution if:-

**A.**  $K_a = K_b$ 

**B.**  $K_a > K_b$ 

C.  $K_b > K_a$ 

**D.** [H<sub>3</sub>O<sup>+</sup>]>[OH<sup>-</sup>]

**8.** What colligative properties are displayed when antifreeze is added to a car's cooling system?

A. vapor-pressure elevation

**B.** boiling point elevation

**C.** freezing-point depression

D. both (B and C)

**9.** By using the information in the adjacent table, which of the following is catalyst?

A. MnO<sub>2</sub>

**B.** H<sub>2</sub>O<sub>2</sub>

**C.** H<sub>2</sub>O

**D.** O<sub>2</sub>

Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>
mass at the start of the reaction (g)	68	0	0	5
mass at the end of the reaction (g)	0	36	32	5

**10.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?

**A.** presence of catalyst

**B.** changing concentration of product

**C.** changing temperature **D.** changing concentration of reactant

**11.** At equilibrium :-

A. all reaction have ceased

**B.** only the forward reaction continues

**C.** only the reverse reaction continues

**D.** both the forward and reverse reactions continue.

**12.** In the following reaction:  $HNO_2(aq)+H_2O(l) \leftrightarrow NO_2(aq)+H_3O^+(aq)$ , the conjugate acid of  $NO_2$  is:-

**A.** H<sub>3</sub>O<sup>+</sup>

**13.** Which of the following is heated with sulfur atoms in vulcanization process? SN: 000014 A. isoprene **B.** neoprene

**C.** poly isoprene

**C.** H<sub>2</sub>O

**D.** 2-methyl-1,3 butadiene

**D.** none of them

**14.** Which of the following oxides when reacted with water forms acid solution?

**A.** CO<sub>2</sub>

B. CaO

**C.** SO<sub>3</sub>

**D.** both ( A and C )

**15.** In the following reaction:  $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the  $\Delta H^0_f$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively

**A.** -814.1kJ/mol

**B.** +814.1kJ/mol

B. HNO<sub>2</sub>

C. -634.9kJ/mol

**D.** +634.9kJ/mol

**16.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?

**A.** [HCl]=0.02M

**B.** [HCl]=0.04M

**C.** the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>

D. both (B and C)

**17.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**?

**A.** OH<sup>-</sup> is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN<sup>-</sup> ion is hydrolyzez **D.** none of them

18. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material **A.** 25°C

be?  $(C_p=0.07J/(g.K))$ 

**B.** 298K

**C.** 40K

**D.** 40°C

**19.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-

**A.** 6

**B.** 10

**C.** 8

**D.** 12

**20.** A molecular compound which dissolves in water and it does **not ionize**:-

A. C<sub>2</sub>H<sub>5</sub>OH

**B.** C<sub>6</sub>H<sub>6</sub>

C. NH<sub>4</sub>Cl

D. HF

**21.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq) + OH^-(aq) \leftrightarrow 2H_2O(l)$ ?

A.  $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

**D.** both (A and B)

**22.** Which theories of acids and bases belong to acids and bases conjugate?

**A.** Arrhenius

**B.** Lewis

**C.** Bronsted-Lowry

**D.** none of them

23. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

B. KF

C. NaF

D. both (B and C)

24. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-**B.** Ca<sup>2+</sup> **C.** Pb<sup>2+</sup> **D.**Al<sup>3+</sup> **A.** Mg<sup>2+</sup>

**25.** The......compounds contribute to the destruction of ozone in the upper atmosphere. **A.** C<sub>2</sub>F<sub>4</sub>

**B.** CFCs

C. MTBE

**26.** All of the following pair compounds are structural isomers to each ether **except**:-

**A.** pentane and 2,2-dimethyl propane **C.** pentane and cyclopentane

**B.** hexene and cyclohexane

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane

I					
27. The correct name for this compound: ( CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl cyclohexane  B. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene  D. 1-methyl-4- ethyl cyclohexane	<ul> <li>41. At which of the following situation the pH do not change?</li> <li>A. adding NH₄NO₃ solution to the NH₃ solution</li> <li>B. adding KCN solution to the HCN solution</li> <li>C. adding a small amount of HCl to NH₃ and NH₄Cl solution</li> <li>D. all of them</li> <li>42. The rate law for the following hypothetical reaction: A+B →C, is R=k[A]²[B], by what factor does the rate increase if the concentration of each A and B is tripled?</li> </ul>				
<b>28.</b> By decreasing pressure on the following equilibrium system: $N_2(g) + O_2(g) \iff 2NO(g)$	A. 27 B. 16 C. 18 D. 8				
<ul> <li>A. the quantity of N<sub>2</sub> decreases</li> <li>B. the quantity of NO decreases</li> <li>D. the quantities do not change</li> </ul>	<b>43.</b> In the following reaction: $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is: $NO_3+NO \longrightarrow 2NO_2$ , which of following is <b>correct</b> ?				
<b>29.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster? <b>A.</b> 0.1M HCl at 25°C <b>B.</b> 0.1M HCl at 50°C <b>C.</b> 1M HCl at 50°C <b>D.</b> 1M HCl at 25°C	<b>A.</b> NO is intermediate <b>B.</b> NO <sub>3</sub> is intermediate <b>C.</b> R=k[NO][O <sub>2</sub> ] <b>D.</b> both(B and C) <b>44.</b> According to IUPAC system the compound:(CH <sub>3</sub> -CH <sub>2</sub> -COH), is called:-				
<b>30.</b> At which of the following concentrations the hydrochloric acid considered a strong electrolyte?	A. 1-butanol B. propanal C. butanone D. butanal				
<b>A.</b> 5M <b>B.</b> 1M <b>C.</b> 0.001M <b>D.</b> all of them	<b>45.</b> The total number of ions moles which are produced by dissociation 500mL an aqueous solution of				
<ul><li>31. The entropy increases by:-</li><li>A. decreasing the pressure</li><li>B. increasing the temperature</li><li>C. mixing gases</li><li>D. all of them</li></ul>	sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution?  A. 0.24  B. 0.12  C. 0.36  D. 0.72				
<b>32.</b> The molecular formula for the ethyl ethanoate compound is :-	<b>46.</b> The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-				
<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> <b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> <b>C.</b> C <sub>4</sub> H <sub>10</sub> O <b>D.</b> C <sub>4</sub> H <sub>8</sub> O	A. substitution B. addition C. condensation D. elimination				
<ul> <li>A. CH<sub>3</sub>COOH</li> <li>B. HCl</li> <li>C. HNO<sub>3</sub></li> <li>D. H<sub>3</sub>PO<sub>4</sub></li> </ul>	<b>47.</b> Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-				
<ul> <li>34. The correct order according the pOH value for the following solution is:-</li> <li>A. NaCl&gt;CH<sub>3</sub>COOK&gt;NH<sub>4</sub>NO<sub>3</sub></li> <li>B. NH<sub>4</sub>NO<sub>3</sub>&gt;NaCl&gt;CH<sub>3</sub>COOK</li> <li>C. CH<sub>3</sub>COOK&gt;NaCl&gt;NH<sub>4</sub>NO<sub>3</sub></li> <li>D. NH<sub>4</sub>NO<sub>3</sub>&gt;CH<sub>3</sub>COOK&gt;NaCl</li> <li>35. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct?</li> <li>A. [OH<sup>-</sup>]=2.0x10<sup>-6</sup>M</li> <li>B. the sea water is basic</li> <li>C. [OH<sup>-</sup>]=5.0x10<sup>-9</sup>M</li> <li>D. both (A and B)</li> </ul>	<ul> <li>A. specific heat B. enthalpy of reaction C. enthalpy of formation D. enthalpy of combustion</li> <li>48. In the following gaseous equilibrium system: 2CO₂+167kJ → 2CO+O₂, which of the following is true?</li> <li>A. the value of K at 500°C is greater than the value of K at 700°C</li> <li>B. the value of K at both temperatures are equal</li> <li>C. the value of K at 500°C is less than the value of K at 700°C</li> <li>D. none of them</li> </ul>				
<b>36.</b> A molecule that donates one electron pair to form a covalent bond is:- <b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub>	<b>49.</b> When compared dimethyl ether and ethanol, which of the following is <b>correct</b> ?				
<b>37.</b> A chemical formula that shows the type of covalent bond in organic compound:-	A. both have the same a functional group  C. both dissolved in water.  B. both have the same boiling point  D. all of them				
<ul> <li>A. molecular formula</li> <li>B. empirical formula</li> <li>C. structural formula</li> <li>D. ionic formula</li> <li>Which of the following is incorrect?</li> <li>A. the reaction type of methane gas with chlorine gas is addition</li> </ul>	<b>50.</b> In the following gaseous equilibrium reaction: $PCl_5 \leftrightarrow PCl_3 + Cl_2$ , the mole number for each of $PCl_5$ , $PCl_3 + Cl_2$ at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is				
B. the alkynes don't have geometric formula C. the graphite is a good electrical conductor D. none of them	<b>A.</b> 0.005 <b>B.</b> 0.05 <b>C.</b> 20 <b>D.</b> 200				
<b>39.</b> Increasing the percentage of branched-chain alkanes in gasoline causes to:-					
A. increase octane rating  B. decrease octane rating					
C. increase boiling point D. both (A and C)					
<b>40.</b> If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by thedifferences between the objects within system.					
A. specific heat B. nature C. temperature D. all of them					

Subject: Chemistry

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific)



2<sup>nd</sup> Attempt Time: 3.30 hours



fingerprint

#### Answer the following questions: (two marks for each right choice)

**1.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-**A.** 0.005 **D.** 200 **B.** 0.05 **C.** 20

2. If 49J of energy are added to 35g of a material at 20 $^{\circ}$ C, what will the final temperature of the material be?  $(C_p=0.07J/(g.K))$ **B.** 298K **A.** 25°C **C.** 40K **D.** 40°C

**3.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

C. the graphite is a good electrical conductor

**D.** none of them

**4.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**?

**A.** the value of K at 500°C is greater than the value of K at 700°C

**B.** the value of K at both temperatures are equal

**C.** the value of K at  $500^{\circ}$ C is less than the value of K at  $700^{\circ}$ C

**D.** none of them

**5.** Which of the following is heated with sulfur atoms in vulcanization process?

**A.** isoprene

**B.** neoprene

**C.** poly isoprene

D. 2-methyl-1,3 butadiene

**6.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?

**A.** 5M

**B.** 1M

**C.** 0.001M

**D.** all of them

**7.** The following reaction: NH<sub>4</sub>Cl(s) +176kJ  $\longrightarrow$  NH<sub>3</sub>(g)+HCl(g), occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ

**B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ **D.** at all temperature

**8.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**?

**A.** OH is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN ion is hydrolyzez **D.** none of them

**9.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?

**A.** [HCl]=0.02M

**B.** [HCl]=0.04M

C. the spectator ions are Ca<sup>2+</sup> and Cl<sup>-</sup>

D. both (B and C)

**10.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L

**A.** ionic product> $K_{sp}$ 

**B.** ionic product  $< K_{Sp}$ 

**C.** ionic product= $K_{sp}$ 

**D.** precipitate isn't form

11. In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?

**A.** presence of catalyst **C.** changing temperature **B.** changing concentration of product

**D.** changing concentration of reactant

**12.** At equilibrium :-

A. all reaction have ceased

**B.** only the forward reaction continues

**C.** only the reverse reaction continues

**D.** both the forward and reverse reactions continue.

SN: 000015

The entropy increases by:-

**A.** decreasing the pressure **B.** increasing the temperature **C.** mixing gases

**D.** all of them

14. Salts of weak acids and weak bases can produce basic aqueous solution if:-

**A.**  $K_a = K_b$ 

**B.**  $K_a > K_b$ 

C.  $K_b > K_a$ 

**D.**  $[H_3O^+] > [OH^-]$ 

**15.** The correct name for this compound: ( CH<sub>3</sub> ) according to IUPAC system is:

**A.** 1-ethyl-4-methyl cyclohexane

**B.** 1-ethyl-4-methyl benzene

C. 1-methyl-4-ethyl benzene

**D.** 1-methyl-4- ethyl cyclohexane

**16.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water except:-.

A. NaCN

B. KCI

C. KNO<sub>2</sub>

D. NH<sub>4</sub>Br

**17.** What colligative properties are displayed when antifreeze is added to a car's cooling system?

A. vapor-pressure elevation

**B.** boiling point elevation

**C.** freezing-point depression

D. both (B and C)

18. Which theories of acids and bases belong to acids and bases conjugate?

A. Arrhenius

**B.** Lewis

**C.** Bronsted-Lowry

**D.** none of them

**19.** When compared dimethyl ether and ethanol, which of the following is **correct**?

A. both have the same a functional group

**B.** both have the same boiling point

**C.** both dissolved in water.

**D.** all of them

**20.** All of the following pair compounds are structural isomers to each ether **except**:-

**A.** pentane and 2,2-dimethyl propane

**B.** hexene and cyclohexane

**C.** pentane and cyclopentane

**D.** 1,1-dichloro ethane and 1,2-dichloro ethane

**21.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?

A.  $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

**D.** both (A and B)

**22.** When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

B. KF

C. NaF

**D.** both (B and C)

**23.** The correct order according the pOH value for the following solution is:-

A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub>

B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK

C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub>

D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl

**24.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\triangle H^0_f$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively

**A.** -814.1kJ/mol

**B.** +814.1kJ/mol

C. -634.9kJ/mol

**D.** +634.9kJ/mol

<ul> <li>5. Increasing the percentage of branched-chain alkanes in gasoline causes to:-</li> <li>A. increase octane rating</li> <li>B. decrease octane rating</li> <li>C. increase boiling point</li> <li>D. both (A and C)</li> </ul>	<ul> <li>41. In the following reaction: 2NO+O₂ → 2NO₂, the reaction for the fast step is: NO₃+NO→2NO₂, which of following is correct?</li> <li>A. NO is intermediate</li> <li>B. NO₃ is intermediate</li> <li>C. R=k[NO][O₂]</li> <li>D. both(B and C)</li> </ul>
<b>6.</b> Which of the following is <b>correct</b> at all temperature in pure water? <b>A.</b> $K_{w}$ =[H <sub>3</sub> O <sup>+</sup> ][OH <sup>-</sup> ] <b>B.</b> [H <sub>3</sub> O <sup>+</sup> ][OH <sup>-</sup> ]=1x10 <sup>-14</sup> <b>C.</b> [H <sub>3</sub> O <sup>+</sup> ]= [OH <sup>-</sup> ]=1x10 <sup>-7</sup> M <b>D.</b> all of them.	<b>42.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster? <b>A.</b> 0.1M HCl at 25°C <b>B.</b> 0.1M HCl at 50°C <b>C.</b> 1M HCl at 50°C <b>D.</b> 1M HCl at 25°C <b>43.</b> The molecular formula for the ethyl ethanoate compound is :-
<ul> <li>7. An acid is used as a fungicide:- A. CH₃COOH B. HCI C. HNO₃ D. H₃PO₄</li> <li>8. In the following reaction: HNO₂(aq)+H₂O(I) → NO₂⁻(aq)+H₃O⁺(aq), the conjugate acid of NO₂⁻ is:- A. H₃O⁺ B. HNO₂ C. H₂O D. none of them</li> <li>9. According to IUPAC system the compound: (CH₃-CH₂-COH), is called:- A. 1-butanol B. propanal C. butanone D. butanal O. The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if (Kȝ=-1.86°C/m) (KЉ=0.51°C/m) A. 102.04°C B. 1.02°C C. 101.02°C D. 100.51°C</li> <li>1. The rate law for the following hypothetical reaction: A + B → C, is R=k[A]²[B], by what factor does the rate increase if the concentration of each A and B is tripled? A. 27 B. 16 C. 18 D. 8</li> <li>2. Which of the following oxides when reacted with water forms acid solution? A. CO₂ B. CaO C. SO₃ D. both (A and C)</li> <li>3. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct? A. [OH⁻]=2.0x10⁻⁶M B. the sea water is basic C. [OH⁻]=5.0x10⁻⁶M D. both (A and B)</li> </ul>	A. C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> B. C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> C. C <sub>4</sub> H <sub>10</sub> O D. C <sub>4</sub> H <sub>8</sub> O  44. By using the information in the adjacent table, which of the following is catalyst?  A. MnO <sub>2</sub> B. H <sub>2</sub> O <sub>2</sub> C. H <sub>2</sub> O D. O <sub>2</sub> 45. A chemical formula that shows the type of covalent bond in organic compound:  A. molecular formula B. empirical formula C. structural formula D. ionic formula  46. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion:  A. Mg <sup>2+</sup> B. Ca <sup>2+</sup> C. Pb <sup>2+</sup> D.Al <sup>3+</sup> 47. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E <sub>a</sub> is:-(place the reactants at energy level zero).  A. 65kJ/mol B65kJ/mol C. 35kJ/mol D. 135kJ/mol  48. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by thedifferences between the objects within system. A. specific heat B. nature C. temperature D. all of them
4. Thecompounds contribute to the destruction of ozone in the upper atmosphere.  A. C <sub>2</sub> F <sub>4</sub> B. CFCs  C. MTBE  D. PVA  5. The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-  A. 6  B. 10  C. 8  D. 12  6. By decreasing pressure on the following equilibrium system: N <sub>2</sub> (g)+ O <sub>2</sub> (g) → 2NO(g)  A. the quantity of N <sub>2</sub> decreases  B. the quantity of NO decreases  C. the quantity of NO increases  D. the quantities do not change  7. The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution?  A. 0.24  B. 0.12  C. 0.36  D. 0.72  8. A molecule that donates one electron pair to form a covalent bond is:-  A. BF <sub>3</sub> B. NH <sub>4</sub> <sup>+</sup> C. CH <sub>4</sub> D. NH <sub>3</sub> 9. A molecular compound which dissolves in water and it does <b>not ionize</b> :-  A. C <sub>2</sub> H <sub>5</sub> OH  B. C <sub>6</sub> H <sub>6</sub> C. NH <sub>4</sub> Cl  D. HF  0. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-  A. substitution  B. addition  C. condensation  D. elimination	49. At which of the following situation the pH do not change?  A. adding NH₄NO₃ solution to the NH₃ solution  C. adding a small amount of HCl to NH₃ and NH₄Cl solution  D. all of them  50. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-  A. specific heat  B. enthalpy of reaction  C. enthalpy of formation  D. enthalpy of combustion

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH MINISTRY OF EDUCATION

Subject: Chemistry

fingerprint

Study year (2024-2025) (Grade twelve scientific)

HIGH COMMITTEE OF THE GENERAL EXAMINATION

**General Examinations for Preparatory Stage** 

2<sup>nd</sup> Attempt Time: 3.30 hours

#### Answer the following questions: (two marks for each right choice)

1. In a reaction, the value of the forward activation energy equals  $100 \, \text{kJ/mol}$  and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). **A.** 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol

2. Which of the following oxides when reacted with water forms acid solution?

**A.** CO<sub>2</sub>

B. CaO

 $\mathbf{C}$ .  $SO_3$ 

**D.** both ( A and C )

**3.** The rate law for the following hypothetical reaction: A+B  $\longrightarrow$  C, is R=k[A]<sup>2</sup>[B], by what factor does the rate increase if the concentration of each A and B is tripled?

**A.** 27

**B.** 16

**C.** 18

**D.** 8

**4.** At which of the following situation the reaction solid zinc with solution of HCl is faster?

**A.** 0.1M HCl at 25°C

**B.** 0.1M HCl at 50°C

C. 1M HCl at 50°C

**D.** 1M HCl at 25°C

**5.** The molecular formula for the ethyl ethanoate compound is :-

**A.**  $C_4H_{10}O_2$ 

**B.** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>

**C.**  $C_4H_{10}O$ 

**D.** C<sub>4</sub>H<sub>8</sub>O

**6.** The following reaction: NH<sub>4</sub>Cl(s) +176kJ  $\longrightarrow$  NH<sub>3</sub>(g)+HCl(g), occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ

**B.** if T $\Delta$ S value > 176kJ

**C.** if  $T\Delta S$  value < 176kJ

**D.** at all temperature

7. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

B. KF

C. NaF

**D.** both (B and C)

**8.** Which of the following is heated with sulfur atoms in vulcanization process?

**A.** isoprene

**B.** neoprene

**C.** poly isoprene

D. 2-methyl-1,3 butadiene

**9.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-

**A.** increase octane rating

**B.** decrease octane rating

**C.** increase boiling point

**D.** both (A and C)

**10.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?

**A.**  $[OH^{-}]=2.0x10^{-6}M$ 

**B.** the sea water is basic

**C.**  $[OH^{-}]=5.0\times10^{-9}M$ 

D. both (A and B)

**11.** An acid is used as a fungicide:-

A. CH<sub>3</sub>COOH

B. HCl

C. HNO<sub>3</sub>

**D.** H<sub>3</sub>PO<sub>4</sub>

**12.** Which of the following is **correct** at all temperature in pure water?

**A.**  $K_W = [H_3O^+][OH^-]$ 

**B.**  $[H_3O^+][OH^-]=1x10^{-14}$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

**D.** all of them.

**13.** When compared dimethyl ether and ethanol, which of the following is correct?

**A.** both have the same a functional group

**B.** both have the same boiling point

**C.** both dissolved in water.

**D.** all of them

which of following is **correct**? A. NO is intermediate **B.** NO<sub>3</sub> is intermediate **C.**  $R = k[NO][O_2]$ **D.** both(B and C) **15.** In the following gaseous equilibrium reaction:  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ 

**14.** In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ ,

and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-

**A.** 0.005

**B.** 0.05

**C.** 20

**D.** 200

**16.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

**C.** the graphite is a good electrical conductor

**D.** none of them

17. The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is:

if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**A.** 102.04°C

**B.** 1.02°C

**C.** 101.02°C

**D.** 100.51°C

**18.** Which theories of acids and bases belong to acids and bases conjugate?

A. Arrhenius

**B.** Lewis

C. Bronsted-Lowry

**D.** none of them

**19.** In the following reaction:  $HNO_2(aq)+H_2O(l) \longleftrightarrow NO_2^-(aq)+H_3O^+(aq)$ , the conjugate acid of  $NO_2^-$  is:-

C. MTBE

A. H<sub>3</sub>O<sup>+</sup>

B. HNO<sub>2</sub>

**C.** H<sub>2</sub>O

**D.** none of them

**20.** The.....compounds contribute to the destruction of ozone in the upper atmosphere.

**A.** C<sub>2</sub>F<sub>4</sub>

B. CFCs

D. PVA

**21.** If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material

be?  $(C_p=0.07J/(g.K))$ **A.** 25°C **B.** 298K

**C.** 40K

**D.** 40°C

**22.** By using the information in the adjacent table, which of the following is catalyst?

A. MnO<sub>2</sub>

**B.** H<sub>2</sub>O<sub>2</sub> **C.** H<sub>2</sub>O

Substance  $H_2O_2$ H<sub>2</sub>O O<sub>2</sub> MnO<sub>2</sub> 68 5 mass at the start of the reaction (g) 0 0 36 32 mass at the end of the reaction (g)

**23.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?

**A.** 5M

**D.** O<sub>2</sub>

**B.** 1M

**C.** 0.001M

**D.** all of them

**24.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-

A. 1-butanol

**B.** propanal

**C.** butanone

**D.** butanal

**25.** A chemical formula that shows the type of covalent bond in organic compound:-

A. molecular formula

**B.** empirical formula

**C.** structural formula

**D.** ionic formula

**26.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\Delta H_f^0$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively

**A.** -814.1kJ/mol

**B.** +814.1kJ/mol

C. -634.9kJ/mol

**D.** +634.9kJ/mol

**27.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \iff 2NO(g)$ 

A. the quantity of N<sub>2</sub> decreases C. the quantity of NO increases

**B.** the quantity of NO decreases **D.** the quantities do not change

<ul> <li>What colligative properties are displayed when antifreeze is added to a car's cooling system?</li> <li>vapor-pressure elevation</li> <li>freezing-point depression</li> <li>both (B and C)</li> </ul>	<ul> <li>42. The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution?</li> <li>A. 0.24</li> <li>B. 0.12</li> <li>C. 0.36</li> <li>D. 0.72</li> </ul>			
<b>9.</b> A molecule that donates one electron pair to form a covalent bond is:- <b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub> <b>O.</b> After mixing Ca <sup>2+</sup> ions with concentration 2.4x10 <sup>-4</sup> M and CO <sub>3</sub> <sup>2-</sup> ions with concentration 1.2x10 <sup>-4</sup> M,	43. The correct order according the pOH value for the following solution is:-  A. NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK  C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl			
which of the following is <b>correct</b> ? If the solubility of CaCO <sub>3</sub> in its saturated solution is $5.3 \times 10^{-5} \text{mol/L}$ A. ionic product> $K_{sp}$ B. ionic product< $K_{sp}$ C. ionic product= $K_{sp}$ D. precipitate isn't form  1. In the following gaseous equilibrium system: $2CO_2+167kJ \Longrightarrow 2CO+O_2$ , which of the following is <b>true</b> ?  A. the value of $K$ at $500^{\circ}$ C is greater than the value of $K$ at $700^{\circ}$ C  B. the value of $K$ at both temperatures are equal  C. the value of $K$ at $500^{\circ}$ C is less than the value of $K$ at $700^{\circ}$ C  D. none of them	<ul> <li>44. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:- <ul> <li>A. specific heat</li> <li>B. enthalpy of reaction</li> <li>C. enthalpy of formation</li> <li>D. enthalpy of combustion</li> </ul> </li> <li>45. Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is correct? <ul> <li>A. [HCl]=0.02M</li> <li>B. [HCl]=0.04M</li> <li>C. the spectator ions are Ca<sup>2+</sup> and Cl<sup>-</sup></li> <li>D. both (B and C)</li> </ul> </li> </ul>			
<ol> <li>The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-</li> <li>substitution B. addition C. condensation D. elimination</li> <li>All of the following salts effect on the H<sub>3</sub>O<sup>+</sup> and OH<sup>-</sup> concentration when added to water except:</li> <li>NaCN B. KCl C. KNO<sub>2</sub> D. NH<sub>4</sub>Br</li> <li>The net ionic equation for which of the following reaction is: H<sub>3</sub>O<sup>+</sup>(aq)+OH<sup>-</sup>(aq) ← 2H<sub>2</sub>O(<i>l</i>)?</li> </ol>	<ul> <li>46. In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?</li> <li>A. presence of catalyst</li> <li>B. changing concentration of product</li> <li>C. changing temperature</li> <li>D. changing concentration of reactant</li> <li>47. At equilibrium:-</li> <li>A. all reaction have ceased</li> <li>B. only the forward reaction continues</li> </ul>			
A. Ba(OH)₂(aq)+H₂SO₄(aq) → B. Sr(OH)₂(aq)+HCl(aq) → C. Zn(s)+HCl(aq) → D. both ( A and B )	<b>C.</b> only the reverse reaction continues <b>D.</b> both the forward and reverse reactions continue. <b>48.</b> Salts of weak acids and weak bases can produce basic aqueous solution if:- <b>A.</b> $K_a = K_b$ <b>B.</b> $K_a > K_b$ <b>C.</b> $K_b > K_a$ <b>D.</b> $[H_3O^+] > [OH^-]$			
<ul> <li>At which of the following situation the pH do not change?</li> <li>A. adding NH₄NO₃ solution to the NH₃ solution</li> <li>B. adding KCN solution to the HCN solution</li> <li>C. adding a small amount of HCl to NH₃ and NH₄Cl solution</li> <li>D. all of them</li> <li>In this reaction: CN⁻(aq)+ H₂O(l) ← HCN(aq)+ OH⁻(aq) ,which of the following is incorrect?</li> <li>A. OH⁻ is conjugate base</li> <li>B. H₂O is amphoteric</li> <li>C. CN⁻ ion is hydrolyzez</li> <li>D. none of them</li> <li>A. All of the following pair compounds are structural isomers to each ether except:-</li> <li>A. pentane and 2,2-dimethyl propane</li> <li>B. hexene and cyclohexane</li> </ul>	<ul> <li>49. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction energy transfer is determined by thedifferences between the objects within system.</li> <li>A. specific heat</li> <li>B. nature</li> <li>C. temperature</li> <li>D. all of them</li> <li>50. The entropy increases by:-</li> <li>A. decreasing the pressure</li> <li>B. increasing the temperature</li> <li>C. mixing gases</li> <li>D. all of them</li> </ul>			
D. 1,1-dichloro ethane and 1,2-dichloro ethane  B. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-  A. Mg <sup>2+</sup> B. Ca <sup>2+</sup> C. Pb <sup>2+</sup> D. Al <sup>3+</sup> D. The correct name for this compound: (  CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl cyclohexane  B. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene  D. 1-methyl-4- ethyl cyclohexane  D. A molecular compound which dissolves in water and it does not ionize:-  A. C <sub>2</sub> H <sub>5</sub> OH  B. C <sub>6</sub> H <sub>6</sub> C. NH <sub>4</sub> Cl  D. HF				
<ol> <li>The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-</li> <li>B. 10</li> <li>C. 8</li> <li>D. 12</li> </ol>				

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 



2<sup>nd</sup> Attempt Time: 3.30 hours

Subject: Chemistry

fingerprint

Study year (2024-2025) (Grade twelve scientific)

#### Answer the following questions: (two marks for each right choice)

<b>1.</b> Supp	ose that 20mL	of $0.01M$ Ca(OH) <sub>2</sub>	is required to n	eutralize 10mL	of HCl solution,	which of the
follow	ring is correct?					

- **A.** [HCl]=0.02M
- **B.** [HCI]=0.04M
- **C.** the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>
- D. both (B and C)
- **2.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?
- **A.** Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$
- **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

- **D.** both (A and B)
- **3.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-
- **A.** 0.005

**B.** 0.05

- **C.** 20
- **D.** 200
- **4.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at  $-3.72^{\circ}$ C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$
- **A.** 102.04°C
- **B.** 1.02°C
- **C.** 101.02°C
- **D.** 100.51°C
- **5.** A chemical formula that shows the type of covalent bond in organic compound:-
- A. molecular formula
- **B.** empirical formula
- C. structural formula
- **D.** ionic formula
- **6.** Salts of weak acids and weak bases can produce basic aqueous solution if:-
- **A.**  $K_a = K_b$

- **B.**  $K_a > K_b$
- **C.**  $K_b > K_a$

- **D.**  $[H_3O^+] > [OH^-]$
- 7. When compared dimethyl ether and ethanol, which of the following is correct?
- **A.** both have the same a functional group
- **B.** both have the same boiling point

**C.** both dissolved in water.

- **D.** all of them
- **8.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-
- **A.** 6
- **B.** 10
- **C.** 8

- **D.** 12
- 9. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?
- A. KNO<sub>3</sub>

B. KF

Substance

mass at the start of the reaction (g)

mass at the end of the reaction (g)

C. NaF

H<sub>2</sub>O

0

36

 $O_2$ 

0

32

- D. both (B and C)
- **10.** By using the information in the adjacent table, which of the following is catalyst?

H<sub>2</sub>O<sub>2</sub>

0

- A. MnO<sub>2</sub>
- **B.** H<sub>2</sub>O<sub>2</sub>
- $\mathbf{C}$ .  $H_2O$
- **D.** O<sub>2</sub>
- **11.** The following reaction: NH<sub>4</sub>Cl(s) +176kJ  $\longrightarrow$  NH<sub>3</sub>(g)+HCl(g), occurs spontaneously:-
- **A.** if T $\Delta$ S value = 176kJ
  - **B.** if T $\Delta$ S value > 176kJ
- **C.** if  $T\Delta S$  value < 176kJ

MnO<sub>2</sub>

5

5

- **D.** at all temperature
- **12.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
- **A.** the quantity of N<sub>2</sub> decreases

**B.** the quantity of NO decreases

C. the quantity of NO increases

**D.** the quantities do not change

- **13.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?
- **A.** 5M
- **B.** 1M

- **C.** 0.001M
- **D.** all of them

- **14.** An acid is used as a fungicide:-SN: 000017 B. HCl
- C. HNO<sub>3</sub>

- **D.** H<sub>3</sub>PO<sub>4</sub>
- **15.** In the following reaction:  $HNO_2(aq)+H_2O(l) \longrightarrow NO_2(aq)+H_3O^+(aq)$ , the conjugate acid of  $NO_2$  is:-
- **A.** H<sub>3</sub>O<sup>+</sup>
- B. HNO2
- **C.** H<sub>2</sub>O

**D.** none of them

- **16.** At equilibrium :-
- A. all reaction have ceased

- **B.** only the forward reaction continues
- C. only the reverse reaction continues
- **D.** both the forward and reverse reactions continue.
- **17.** At which of the following situation the pH do not change?
- A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution
- B. adding KCN solution to the HCN solution
- C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution D. all of them
- 18. After mixing  $Ca^{2+}$  ions with concentration  $2.4 \times 10^{-4} M$  and  $CO_3^{2-}$  ions with concentration  $1.2 \times 10^{-4} M$ , which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L
- **A.** ionic product> $K_{sp}$
- **B.** ionic product $< K_{Sp}$
- **C.** ionic product= $K_{SP}$
- **D.** precipitate isn't form
- **19.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?
- A. presence of catalyst

**B.** changing concentration of product

**C.** changing temperature

- **D.** changing concentration of reactant
- **20.** A molecule that donates one electron pair to form a covalent bond is:-
- $A. BF_3$
- B. NH<sub>4</sub><sup>+</sup>

**C.** CH<sub>4</sub>

- D. NH<sub>3</sub>
- **21.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol
- **22.** In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ , which of following is **correct**?
- **A.** NO is intermediate
- **B.** NO<sub>3</sub> is intermediate
- **C.**  $R = k[NO][O_2]$
- **D.** both(B and C)

- **23.** Which of the following is **incorrect**?
- A. the reaction type of methane gas with chlorine gas is addition
- **B.** the alkynes don't have geometric formula C. the graphite is a good electrical conductor
- **D.** none of them
- **24.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system.
- A. specific heat
- **B.** nature
- **C.** temperature
- **D.** all of them
- **25.** At which of the following situation the reaction solid zinc with solution of HCl is faster?
- **A.** 0.1M HCl at 25°C
- **B.** 0.1M HCl at 50°C
- **C.** 1M HCl at 50°C
- **D.** 1M HCl at 25°C

- 100

<b>6.</b> The rate law for the following hypothetical reaction: $A + B \longrightarrow C$ , is $R = k[A]^2[B]$ , by what factor does the rate increase if the concentration of each A and B is tripled?	<b>42.</b> In the following gaseous equilibrium system: $2CO_2+167kJ \longrightarrow 2CO+O_2$ , which of the following is <b>true</b> ? <b>A.</b> the value of $K$ at $500^{\circ}$ C is greater than the value of $K$ at $700^{\circ}$ C			
A. 27 B. 16 C. 18 D. 8	<b>B.</b> the value of <i>K</i> at both temperatures are equal			
7. Thecompounds contribute to the destruction of ozone in the upper atmosphere.  A. C <sub>2</sub> F <sub>4</sub> B. CFCs  C. MTBE  D. PVA	C. the value of K at 500°C is less than the value of K at 700°C  D. none of them			
<ul> <li>8. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-</li> <li>A. specific heat</li> <li>B. enthalpy of reaction</li> <li>C. enthalpy of formation</li> <li>D. enthalpy of combustion</li> </ul>	43. The correct order according the pOH value for the following solution is:-  A. NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK  C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl			
<ul> <li>9. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-</li> <li>A. substitution</li> <li>B. addition</li> <li>C. condensation</li> <li>D. elimination</li> </ul>	<b>44.</b> In this reaction: $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is <b>incorrect</b> ? <b>A.</b> $OH^{-}$ is conjugate base <b>B.</b> $H_2O$ is amphoteric <b>C.</b> $CN^{-}$ ion is hydrolyzez <b>D.</b> none of them			
<b>0.</b> Which of the following is heated with sulfur atoms in vulcanization process? <b>A.</b> isoprene <b>B.</b> neoprene <b>C.</b> poly isoprene <b>D.</b> 2-methyl-1,3 butadiene <b>1.</b> In the following reaction: $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the $\Delta H^0_f$ value for CaO? If the $\Delta H^0_f$ value for each of $CO_2$ and $CaCO_3$ equal to (-393.5, -1207.6) kJ/mol respectively <b>A.</b> -814.1kJ/mol <b>B.</b> +814.1kJ/mol <b>C.</b> -634.9kJ/mol <b>D.</b> +634.9kJ/mol	45. The correct name for this compound: ( CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl cyclohexane  B. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene  D. 1-methyl-4- ethyl cyclohexane			
<ul> <li>2. The entropy increases by:-</li> <li>A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them</li> </ul>	<b>46.</b> The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na₂SO₄) is 0.36mol, what is the molarity of solution? <b>A.</b> 0.24 <b>B.</b> 0.12 <b>C.</b> 0.36 <b>D.</b> 0.72			
<ul> <li>3. All of the following salts effect on the H<sub>3</sub>O<sup>+</sup> and OH<sup>-</sup> concentration when added to water except:</li> <li>A. NaCN</li> <li>B. KCl</li> <li>C. KNO<sub>2</sub></li> <li>D. NH<sub>4</sub>Br</li> </ul>	<b>47.</b> If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material be? $(C_p=0.07J/(g.K))$ <b>A.</b> 25°C <b>B.</b> 298K <b>C.</b> 40K <b>D.</b> 40°C			
<ul> <li>4. Increasing the percentage of branched-chain alkanes in gasoline causes to:-</li> <li>A. increase octane rating</li> <li>B. decrease octane rating</li> <li>C. increase boiling point</li> <li>D. both (A and C)</li> </ul>	<ul> <li>48. Which theories of acids and bases belong to acids and bases conjugate?</li> <li>A. Arrhenius B. Lewis C. Bronsted-Lowry D. none of them</li> </ul>			
<b>5.</b> An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :- <b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>	<b>49.</b> Which of the following oxides when reacted with water forms acid solution? <b>A.</b> CO <sub>2</sub> <b>B.</b> CaO <b>C.</b> SO <sub>3</sub> <b>D.</b> both ( A and C )			
6. The molecular formula for the ethyl ethanoate compound is :-  A. C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> B. C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> C. C <sub>4</sub> H <sub>10</sub> O  D. C <sub>4</sub> H <sub>8</sub> O  7. According to IUPAC system the compound:(CH <sub>3</sub> -CH <sub>2</sub> -COH), is called:-  A. 1-butanol  B. propanal  C. butanone  D. Alexander  D. Alexande	<ul> <li>50. What colligative properties are displayed when antifreeze is added to a car's cooling system?</li> <li>A. vapor-pressure elevation</li> <li>B. boiling point elevation</li> <li>C. freezing-point depression</li> <li>D. both (B and C)</li> </ul>			
8. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct?  A. [OH <sup>-</sup> ]=2.0x10 <sup>-6</sup> M  B. the sea water is basic  C. [OH <sup>-</sup> ]=5.0x10 <sup>-9</sup> M  D. both (A and B)				
<b>9.</b> Which of the following is <b>correct</b> at all temperature in pure water? <b>A.</b> $K_W = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-7} M$ <b>D.</b> all of them.				
<ul> <li>O. A molecular compound which dissolves in water and it does not ionize:-</li> <li>A. C<sub>2</sub>H<sub>5</sub>OH</li> <li>B. C<sub>6</sub>H<sub>6</sub></li> <li>C. NH<sub>4</sub>Cl</li> <li>D. HF</li> </ul>				
<ol> <li>All of the following pair compounds are structural isomers to each ether except:-</li> <li>A. pentane and 2,2-dimethyl propane</li> <li>B. hexene and cyclohexane</li> <li>C. pentane and cyclopentane</li> <li>D. 1,1-dichloro ethane and 1,2-dichloro ethane</li> </ol>				

MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION

**General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific)



C.  $R=k[NO][O_2]$ 

2<sup>nd</sup> Attempt Time: 3.30 hours

Subject: Chemistry

# fingerprint



**D.** both(B and C)

**D.** none of them

#### Answer the following questions: (two marks for each right choice)

<b>1.</b> If 49J	of energy are add	led to 35g of a mate	rial at 20°C , what w	ill the final temperat	ure of the material
be?	$(C_{\rho}=0.07J/(g.K))$	<b>A.</b> 25°C	<b>B.</b> 298K	<b>C.</b> 40K	<b>D.</b> 40°C

- **2.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub> (aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub> is:-
- **A.** H<sub>3</sub>O<sup>+</sup> B. HNO<sub>2</sub> **C.** H<sub>2</sub>O **D.** none of them
- **3.** In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ , which of following is **correct**?
- **4.** Which theories of acids and bases belong to acids and bases conjugate?
- **A.** Arrhenius **B.** Lewis C. Bronsted-Lowry

**B.** NO<sub>3</sub> is intermediate

- **5.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system.
- **A.** specific heat **D.** all of them **B.** nature **C.** temperature
- **6.** All of the following salts effect on the H<sub>3</sub>O<sup>+</sup> and OH<sup>-</sup> concentration when added to water **except**:-. \
- A. NaCN B. KCI C. KNO<sub>2</sub> **D.** NH₄Br
- **7.** In the following gaseous equilibrium system:  $2CO_2+167kJ \longrightarrow 2CO+O_2$ , which of the following is **true**?
- **A.** the value of K at 500°C is greater than the value of K at 700°C
- **B.** the value of K at both temperatures are equal
- C. the value of K at 500°C is less than the value of K at 700°C
- **D.** none of them

**A.** NO is intermediate

- 8. When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?
- B. KF A. KNO<sub>3</sub>
- C. NaF
- D. both (B and C)
- **9.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?
- **A.** [HCl]=0.02M
- **B.** [HCl]=0.04M
- C. the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>
- D. both (B and C)
- **10.** The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution?
- **A.** 0.24

**B.** 0.12

**C.** 0.36

- **D.** 0.72
- **11.** The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-
- **A.** if T $\Delta$ S value = 176kJ **B.** if T $\Delta$ S value > 176kJ **C.** if T $\Delta$ S value < 176kJ **D.** at all temperature
- **12.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-
- **A.** 0.005

**B.** 0.05

- **C.** 20
- **D.** 200

- **13.** After mixing Ca<sup>2+</sup> ions with concentration  $2.4 \times 10^{-4} \text{M}$  and  $CO_3^{2-}$  ions with concentration  $1.2 \times 10^{-4} \text{M}$ , which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L
- **A.** ionic product> $K_{SD}$
- **B.** ionic product  $< K_{SD}$
- **C.** ionic product= $K_{SD}$
- **D.** precipitate isn't form

- SN: 000018
  The entropy increases by:-
- **A.** decreasing the pressure **B.** increasing the temperature **C.** mixing gases
- - **D.** all of them
- **15.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?
- **A.**  $[OH^{-}]=2.0x10^{-6}M$
- **B.** the sea water is basic
- **C.**  $[OH^{-}]=5.0x10^{-9}M$
- D. both (A and B)
- **16.** The correct name for this compound: ( CH<sub>3</sub> ) according to IUPAC system is:



- - **A.** 1-ethyl-4-methyl cyclohexane
  - **B.** 1-ethyl-4-methyl benzene
  - C. 1-methyl-4-ethyl benzene

**D.** 1-methyl-4- ethyl cyclohexane

- **17.** The rate law for the following hypothetical reaction:  $A + B \longrightarrow C$ , is  $R = k[A]^2[B]$ , by what factor does the
- A. 27
- rate increase if the concentration of each A and B is tripled? **B.** 16
  - **C.** 18

- **D.** 8
- **18.** All of the following pair compounds are structural isomers to each ether **except**:-
- A. pentane and 2,2-dimethyl propane
- **B.** hexene and cyclohexane

**C.** pentane and cyclopentane

- **D.** 1,1-dichloro ethane and 1,2-dichloro ethane
- **19.** When compared dimethyl ether and ethanol, which of the following is **correct**?
- **A.** both have the same a functional group
- **B.** both have the same boiling point

**C.** both dissolved in water.

- **D.** all of them
- **20.** Which of the following is **correct** at all temperature in pure water?
- **A.**  $K_{w} = [H_{3}O^{+}][OH^{-}]$

**B.**  $[H_3O^+][OH^-]=1x10^{-14}$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

**D.** all of them.

- **21.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-
- **A.** increase octane rating

**B.** decrease octane rating

**C.** increase boiling point

- **D.** both (A and C)
- **22.** Which of the following oxides when reacted with water forms acid solution?
- **A.** CO<sub>2</sub>
- B. CaO

**C.** SO<sub>3</sub>

- **D.** both (A and C)
- 23. According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-
- A. 1-butanol
- **B.** propanal
- **C.** butanone
- **24.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-
- **B.** 10 **A.** 6 **C.** 8

- **D.** 12
- **25.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \iff 2H_2O(l)$ ?
- **A.** Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$
- **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

- **D.** both (A and B)
- **26.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**?
- **A.** OH<sup>-</sup> is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN<sup>-</sup> ion is hydrolyzez **D.** none of them

<b>27.</b> Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-	<b>41.</b> A molecule that donates one electron pair to form a covalent bond is:- <b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub>				
A. specific heat B. enthalpy of reaction C. enthalpy of formation D. enthalpy of combustion					
<ul> <li>28. At which of the following situation the pH do not change?</li> <li>A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution</li> <li>B. adding KCN solution to the HCN solution</li> <li>C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution</li> <li>D. all of them</li> </ul>	<ul> <li>42. What colligative properties are displayed when antifreeze is added to a car's cooling system?</li> <li>A. vapor-pressure elevation</li> <li>B. boiling point elevation</li> <li>C. freezing-point depression</li> <li>D. both (B and C)</li> </ul>				
	43. The correct order according the pOH value for the following solution is:-				
<b>29.</b> An acid is used as a fungicide:-  A. CH₃COOH  B. HCl  C. HNO₃  D. H₃PO₄	A. NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK  C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl				
<b>30.</b> Salts of weak acids and weak bases can produce basic aqueous solution if:-	<b>44.</b> Which of the following is <b>incorrect</b> ?				
<b>A.</b> $K_a = K_b$ <b>B.</b> $K_a > K_b$ <b>C.</b> $K_b > K_a$ <b>D.</b> $[H_3O^+] > [OH^-]$	A. the reaction type of methane gas with chlorine gas is addition				
31. At which of the following concentrations the hydrochloric acid considered a strong electrolyte?  A. 5M  B. 1M  C. 0.001M  D. all of them	<ul><li>B. the alkynes don't have geometric formula</li><li>C. the graphite is a good electrical conductor</li><li>D. none of them</li></ul>				
32. A molecular compound which dissolves in water and it does not ionize:-	<b>45.</b> Which of the following is heated with sulfur atoms in vulcanization process?				
<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH <b>B.</b> C <sub>6</sub> H <sub>6</sub> <b>C.</b> NH <sub>4</sub> Cl <b>D.</b> HF	A. isoprene B. neoprene C. poly isoprene D. 2-methyl-1,3 butadiene				
<ul> <li>A. all reaction have ceased</li> <li>B. only the forward reaction continues</li> <li>C. only the reverse reaction continues</li> <li>D. both the forward and reverse reactions continue.</li> <li>34. By using the information in the adjacent table, which of the following is catalyst?</li> </ul>	<ul> <li>46. In the reaction that occurs by one direction(forward), which of the following doesn't effect of the rate of reaction?</li> <li>A. presence of catalyst</li> <li>B. changing concentration of product</li> </ul>				
A. MnO2	C. changing temperature D. changing concentration of reactant				
B. $H_2O_2$ mass at the start of the reaction (g) $68$ $0$ $0$ $5$	<b>47.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster?				
C. H <sub>2</sub> O	<b>A.</b> 0.1M HCl at 25°C <b>B.</b> 0.1M HCl at 50°C <b>C.</b> 1M HCl at 50°C <b>D.</b> 1M HCl at 25°C				
<b>D.</b> O <sub>2</sub>	<b>48.</b> A chemical formula that shows the type of covalent bond in organic compound:				
<b>35.</b> In the following reaction: CaCO <sub>3</sub> (s)+ 179.2kJ $\longrightarrow$ CaO (s)+ CO <sub>2</sub> (g), what is the $\Delta H^0_f$ value for CaO? If the $\Delta H^0_f$ value for each of CO <sub>2</sub> and CaCO <sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively <b>A.</b> -814.1kJ/mol <b>B.</b> +814.1kJ/mol <b>C.</b> -634.9kJ/mol <b>D.</b> +634.9kJ/mol	A. molecular formula B. empirical formula C. structural formula D. ionic formula 49. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion:  A. Mg <sup>2+</sup> B. Ca <sup>2+</sup> C. Pb <sup>2+</sup> D.Al <sup>3+</sup>				
<ul> <li>36. By decreasing pressure on the following equilibrium system: N₂(g) + O₂(g) ← 2NO(g)</li> <li>A. the quantity of N₂ decreases</li> <li>C. the quantity of NO increases</li> <li>D. the quantities do not change</li> </ul>	<b>50.</b> Thecompounds contribute to the destruction of ozone in the upper atmosphere. <b>A.</b> C <sub>2</sub> F <sub>4</sub> <b>B.</b> CFCs <b>C.</b> MTBE <b>D.</b> PVA				
<b>37.</b> The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if $(K_f = -1.86^{\circ}\text{C/m})$ $(K_b = 0.51^{\circ}\text{C/m})$					
<b>A.</b> 102.04°C <b>B.</b> 1.02°C <b>C.</b> 101.02°C <b>D.</b> 100.51°C					
<ul> <li>38. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-</li> <li>A. substitution</li> <li>B. addition</li> <li>C. condensation</li> <li>D. elimination</li> </ul>					
<b>39.</b> The molecular formula for the ethyl ethanoate compound is :-					
<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> <b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> <b>C.</b> C <sub>4</sub> H <sub>10</sub> O <b>D.</b> C <sub>4</sub> H <sub>8</sub> O					
<b>40.</b> In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy					
change for reverse reaction equals -35kJ/mol , the value of E <sub>a</sub> is:-(place the reactants at energy level zero).  A. 65kJ/mol  B65kJ/mol  C. 35kJ/mol  D. 135kJ/mol					

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH **Subject: Chemistry** fingerprint MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 2<sup>nd</sup> Attempt Study year (2024-2025) (Grade twelve scientific) Time: 3.30 hours Answer the following questions: ( two marks for each right choice ) **1.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-**A.** 6 **B.** 10 **C.** 8 **D.** 12 **2.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte? **C.** 0.001M **A.** 5M **B.** 1M **D.** all of them **3.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water **except**:-. A. NaCN B. KCl C. KNO<sub>2</sub> D. NH<sub>4</sub>Br **4.** After mixing Ca<sup>2+</sup> ions with concentration 2.4x10<sup>-4</sup>M and CO<sub>3</sub><sup>2-</sup> ions with concentration 1.2x10<sup>-4</sup>M, whi of the following is correct? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L **A.** ionic product> $K_{sp}$ **B.** ionic product  $< K_{sp}$ **C.** ionic product= $K_{sp}$ **D.** precipitate isn't form **5.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\Delta H^0_f$  value for CaO If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively **C.** -634.9kJ/mol **A.** -814.1kJ/mol **B.** +814.1kJ/mol **D.** +634.9kJ/mol **6.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_5$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant **A.** 0.005 **B.** 0.05 **C.** 20 **D.** 200 7. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-**A.** specific heat **B.** enthalpy of reaction **C.** enthalpy of formation **D.** enthalpy of combustion **8.** The correct order according the pOH value for the following solution is:-A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub> B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub> D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl **9.** The following reaction: NH<sub>4</sub>Cl(s) +176kJ  $\longrightarrow$  NH<sub>3</sub>(g)+HCl(g), occurs spontaneously:-**A.** if  $T\Delta S$  value = 176kJ **B.** if T $\Delta$ S value > 176kJ **C.** if  $T\Delta S$  value < 176kJ **D.** at all temperature **10.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**? **A.** OH<sup>-</sup> is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN<sup>-</sup> ion is hydrolyzez **D.** none of them **11.** Which of the following oxides when reacted with water forms acid solution? A. CO<sub>2</sub>**D.** both ( A and C ) **B.** CaO **C.** SO<sub>3</sub> **12.** The entropy increases by:-**A.** decreasing the pressure **B.** increasing the temperature **C.** mixing gases **D.** all of them **13.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-A. 1-butanol B. propanal **C.** butanone **D.** butanal **14.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub> (aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub> is:-**A.** H<sub>3</sub>O<sup>+</sup> **C.** H<sub>2</sub>O B. HNO<sub>2</sub> **D.** none of them 0019 100

	(aq)+H₂SO₄(aq) →		•		)+HCl(ad	q) <del></del>		
<b>C.</b> Zn(s)+H(	SN: 000019		both	•	•			
<b>16.</b> By using <b>A.</b> MnO <sub>2</sub>	the information in the ac	djacent tab	le, whi	ch of	the foll	owing is cata	ılyst?	
<b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H <sub>2</sub> O	O <sub>2</sub>	MnO <sub>2</sub>			
<b>C.</b> H <sub>2</sub> O	mass at the start of the reactio	n (g) 68	0	0	5	-		
<b>D.</b> O <sub>2</sub>	mass at the end of the reaction	n (g) 0	36	32	5			
<b>7.</b> If a piec	e of hot copper metal is d	ipped in co	ol wat	er, th	e energ	y is transferr	ed as heat	, the direction o
energy trar	nsfer is determined by the	edi	fferen	ces be	etween	the objects v	within syste	em.
A. specific	heat <b>B.</b> nature	2	<b>C.</b> t	empe	erature	D.	all of them	n
<b>8.</b> Which t	heories of acids and base	s belong to	acids a	and b	ases cor	njugate?		
<b>A.</b> Arrheniu	us <b>B.</b> Lewis		C. Bro	nsted	-Lowry		<b>D.</b> none	e of them
In the fo	ollowing gaseous equilibri	um system:	2CO <sub>2</sub> -	+167k	<b>√</b> 2	CO+O <sub>2</sub> , whic	ch of the fo	ollowing is true?
A. the valu	e of K at 500°C is greater	than the va	lue of	<i>K</i> at 7	′00°C			
<b>B.</b> the value	e of <i>K</i> at both temperatur	es are equa	al					
C. the value	e of K at 500°C is less than	the value	of <i>K</i> at	700°	С			
<b>D.</b> none of	them							
<b>0.</b> In the fo	ollowing reaction: 2NO+O	2 → 2NO <sub>2</sub>	the re	actio		a fact stap is		
			,tile ie	actio	n for th	e iast step is	: NO <sub>3</sub> +NO	→2NO <sub>2</sub> ,
which of fo	ollowing is correct?		,tile ie	actio	n for th	e iast step is	: NO₃+NO−	→2NO <sub>2</sub> ,
	llowing is correct?	₃ is interme		actio		e fast step is :[NO][O <sub>2</sub> ]		→ 2NO <sub>2</sub> , poth(B and C)
A. NO is int	llowing is correct?	₃ is interme	ediate		<b>C.</b> R= <i>k</i>	[NO][O <sub>2</sub> ]	<b>D.</b> b	ooth(B and C)
<b>A.</b> NO is int <b>1.</b> If 49J of	ollowing is <b>correct</b> ? termediate <b>B.</b> NO	₃ is interme	ediate al at 2		<b>C.</b> R= <i>k</i>	[NO][O <sub>2</sub> ]	<b>D.</b> b	ooth(B and C)
<b>A.</b> NO is int <b>21.</b> If 49J of be? $(C_p =$	termediate energy are added to 35g =0.07J/(g.K)) A. 25	₃ is interme of a materi °C	ediate al at 2 <b>B.</b> 2	0°C , <sub>'</sub> 298K	<b>C.</b> R=&	[NO][O <sub>2</sub> ] II the final te <b>C.</b> 40K	<b>D.</b> b emperature	ooth(B and C) e of the material D. 40°C
<b>A.</b> NO is integrated and is integrated as $(C_p = 2.)$ The total	ellowing is <b>correct</b> ?  termediate <b>B.</b> NO  energy are added to 35g	₃ is interme of a materi °C ⁄hich are pr	ediate al at 20 <b>B.</b> 2 roduce	0°C , <sup>,</sup> 298K d by (	<b>C.</b> R= <i>k</i> what wi	[NO][O <sub>2</sub> ] II the final te <b>C.</b> 40K tion 500mL a	<b>D.</b> b emperature	ooth(B and C) e of the material D. 40°C
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<b>A.</b> NO is intaction of the content	termediate  B. NO energy are added to 35g =0.07J/(g.K))  A. 25 al number of ions moles w fate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol,  B. 0.12	3 is interme of a materi °C which are pr what is the	ediate al at 20 <b>B.</b> 2 oduce molari	0°C , , 298K d by ( ity of	C. R=A what wi dissociation solution	[NO][O <sub>2</sub> ]  II the final te  C. 40K  tion 500mL a  1?	<b>D.</b> be emperature an aqueous	ooth(B and C) of the material D. 40°C solution of 0.72
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<b>28.</b> All of the following pair compounds are structural isomers to each ether <b>except</b> :-	41. Which of the following is correct at all temperature in pure water?				
A. pentane and 2,2-dimethyl propane B. hexene and cyclohexane	<b>A.</b> $K_W = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-14}$				
C. pentane and cyclopentane D. 1,1-dichloro ethane and 1,2-dichloro ethane	<b>C.</b> $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ <b>D.</b> all of them.				
<b>29.</b> The correct name for this compound: ( CH₃ ) according to IUPAC system is:	<b>42.</b> A molecular compound which dissolves in water and it does <b>not ionize</b> :-				
A. 1-ethyl-4-methyl cyclohexane	<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH <b>B.</b> C <sub>6</sub> H <sub>6</sub> <b>C.</b> NH <sub>4</sub> Cl <b>D.</b> HF				
B. 1-ethyl-4-methyl benzene	<b>43.</b> At which of the following situation the pH do not change?				
C. 1-methyl-4-ethyl benzene	A. adding NH₄NO₃ solution to the NH₃ solution  B. adding KCN solution to the HCN solution				
CH <sub>2</sub> -CH <sub>3</sub> <b>D.</b> 1-methyl-4- ethyl cyclohexane	C. adding a small amount of HCl to NH <sub>3</sub> and NH <sub>4</sub> Cl solution D. all of them				
<b>30.</b> When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of	44. In the reaction that occurs by one direction(forward), which of the following doesn't effect on				
the following salts may be formed?	the rate of reaction?				
A. KNO <sub>3</sub> B. KF C. NaF D. both (B and C)	A. presence of catalyst B. changing concentration of product				
<b>31.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster?	C. changing temperature D. changing concentration of reactant				
<b>A.</b> 0.1M HCl at 25°C <b>B.</b> 0.1M HCl at 50°C <b>C.</b> 1M HCl at 50°C <b>D.</b> 1M HCl at 25°C	<b>45.</b> By decreasing pressure on the following equilibrium system: $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$				
<b>32.</b> The rate law for the following hypothetical reaction: A +B $\longrightarrow$ C, is R= $k$ [A] <sup>2</sup> [B], by what factor does the	A. the quantity of N₂ decreases  B. the quantity of NO decreases				
rate increase if the concentration of each A and B is tripled?	C. the quantity of NO increases  D. the quantities do not change				
A. 27 B. 16 C. 18 D. 8	46. An acid is used as a fungicide:-				
<b>33.</b> The molecular formula for the ethyl ethanoate compound is :-	<b>A.</b> CH <sub>3</sub> COOH <b>B.</b> HCl <b>C.</b> HNO <sub>3</sub> <b>D.</b> H <sub>3</sub> PO <sub>4</sub>				
<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> <b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> <b>C.</b> C <sub>4</sub> H <sub>10</sub> O <b>D.</b> C <sub>4</sub> H <sub>8</sub> O	<b>47.</b> The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is:				
<b>34.</b> Salts of weak acids and weak bases can produce basic aqueous solution if:-	if $(K_f = -1.86^{\circ}\text{C/m})$ $(K_b = 0.51^{\circ}\text{C/m})$				
<b>A.</b> $K_a = K_b$ <b>B.</b> $K_a > K_b$ <b>C.</b> $K_b > K_a$ <b>D.</b> $[H_3O^+] > [OH^-]$	<b>A.</b> 102.04°C <b>B.</b> 1.02°C <b>C.</b> 101.02°C <b>D.</b> 100.51°C				
<b>35.</b> If the pH of sea water at 25°C is equal to 8.3, which of the following is <b>correct</b> ?	48. A chemical formula that shows the type of covalent bond in organic compound:-				
<b>A.</b> $[OH^{-}]=2.0x10^{-6}M$ <b>B.</b> the sea water is basic <b>C.</b> $[OH^{-}]=5.0x10^{-9}M$ <b>D.</b> both (A and B)	A. molecular formula B. empirical formula C. structural formula D. ionic formula				
<b>36.</b> An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion:-	<b>49.</b> Suppose that 20mL of 0.01M Ca(OH) <sub>2</sub> is required to neutralize 10mL of HCl solution, which of the				
<b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>	following is correct?				
<b>37.</b> When compared dimethyl ether and ethanol, which of the following is <b>correct</b> ?	<b>A.</b> [HCl]=0.02M <b>B.</b> [HCl]=0.04M <b>C.</b> the spectator ions are Ca <sup>2+</sup> and Cl <sup>-</sup> <b>D.</b> both (B and C)				
A. both have the same a functional group B. both have the same boiling point	<b>50.</b> The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-				
C. both dissolved in water.  D. all of them	A. substitution B. addition C. condensation D. elimination				
38. Increasing the percentage of branched-chain alkanes in gasoline causes to:-					
A. increase octane rating  B. decrease octane rating					
C. increase boiling point D. both (A and C)					
<b>39.</b> A molecule that donates one electron pair to form a covalent bond is:-					
<b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub>					
<b>40.</b> Which of the following is <b>incorrect</b> ?					
A. the reaction type of methane gas with chlorine gas is addition					
B. the alkynes don't have geometric formula					
<ul><li>C. the graphite is a good electrical conductor</li><li>D. none of them</li></ul>					
inone of them					

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific)

2<sup>nd</sup> Attempt Time: 3.30 hours

Subject: Chemistry

fingerprint



#### Answer the following questions: (two marks for each right choice)

1. A chemical formula that sh	ows the type of covalent b	ond in organic compound:-
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- A. molecular formula
- **B.** empirical formula
- C. structural formula
- **D.** ionic formula
- **2.** Which of the following oxides when reacted with water forms acid solution?
- **A.** CO<sub>2</sub>

B. CaO

**C.** SO<sub>3</sub>

- D. both (A and C)
- **3.** By using the information in the adjacent table, which of the following is catalyst?

<b>A.</b> MnO <sub>2</sub> <b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	<b>O</b> <sub>2</sub>	MnO <sub>2</sub>
<b>C.</b> H <sub>2</sub> O <sub>2</sub>	mass at the start of the reaction (g)	68	0	0	5
<b>D</b> . O <sub>2</sub>	mass at the end of the reaction (g)	0	36	32	5

- **4.** Which of the following is heated with sulfur atoms in vulcanization process?
- **A.** isoprene
- **B.** neoprene
- **C.** poly isoprene
- **D.** 2-methyl-1,3 butadiene
- **5.** At which of the following situation the reaction solid zinc with solution of HCl is faster?
- **A.** 0.1M HCl at 25°C
- **B.** 0.1M HCl at 50°C
- **C.** 1M HCl at 50°C
- D. 1M HCl at 25°C
- **6.** The.....compounds contribute to the destruction of ozone in the upper atmosphere.
- A. C<sub>2</sub>F<sub>4</sub>
- B. CFCs

C. MTBE

- 7. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-
- **A.** Mg<sup>2+</sup>
- **B.** Ca<sup>2+</sup>
- **C.** Pb<sup>2+</sup>

- **D.**Al<sup>3+</sup>
- **8.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?
- **A.** [HCl]=0.02M
- **B.** [HCl]=0.04M
- **C.** the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>
- D. both (B and C)
- **9.** Which theories of acids and bases belong to acids and bases conjugate?
- **A.** Arrhenius
- **B.** Lewis
- C. Bronsted-Lowry
- **D.** none of them
- **10.** The molecular formula for the ethyl ethanoate compound is :-
- **A.**  $C_4H_{10}O_2$
- $B. C_4H_8O_2$
- **C.**  $C_4H_{10}O$
- $D. C_4H_8O$
- **11.** Which of the following is **correct** at all temperature in pure water?
- **A.**  $K_{W} = [H_{3}O^{+}][OH^{-}]$

**B.**  $[H_3O^+][OH^-]=1x10^{-14}$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

- D. all of them.
- **12.** When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?
- A. KNO<sub>3</sub>
- B. KF
- C. NaF
- **D.** both (B and C)
- **13.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system.
- A. specific heat
- **B.** nature
- C. temperature
- **D.** all of them

**A.** both have the same a functional group **C.** both dissolved in water. **D.** all of them

**14.** When compared dimethyl ether and ethanol, which of the following is **correct**?

- **B.** both have the same boiling point
- SN: 000020 **15.** Salts of weak acids and weak bases can produce basic aqueous solution if:-
- **A.**  $K_a = K_b$
- **B.**  $K_a > K_b$
- C.  $K_b > K_a$

- **D.**  $[H_3O^+] > [OH^-]$
- **16.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?
- A. Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$
- **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

- D. both (A and B)
- 17. In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?
- A. presence of catalyst

**B.** changing concentration of product

**C.** changing temperature

- **D.** changing concentration of reactant
- **18.** In the following gaseous equilibrium system:  $2CO_2+167kJ \leftrightarrow 2CO+O_2$ , which of the following is **true**?
- **A.** the value of K at 500°C is greater than the value of K at 700°C
- **B.** the value of K at both temperatures are equal
- C. the value of K at  $500^{\circ}$ C is less than the value of K at  $700^{\circ}$ C
- **D.** none of them
- **19.** A molecule that donates one electron pair to form a covalent bond is:-
- $A. BF_3$
- B. NH<sub>4</sub><sup>+</sup>

C. CH<sub>4</sub>

- D. NH<sub>3</sub>
- **20.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-
- **A.** increase octane rating

**B.** decrease octane rating

**C.** increase boiling point

- **D.** both (A and C)
- **21.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol
- **22.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \iff 2NO(g)$
- **A.** the quantity of  $N_2$  decreases

**B.** the quantity of NO decreases

**C.** the quantity of NO increases

- **D.** the quantities do not change
- **23.** In the following reaction:  $HNO_2(aq)+H_2O(l) \longrightarrow NO_2(aq)+H_3O^+(aq)$ , the conjugate acid of  $NO_2$  is:-
- **A.** H<sub>3</sub>O<sup>+</sup>

- B. HNO<sub>2</sub>
- **C.** H<sub>2</sub>O

- **D.** none of them
- **24.** In the following gaseous equilibrium reaction: PCl<sub>5</sub> ← PCl<sub>3</sub>+Cl<sub>2</sub>, the mole number for each of PCl<sub>5</sub>, PCl<sub>3</sub> and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-
- **A.** 0.005

**B.** 0.05

- **C.** 20
- **D.** 200
- **25.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$
- **A.** 102.04°C
- **B.** 1.02°C
- **C.** 101.02°C
- **D.** 100.51°C
- **26.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte?
- **A.** 5M

**B.** 1M

- **C.** 0.001M
- **D.** all of them

<ul><li>27. Which of the following is incorrect?</li><li>A. the reaction type of methane gas with chlorine gas is addition</li><li>B. the alkynes don't have geometric formula</li></ul>	<b>41.</b> The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:- <b>A.</b> 6 <b>B.</b> 10 <b>C.</b> 8 <b>D.</b> 12
C. the graphite is a good electrical conductor  D. none of them	<b>42.</b> The following reaction: $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:- <b>A.</b> if $T\Delta S$ value = 176kJ <b>B.</b> if $T\Delta S$ value > 176kJ <b>C.</b> if $T\Delta S$ value < 176kJ <b>D.</b> at all temperature
28. A molecular compound which dissolves in water and it does <b>not ionize</b> :-  A. C₂H₅OH  B. C <sub>6</sub> H <sub>6</sub> C. NH₄Cl  D. HF	<b>43.</b> In this reaction: $CN^{-}(aq) + H_{2}O(l) \longrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is <b>incorrect</b> ? <b>A.</b> $OH^{-}$ is conjugate base <b>B.</b> $H_{2}O$ is amphoteric <b>C.</b> $CN^{-}$ ion is hydrolyzez <b>D.</b> none of them
<ul> <li>29. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material be? (C<sub>p</sub>=0.07J/(g.K))</li> <li>A. 25°C</li> <li>B. 298K</li> <li>C. 40K</li> <li>D. 40°C</li> <li>30. An acid is used as a fungicide:-</li> <li>A. CH<sub>3</sub>COOH</li> <li>B. HCl</li> <li>C. HNO<sub>3</sub></li> <li>D. H<sub>3</sub>PO<sub>4</sub></li> </ul>	44. The correct name for this compound: ( CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl cyclohexane  B. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene  D. 1-methyl-4- ethyl cyclohexane
<b>31.</b> In the following reaction: $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the $\Delta H^0_f$ value for $CaO$ ? If the $\Delta H^0_f$ value for each of $CO_2$ and $CaCO_3$ equal to (-393.5, -1207.6) kJ/mol respectively <b>A.</b> -814.1kJ/mol <b>B.</b> +814.1kJ/mol <b>C.</b> -634.9kJ/mol <b>D.</b> +634.9kJ/mol	45. The correct order according the pOH value for the following solution is:-  A. NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK  C. CH <sub>3</sub> COOK>NaCl>NH <sub>4</sub> NO <sub>3</sub> D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl
<ul> <li>32. All of the following pair compounds are structural isomers to each ether except:- <ul> <li>A. pentane and 2,2-dimethyl propane</li> <li>B. hexene and cyclohexane</li> <li>C. pentane and cyclopentane</li> <li>D. 1,1-dichloro ethane and 1,2-dichloro ethane</li> </ul> </li> <li>33. At equilibrium :- <ul> <li>A. all reaction have ceased</li> <li>B. only the forward reaction continues</li> </ul> </li> </ul>	<ul> <li>46. All of the following salts effect on the H<sub>3</sub>O<sup>+</sup> and OH<sup>-</sup> concentration when added to water except:</li> <li>A. NaCN</li> <li>B. KCl</li> <li>C. KNO<sub>2</sub></li> <li>D. NH<sub>4</sub>Br</li> <li>47. What colligative properties are displayed when antifreeze is added to a car's cooling system?</li> <li>A. vapor-pressure elevation</li> <li>B. boiling point elevation</li> <li>C. freezing-point depression</li> <li>D. both (B and C)</li> </ul>
C. only the reverse reaction continues  D. both the forward and reverse reactions continue.  34. The entropy increases by:-	<b>48.</b> According to IUPAC system the compound:(CH <sub>3</sub> -CH <sub>2</sub> -COH), is called:- <b>A.</b> 1-butanol <b>B.</b> propanal <b>C.</b> butanone <b>D.</b> butanal
A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them  35. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct?  A. [OH-]=2.0x10-6M B. the sea water is basic C. [OH-]=5.0x10-9M D. both (A and B)	<ul> <li>49. At which of the following situation the pH do not change?</li> <li>A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution</li> <li>B. adding KCN solution to the HCN solution</li> <li>C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution</li> <li>D. all of them</li> </ul>
<b>36.</b> The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what is the molarity of solution? <b>A.</b> 0.24 <b>B.</b> 0.12 <b>C.</b> 0.36 <b>D.</b> 0.72	<ul> <li>50. The rate law for the following hypothetical reaction: A +B → C, is R=k[A]²[B], by what factor does the rate increase if the concentration of each A and B is tripled?</li> <li>A. 27</li> <li>B. 16</li> <li>C. 18</li> <li>D. 8</li> </ul>
<ul> <li>37. Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-</li> <li>A. specific heat B. enthalpy of reaction C. enthalpy of formation D. enthalpy of combustion</li> </ul>	
<b>38.</b> After mixing Ca <sup>2+</sup> ions with concentration $2.4x10^{-4}M$ and $CO_3^{2-}$ ions with concentration $1.2x10^{-4}M$ , which of the following is <b>correct</b> ? If the solubility of CaCO <sub>3</sub> in its saturated solution is $5.3x10^{-5}mol/L$ <b>A.</b> ionic product> $K_{sp}$ <b>B.</b> ionic product< $K_{sp}$ <b>C.</b> ionic product= $K_{sp}$ <b>D.</b> precipitate isn't form	
<b>39.</b> In the following reaction: $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is: $NO_3+NO \longrightarrow 2NO_2$ , which of following is <b>correct</b> ? <b>A.</b> NO is intermediate <b>B.</b> NO <sub>3</sub> is intermediate <b>C.</b> R= $k$ [NO][O <sub>2</sub> ] <b>D.</b> both(B and C)	
40. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-  A. substitution  B. addition  C. condensation  D. elimination	

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific) 2<sup>nd</sup> Attempt Answer the following questions: (two marks for each right choice) **1.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**? **A.** the value of K at 500°C is greater than the value of K at 700°C **B.** the value of K at both temperatures are equal **C.** the value of K at 500°C is less than the value of K at 700°C **D.** none of them

**3.** At which of the following situation the pH do not change?

**B.**  $C_6H_6$ 

rate increase if the concentration of each A and B is tripled?

**B.** 16

**B.** nature

**B.** propanal

**B.** [HCl]=0.04M

A. 65kJ/mol

B. HCl

**A.** 25°C

**11.** Which of the following is **correct** at all temperature in pure water?

**7.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-

C. adding a small amount of HCl to NH₃ and NH₄Cl solution D. all of them

**4.** A molecular compound which dissolves in water and it does **not ionize**:-

A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution

**B.** increasing the temperature

C. NH<sub>4</sub>Cl

**5.** The rate law for the following hypothetical reaction: A+B  $\longrightarrow$  C, is R=k[A]<sup>2</sup>[B], by what factor does the

**6.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of

**C.** temperature

**C.** butanone

C. the spectator ions are Ca<sup>2+</sup>and Cl<sup>-</sup>

**B.**  $[H_3O^+][OH^-]=1\times10^{-14}$ 

**D.** all of them.

**C.** 18

energy transfer is determined by the.....differences between the objects within system.

**8.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the

**9.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy

**B.** -65kJ/mol

**B.** 298K

C. HNO<sub>3</sub>

**Subject: Chemistry** 

Time: 3.30 hours

**B.** adding KCN solution to the HCN solution

**D.** all of them

**D.** butanal

D. both (B and C)

**D.** 135kJ/mol

**D.** 40°C

**D.** all of them



fingerprint

C. mixing gases

**D.** 8

**C.** 35kJ/mol

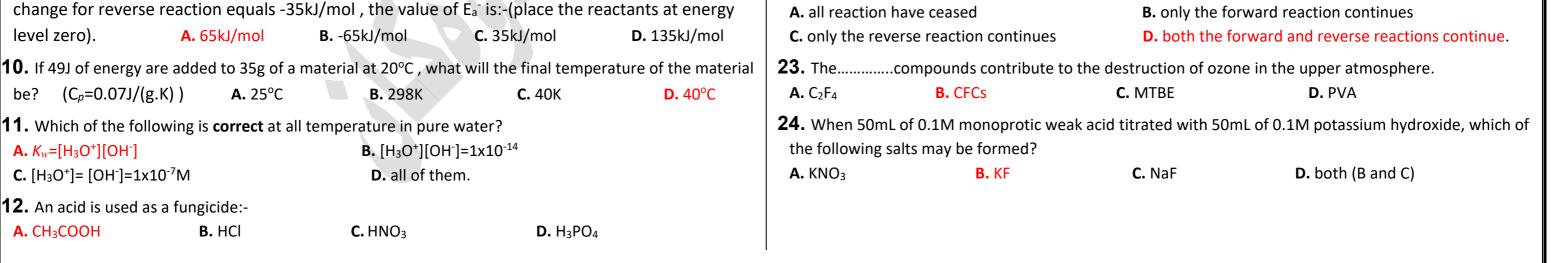
**C.** 40K

**D.** H<sub>3</sub>PO<sub>4</sub>

<b>13.</b> Which of the following is <b>incorrect</b> ?
A. the reaction type of methane gas with chlorine gas is addition
B. the alkynes don't have geometric formula  C. the graphite is a solo coefficial conductor

A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula  C. the graphite is a \$\frac{8}{2}\text{O} \text{Q} \text{Q} \text{C} \text{d} cal conductor}  D. none of them  14. The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is: if (K <sub>2</sub> = -1.86°C/m) (K <sub>2</sub> = 0.51°C/m)  A. 102.04°C  B. 1.02°C  C. 101.02°C  D. 100.51°C  15. In the following reaction: HNO <sub>2</sub> (aq)+H <sub>2</sub> O(l) → NO <sub>2</sub> (aq)+H <sub>3</sub> O <sup>+</sup> (aq), the conjugate acid of NO <sub>2</sub> is:-A. H <sub>3</sub> O <sup>+</sup> B. HNO <sub>2</sub> C. H <sub>2</sub> O  D. none of them  16. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion:-A. Mg <sup>2+</sup> B. Ca <sup>2+</sup> C. Pb <sup>2+</sup> D.Al <sup>3+</sup> 17. The correct name for this compound: (CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene  D. 1-methyl-4-ethyl benzene  C. 1-methyl-4-ethyl benzene  B. 1-ethyl-4-methyl benzene  C. 1-methyl-4-ethyl benzene  D. 1-methyl-4-opethyl benzene  C. 1-methyl-4-opethyl benzene  D. 1-methyl-4-opethyl benzene  D. 1-methyl-4-opethyl benzene  C. 1-methyl-4-opethyl benzene  D. 1-methyl-4-opethy	13. Which of the	e following is <b>incorrect</b> ?				
C. the graphite is a \$800000000000000000000000000000000000	A. the reaction t	type of methane gas wit	th chlorine gas is ad	dition		
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	20 What calligat	tivo proportios are displ		70 is added to	•	
A. vapor-pressure elevation B. boiling point elevation	•		•		a car s cooming systems	

<b>A.</b> presence of cat	talyst	<b>B.</b> changing concentration of product				
C. changing tempe	rature	D. changing concentration of reactant				
<b>19.</b> Which of the following	llowing oxides when i	eacted with water forms acid sol	ution?			
A. CO <sub>2</sub>	<b>B.</b> CaO	<b>C.</b> SO <sub>3</sub>	D. both ( A and C )			
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A. vapor-pressure	elevation	B. boiling point elevation				
C. freezing-point de	epression	<b>D.</b> both (B and C)				
<b>21.</b> The reaction that	at occurs when aqueo	ous solutions of carboxylic acids a	nd amines are mixed is called:-			
A. substitution	B. addition	C. condensation	<b>D.</b> elimination			
22. At equilibrium :	-					



be?  $(C_p=0.07J/(g.K))$ 

**C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ 

**12.** An acid is used as a fungicide:-

**A.**  $K_{W} = [H_{3}O^{+}][OH^{-}]$ 

**2.** The entropy increases by:-

A.  $C_2H_5OH$ 

**A.** 27

**A.** specific heat

following is **correct**?

**A.** [HCl]=0.02M

level zero).

A. 1-butanol

**A.** decreasing the pressure

	e information in the adjace	ent table,	, whic	ch of t	the following	g is catalyst?			-	sulfur atoms in vulcanizatio	·
<b>A.</b> MnO <sub>2</sub> <b>B.</b> H <sub>2</sub> O <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>			A. isoprene	<b>B.</b> neoprene	C. poly isoprene	<b>D.</b> 2-methyl-1,3 butadiene
	ass at the start of the reaction (g)	68	0	0	5					• •	(g), what is the $\Delta H_f^0$ value for CaO?
	ass at the end of the reaction (g)	0	36	32	5			If the $\Delta H^{o}_{f}$ value in $A$ 814.1kJ/mol	tor each of CO2 and C <b>B.</b> +814.1kJ/	aCO₃ equal to ( -393.5, -12 mol <b>C.</b> -634.9kJ/	·
<b>26.</b> When comp	pared dimethyl ether and e	ethanol, v	which	n of th	he following	is <b>correct</b> ?		,	_		•
A. both have t	ne same a functional group	ρ		В.	. both have t	he same boiling po	oint		ving pair compounds a 2-dimethyl propane	re structural isomers to each <b>B.</b> hexene and o	•
<b>C.</b> both dissolv	ed in water.			D.	. all of them			C. pentane and cy			ethane and 1,2-dichloro ethane
	ving reaction: 2NO+O <sub>2</sub> —	+2NO₂ ,tl	he re	action	n for the fas	step is: NO <sub>3</sub> +NO-	→2NO <sub>2</sub> ,				when added to water <b>except</b> :
	ving is <b>correct</b> ?					ro 1	(5	A. NaCN	B. KCI	C. KNO <sub>2</sub>	<b>D.</b> NH <sub>4</sub> Br
<b>A.</b> NO is intern					<b>C.</b> R= <i>k</i> [NO]		oth(B and C)	<b>43.</b> In the following	g gaseous equilibrium r	eaction: PCl <sub>5</sub> ←→ PCl <sub>3</sub> +Cl <sub>2</sub> ,t	he mole number for each of PCI <sub>5</sub> ,PCI <sub>5</sub>
	g Ca <sup>2+</sup> ions with concentrat										, the value of equilibrium constant is:
A. ionic produc	ollowing is <b>correct</b> ? If the set> $K_{sp}$ <b>B.</b> ionic product	•			n its saturat c product= <i>K</i>		ate isn't form	<b>A.</b> 0.005	<b>B.</b> 0.05	<b>C.</b> 20	<b>D.</b> 200
•		•			•	, , ,	ate isii t ioiiii	<b>44.</b> Increasing the	percentage of branche	d-chain alkanes in gasoline c	auses to:-
<b>A.</b> NaCl>CH₃C0	order according the pOH v	value for			ving solution )₃>NaCl>CH₃			A. increase octane		<b>B.</b> decrease octane	e rating
C. CH <sub>3</sub> COOK>N					O <sub>3</sub> >CH <sub>3</sub> COOK			<b>C.</b> increase boiling	point	<b>D.</b> both (A and C)	
<b>80.</b> At which of	the following situation the	e reaction	n soli	d zinc	c with solution	on of HCl is faster?				ong to acids and bases conju	
<b>A.</b> 0.1M HCl at	_				∕l HCl at 50°C			<b>A.</b> Arrhenius	<b>B.</b> Lewis	<b>C.</b> Bronsted-Lowry	<b>D.</b> none of them
<b>11.</b> A chemical	formula that shows the type	pe of cov	/alent	t bond	d in organic	compound:-				ng equilibrium system: N <sub>2</sub> (g)	
A. molecular fo	•				structural for		ic formula	<b>A.</b> the quantity of <b>C.</b> the quantity of		·	ty of NO decreases ties do not change
<b>2.</b> The following	ng reaction: NH <sub>4</sub> Cl(s) +176	kJ <b>→</b> NI	H₃(g)·	+HCl(	g), occurs sp	oontaneously:-				•	ties do not change
<b>A.</b> if TΔS value					<sup>-</sup> ΔS value < 1		temperature	<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	<b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>	thanoate compound is :- <b>C.</b> C <sub>4</sub> H <sub>10</sub> O	<b>D.</b> C <sub>4</sub> H <sub>8</sub> O
<b>33.</b> The total nu	ımber of ions moles which	are prod	duced	d by d	dissociation 5	600mL an aqueous	solution of			ICN(aq)+ OH <sup>-</sup> (aq) ,which of t	
sodium sulfate	(Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol, what	t is the m	nolari	ty of s	solution?					photeric <b>C.</b> CN <sup>-</sup> ion is hyd	•
<b>A.</b> 0.24	<b>B.</b> 0.12				<b>C.</b> 0.36	D.	0.72	, ,		•	of a substance by one Celsius degree
<b>34.</b> At which of	the following concentration	ons the h	ydro	chlori	ic acid consi	dered a strong elec	ctrolyte?	(1°C) or one kelvin	•	ie temperature or one gram	or a substance by one delistas degree
<b>A.</b> 5M	<b>B.</b> 1M				<b>C.</b> 0.001M	D.	all of them	A. specific heat	<b>B.</b> enthalpy of reaction	<b>C.</b> enthalpy of formation	on <b>D.</b> enthalpy of combustion
	k acids and weak bases ca	•			queous solut			<b>50.</b> The number of	hydrogen atoms in the	2 1,1-dimethyl cyclopropane	compound is equal to:-
<b>A.</b> $K_a = K_b$	<b>B.</b> $K_a > K_b$	С	:. K <sub>b</sub> >	Ka		<b>D.</b> [H <sub>3</sub> O <sup>+</sup> ]>[OH <sup>-</sup> ]		<b>A.</b> 6	<b>B.</b> 10	<b>C.</b> 8 <b>D.</b> 12	
	ic equation for which of th						O( <i>l</i> )?				
_	$+H_2SO_4(aq) \longrightarrow$				)+HCl(aq)	•					
<b>C.</b> Zn(s)+HCl(ad				A and							
	that donates one electron	pair to f			alent bond is						
<b>A.</b> BF <sub>3</sub>	<b>B.</b> NH <sub>4</sub> <sup>+</sup>		<b>c</b> . c			D. NH <sub>3</sub>					
•	sea water at 25°C is equal				_	_	·h (A and D)				
<b>A.</b> [OH <sup>-</sup> ]=2.0x1	0 <sup>-6</sup> M <b>B.</b> the sea wat	ci is nasi	IC	C.	. [OH <sup>-</sup> ]=5.0x1	.O IVI <b>D.</b> DOL	th (A and B)				

Subject: Chemistry

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 

Study year (2024-2025) (Grade twelve scientific)



2<sup>nd</sup> Attempt Time: 3.30 hours



fingerprint

## Answer the following questions: (two marks for each right choice)

1. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction c
energy transfer is determined by thedifferences between the objects within system.

A. specific heat

**B.** nature

**C.** temperature

**D.** all of them

**2.** By using the information in the adjacent table, which of the following is catalyst?

A. MnO<sub>2</sub>

B. H<sub>2</sub>O<sub>2</sub>

**C.** H<sub>2</sub>O **D.** O<sub>2</sub>

Substance	11202	1120	<b>O</b> 2	1411102
mass at the start of the reaction (g)	68	0	0	5
mass at the end of the reaction (g)	0	36	32	5

3. If 49J of energy are added to 35g of a material at  $20^{\circ}$ C, what will the final temperature of the material

be?  $(C_p=0.07J/(g.K))$ 

**A.** 25°C

**B.** 298K

H<sub>2</sub>O<sub>2</sub> H<sub>2</sub>O O<sub>2</sub> MnO<sub>2</sub>

**C.** 40K

**D.** 40°C

**4.** Salts of weak acids and weak bases can produce basic aqueous solution if:-

**A.**  $K_a = K_b$ 

**B.**  $K_a > K_b$ 

C.  $K_b > K_a$ 

**D.**  $[H_3O^+] > [OH^-]$ 

**5.** Which of the following is **incorrect**?

**A.** the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

**C.** the graphite is a good electrical conductor

**D.** none of them

**6.** An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-

**A.** Mg<sup>2+</sup>

**B.** Ca<sup>2+</sup>

**C.** Pb<sup>2+</sup>

**D.**Al<sup>3+</sup>

**7.** In the following gaseous equilibrium system:  $2CO_2+167kJ \longrightarrow 2CO+O_2$ , which of the following is **true**?

**A.** the value of *K* at 500°C is greater than the value of *K* at 700°C

**B.** the value of *K* at both temperatures are equal

C. the value of K at 500°C is less than the value of K at 700°C

**D.** none of them

**8.** In the following reaction: HNO<sub>2</sub>(aq)+H<sub>2</sub>O(l)  $\longleftrightarrow$  NO<sub>2</sub> (aq)+H<sub>3</sub>O<sup>+</sup>(aq), the conjugate acid of NO<sub>2</sub> is:-

**A.** H<sub>3</sub>O<sup>+</sup>

B. HNO<sub>2</sub>

**C.** H<sub>2</sub>O

**D.** none of them

**9.** Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-

**A.** specific heat **B.** enthalpy of reaction

**C.** enthalpy of formation **D.** enthalpy of combustion

**10.** The net ionic equation for which of the following reaction is:  $H_3O^+(ag) + OH^-(ag) \iff 2H_2O(l)$ ?

A.  $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

**C.**  $Zn(s)+HCl(aq) \longrightarrow$ 

D. both (A and B)

**11.** The......compounds contribute to the destruction of ozone in the upper atmosphere.

**A.** C<sub>2</sub>F<sub>4</sub>

B. CFCs

C. MTBE

D. PVA

**12.** The molecular formula for the ethyl ethanoate compound is :-

**A.**  $C_4H_{10}O_2$ 

**B.**  $C_4H_8O_2$ 

**C.**  $C_4H_{10}O$ 

**D.**  $C_4H_8O$ 

**13.** The correct order according the pOH value for the following solution is:-5N: 000022

A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub>

B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK

C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub>

D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl

**14.** Which of the following is heated with sulfur atoms in vulcanization process?

**A.** isoprene

**B.** neoprene

**C.** poly isoprene

**D.** 2-methyl-1,3 butadiene

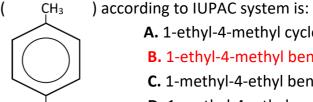
**15.** After mixing  $Ca^{2+}$  ions with concentration  $2.4x10^{-4}M$  and  $CO_3^{2-}$  ions with concentration  $1.2x10^{-4}M$ , which of the following is correct? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L

**A.** ionic product> $K_{sp}$  **B.** ionic product< $K_{sp}$ 

**C.** ionic product= $K_{sp}$ 

**D.** precipitate isn't form

**16.** The correct name for this compound: (



**A.** 1-ethyl-4-methyl cyclohexane

**B.** 1-ethyl-4-methyl benzene

**C.** 1-methyl-4-ethyl benzene

**D.** 1-methyl-4- ethyl cyclohexane

**17.** When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

B. KF

C. NaF

D. both (B and C)

**18.** The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ **B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ

**D.** at all temperature

**19.** At equilibrium :-

A. all reaction have ceased

**B.** only the forward reaction continues

**C.** only the reverse reaction continues

**D.** both the forward and reverse reactions continue.

**20.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-

A. 1-butanol

**B.** propanal

**C.** butanone

**D.** butanal

**21.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-

**A.** 6

**B.** 10

**C.** 8

**D.** 12

**22.** In the following reaction:  $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is:  $NO_3+NO \longrightarrow 2NO_2$ , which of following is **correct**?

**A.** NO is intermediate

**B.** NO<sub>3</sub> is intermediate

**C.**  $R = k[NO][O_2]$ 

**D.** both(B and C)

**23.** In this reaction:  $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is **incorrect**?

**A.** OH is conjugate base **B.** H<sub>2</sub>O is amphoteric **C.** CN ion is hydrolyzez **D.** none of them

**24.** A chemical formula that shows the type of covalent bond in organic compound:-

A. molecular formula

**B.** empirical formula

**C.** structural formula

**D.** ionic formula

**25.** In the following gaseous equilibrium reaction:  $PCl_5 \leftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-

**A.** 0.005

**B.** 0.05

**C.** 20

**D.** 200

<b>6.</b> The reaction that occurs when a <b>A.</b> substitution <b>B.</b> addition	queous solutions of carboxylic acids and a  C. condensation	mines are mixed is called:- <b>D.</b> elimination	<b>41.</b> A molecular com	•	n water and it does <b>not ioni C.</b> NH <sub>4</sub> Cl <b>D.</b>	ze:- HF
	ctron pair to form a covalent bond is:-					the following doesn't effect on
<b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup>	<b>C.</b> CH <sub>4</sub>	NH <sub>3</sub>	the rate of reaction	n?		-
<b>8.</b> All of the following salts effect or <b>A.</b> NaCN <b>B.</b> KCl	n the $H_3O^+$ and $OH^-$ concentration when acceptable $\mathbf{C}$ . $KNO_2$ $\mathbf{D}$ . $N$	•	A. presence of cata C. changing tempera		B. changing concentration D. changing concentration	•
<ol> <li>What colligative properties are d</li> <li>vapor-pressure elevation</li> <li>freezing-point depression</li> </ol>	displayed when antifreeze is added to a car <b>B.</b> boiling point elevation <b>D.</b> both (B and C)	r's cooling system?	<b>A.</b> Arrhenius	<b>B.</b> Lewis	g to acids and bases conjuga  C. Bronsted-Lowry  mperature in pure water?	te? <b>D.</b> none of them
	(OH) <sub>2</sub> is required to neutralize 10mL of HC	solution, which of the	<b>A.</b> $K_W = [H_3O^+][OH^-]$ <b>C.</b> $[H_3O^+] = [OH^-] = 1x1$	A DO	<b>B.</b> [H₃O <sup>+</sup> ][OH <sup>-</sup> ]=1x10 <sup>-14</sup> <b>D.</b> all of them.	1
<b>A.</b> [HCl]=0.02M <b>B.</b> [HCl]=0.04l	M C. the spectator ions are Ca <sup>2+</sup> and	Cl <sup>-</sup> <b>D.</b> both (B and C)	<b>45.</b> In the following	reaction: CaCO <sub>3</sub> (s)+ 17	79.2kJ → CaO (s)+ CO₂(g)	, what is the $\Delta H^0_f$ value for CaO?
<b>1.</b> The total number of ions moles viscodium sulfate (Na <sub>2</sub> SO <sub>4</sub> ) is 0.36mol,	which are produced by dissociation 500ml what is the molarity of solution?	an aqueous solution of	If the $\Delta H^0_f$ value fo <b>A.</b> -814.1kJ/mol	r each of CO <sub>2</sub> and CaCo <b>B.</b> +814.1kJ/mo	O <sub>3</sub> equal to (-393.5, -1207 ol <b>C.</b> -634.9kJ/mo	·
<b>A.</b> 0.24 <b>B.</b> 0.1 <b>2.</b> An acid is used as a fungicide:-	<b>C.</b> 0.36	<b>D.</b> 0.72	<b>46.</b> Which of the followa. CO <sub>2</sub>	owing oxides when reac <b>B.</b> CaO	ted with water forms acid so	olution?  D. both ( A and C )
A. CH₃COOH B. HCl	C. HNO <sub>3</sub> D.	H <sub>3</sub> PO <sub>4</sub>	<b>47.</b> The boiling point	of an aqueous solution	containing a nonelectrolyte	that freezes at -3.72°C, is:
<ul><li>3. The rate law for the following hy rate increase if the concentration of</li><li>A. 27</li><li>B. 16</li></ul>	pothetical reaction: $A + B \longrightarrow C$ , is $R = k[A]^2$ f each A and B is tripled?  C. 18  D. 8	[B], by what factor does the	if ( <i>K<sub>f</sub></i> = -1.86°C/ <i>m</i> ) ( <i>K<sub>b</sub></i> <b>A.</b> 102.04°C	b= 0.51°C/m) <b>B.</b> 1.02°C	<b>C.</b> 101.02°C	<b>D.</b> 100.51°C
	ntrations the hydrochloric acid considered  • 0.001M	a strong electrolyte?  D. all of them	A. increase octane ra C. increase boiling p	ating	hain alkanes in gasoline cau <b>B.</b> decrease octane ra <b>D.</b> both (A and C)	
_	on the reaction solid zinc with solution of I HCl at 50°C C. 1M HCl at 50°C	HCl is faster? <b>D.</b> 1M HCl at 25°C	A. adding NH <sub>4</sub> NO <sub>3</sub> so	ollowing situation the plotution to the NH <sub>3</sub> soluti	on <b>B.</b> adding K	CCN solution to the HCN solution
·	equal to 8.3, which of the following is corr				NH <sub>4</sub> Cl solution <b>D.</b> all of the	
• •	a water is basic <b>C.</b> $[OH^{-}]=5.0x10^{-9}M$		<b>50.</b> All of the followin <b>A.</b> pentane and 2,2-		structural isomers to each et <b>B.</b> hexene and cyc	•
<b>7.</b> By decreasing pressure on the fo <b>A.</b> the quantity of $N_2$ decreases <b>C.</b> the quantity of NO increases	ollowing equilibrium system: N <sub>2</sub> (g)+ O <sub>2</sub> (g) • <b>B.</b> the quantity of NO or the quantities do no	decreases	C. pentane and cyclo		•	nane and 1,2-dichloro ethane
8. When compared dimethyl ether A. both have the same a functional C. both dissolved in water.	and ethanol, which of the following is <b>cor</b> group <b>B.</b> both have the said <b>D.</b> all of them					
<ul><li>9. The entropy increases by:-</li><li>A. decreasing the pressure</li><li>B. inc</li></ul>	creasing the temperature <b>C.</b> mixing gas	ses <b>D.</b> all of them				
	orward activation energy equals 100kJ/ uls -35kJ/mol , the value of Ea is:-(place B65kJ/mol C. 35kJ/mol	the reactants at energy				

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION

**General Examinations for Preparatory Stage** Study year (2024-2025) (Grade twelve scientific)



2<sup>nd</sup> Attempt Time: 3.30 hours

**Subject: Chemistry** 



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## Answer the following questions: (two marks for each right choice)

<ol> <li>At which of the following si</li> </ol>	tuation the reaction s	olid zinc with solution	of HCl is faster?
--	------------------------	-------------------------	-------------------

**A.** 0.1M HCl at 25°C

**B.** 0.1M HCl at 50°C

C. 1M HCl at 50°C

D. 1M HCl at 25°C

**2.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-

A. 1-butanol

**B.** propanal

**C.** butanone

**D.** butanal

**3.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**?

**A.** the value of K at 500°C is greater than the value of K at 700°C

**B.** the value of *K* at both temperatures are equal

**C.** the value of K at 500°C is less than the value of K at 700°C

**D.** none of them

**4.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction?

**A.** presence of catalyst

B. changing concentration of product

**C.** changing temperature

**D.** changing concentration of reactant

**5.** The boiling point of an aqueous solution containing a nonelectrolyte that freezes at  $-3.72^{\circ}$ C, is: if  $(K_f = -1.86^{\circ}C/m)$   $(K_b = 0.51^{\circ}C/m)$ 

**A.** 102.04°C

**B.** 1.02°C

C. 101.02°C

**D.** 100.51°C

**6.** By using the information in the adjacent table, which of the following is catalyst?

^	n 1		$\overline{}$	
^	IN /I	n		ı

B. H<sub>2</sub>O<sub>2</sub>**C.**  $H_2O$ 

 $D, O_2$ 

Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>
mass at the start of the reaction (g)	68	0	0	5
mass at the end of the reaction (g)	0	36	32	5

**7.** Suppose that 20mL of 0.01M Ca(OH)<sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is **correct**?

**A.** [HCl]=0.02M

**B.** [HCl]=0.04M

C. the spectator ions are Ca<sup>2+</sup> and Cl<sup>-</sup>

D. both (B and C)

**8.** Which theories of acids and bases belong to acids and bases conjugate?

**A.** Arrhenius

**B.** Lewis

C. Bronsted-Lowry

**D.** none of them

**9.** All of the following salts effect on the H<sub>3</sub>O<sup>+</sup> and OH<sup>-</sup> concentration when added to water **except**:-.

A. NaCN

B. KCI

C. KNO<sub>2</sub>

**D.** NH₄Br

**10.** The correct name for this compound: (

CH<sub>3</sub> ) according to IUPAC system is:

A. 1-ethyl-4-methyl cyclohexane

B. 1-ethyl-4-methyl benzene

C. 1-methyl-4-ethyl benzene

D. 1-methyl-4- ethyl cyclohexane

**11.** In the following reaction:  $CaCO_3(s) + 179.2kJ \longrightarrow CaO(s) + CO_2(g)$ , what is the  $\Delta H^0_f$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively **A.** -814.1kJ/mol **B.** +814.1kJ/mol C. -634.9kJ/mol **D.** +634.9kJ/mol

SN: 000023 **12.** Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-

**A.** specific heat **B.** enthalpy of reaction **C.** enthalpy of formation **D.** enthalpy of combustion

**13.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

**C.** the graphite is a good electrical conductor

**D.** none of them

**14.** In the following reaction:  $HNO_2(aq) + H_2O(l) \longrightarrow NO_2(aq) + H_3O^+(aq)$ , the conjugate acid of  $NO_2$  is:-

**A.** H<sub>3</sub>O<sup>+</sup>

B. HNO<sub>2</sub>

**C.**  $H_2O$ 

**D.** none of them

**15.** By decreasing pressure on the following equilibrium system:  $N_2(g) + O_2(g) \iff 2NO(g)$ 

A. the quantity of N<sub>2</sub> decreases

**B.** the quantity of NO decreases

C. the quantity of NO increases

**D.** the quantities do not change

16. If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material

be?  $(C_p=0.07J/(g.K))$ 

**A.** 25°C

**B.** 298K

**C.** 40K

**D.** 40°C

17. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol

**C.** 35kJ/mol

**D.** 135kJ/mol

**18.** In the following gaseous equilibrium reaction:  $PCl_5 \leftarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-

**A.** 0.005

**B.** 0.05

**C.** 20

**D.** 200

**19.** When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?

A. KNO<sub>3</sub>

B. KF

C. NaF

**D.** both (B and C)

**20.** Which of the following is heated with sulfur atoms in vulcanization process?

**A.** isoprene

**B.** neoprene

**C.** poly isoprene

**D.** 2-methyl-1,3 butadiene

**21.** At which of the following concentrations the hydrochloric acid considered a strong electrolyte? **D.** all of them

**A.** 5M

**B.** 1M

**C.** 0.001M

**22.** What colligative properties are displayed when antifreeze is added to a car's cooling system?

**A.** vapor-pressure elevation

**B.** boiling point elevation D. both (B and C)

**C.** CH<sub>4</sub>

**C.** freezing-point depression

D. NH<sub>3</sub>

**24.** Salts of weak acids and weak bases can produce basic aqueous solution if:-

**23.** A molecule that donates one electron pair to form a covalent bond is:-

**A.**  $K_a = K_b$ 

 $A. BF_3$ 

**B.**  $K_a > K_b$ 

B. NH<sub>4</sub><sup>+</sup>

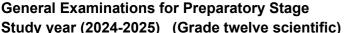
C.  $K_b > K_a$ 

**D.**  $[H_3O^+] > [OH^-]$ 

<b>5.</b> Thecompounds contribute to the destruction of ozone in the upper atmosphere.	<b>41.</b> The net ionic equation for which of the following reaction is: $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?
A. C <sub>2</sub> F <sub>4</sub> B. CFCs C. MTBE D. PVA	A. Ba(OH) <sub>2</sub> (aq)+H <sub>2</sub> SO <sub>4</sub> (aq) $\longrightarrow$ B. Sr(OH) <sub>2</sub> (aq)+HCl(aq) $\longrightarrow$
6. If the pH of sea water at 25°C is equal to 8.3, which of the following is correct?	C. Zn(s)+HCl(aq) → D. both ( A and B )
<b>A.</b> [OH <sup>-</sup> ]=2.0x10 <sup>-6</sup> M <b>B.</b> the sea water is basic <b>C.</b> [OH <sup>-</sup> ]=5.0x10 <sup>-9</sup> M <b>D.</b> both (A and B)	<b>42.</b> The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:
7. Which of the following oxides when reacted with water forms acid solution?	A. substitution B. addition C. condensation D. elimination
<b>A.</b> $CO_2$ <b>B.</b> $CaO$ <b>C.</b> $SO_3$ <b>D.</b> both ( A and C )	<b>43.</b> The rate law for the following hypothetical reaction: $A + B \longrightarrow C$ , is $R = k[A]^2[B]$ , by what factor does the
<b>8.</b> All of the following pair compounds are structural isomers to each ether <b>except</b> :-	rate increase if the concentration of each A and B is tripled?
A. pentane and 2,2-dimethyl propane  B. hexene and cyclohexane	A. 27 B. 16 C. 18 D. 8
C. pentane and cyclopentane  D. 1,1-dichloro ethane and 1,2-dichloro ethane	<b>44.</b> In the following reaction: $2NO+O_2 \longrightarrow 2NO_2$ , the reaction for the fast step is: $NO_3+NO \longrightarrow 2NO_2$ ,
<b>9.</b> The correct order according the pOH value for the following solution is:-	which of following is <b>correct</b> ? <b>A.</b> NO is intermediate <b>B.</b> NO <sub>3</sub> is intermediate <b>C.</b> R= $k$ [NO][O <sub>2</sub> ] <b>D.</b> both(B and C)
A. NaCl>CH <sub>3</sub> COOK>NH <sub>4</sub> NO <sub>3</sub> B. NH <sub>4</sub> NO <sub>3</sub> >NaCl>CH <sub>3</sub> COOK  D. NH <sub>4</sub> NO <sub>3</sub> >CH <sub>3</sub> COOK>NaCl	
	<b>45.</b> If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of
A chemical formula that shows the type of covalent bond in organic compound:-	energy transfer is determined by thedifferences between the objects within system.  A. specific heat  B. nature  C. temperature  D. all of them
A. molecular formula B. empirical formula C. structural formula D. ionic formula	
1. A molecular compound which dissolves in water and it does not ionize:-	<b>46.</b> An acid is used as a fungicide:- <b>A.</b> CH <sub>3</sub> COOH <b>B.</b> HCl <b>C.</b> HNO <sub>3</sub> <b>D.</b> H <sub>3</sub> PO <sub>4</sub>
<b>A.</b> C <sub>2</sub> H <sub>5</sub> OH <b>B.</b> C <sub>6</sub> H <sub>6</sub> <b>C.</b> NH <sub>4</sub> Cl <b>D.</b> HF	
<b>2.</b> The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate ( $Na_2SO_4$ ) is 0.36mol, what is the molarity of solution? <b>A.</b> 0.24 <b>B.</b> 0.12 <b>C.</b> 0.36 <b>D.</b> 0.72	<b>47.</b> After mixing Ca <sup>2+</sup> ions with concentration $2.4 \times 10^{-4} \text{M}$ and CO <sub>3</sub> <sup>2-</sup> ions with concentration $1.2 \times 10^{-4} \text{M}$ , which of the following is <b>correct</b> ? If the solubility of CaCO <sub>3</sub> in its saturated solution is $5.3 \times 10^{-5} \text{mol/L}$ <b>A.</b> ionic product> $K_{sp}$ <b>B.</b> ionic product< $K_{sp}$ <b>C.</b> ionic product= $K_{sp}$ <b>D.</b> precipitate isn't form
<b>3.</b> In this reaction: $CN^{-}(aq) + H_2O(l) \longrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is <b>incorrect</b> ?	<b>48.</b> When compared dimethyl ether and ethanol, which of the following is <b>correct</b> ?
<b>A.</b> OH is conjugate base $\mathbf{B.H_2O}$ is amphoteric $\mathbf{C.CN}$ ion is hydrolyzez $\mathbf{D.}$ none of them	A. both have the same a functional group  B. both have the same boiling point
	C. both dissolved in water.  D. all of them
<b>4.</b> Which of the following is <b>correct</b> at all temperature in pure water? <b>A.</b> $K_w = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-14}$	<b>49.</b> The following reaction: $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-
$\Gamma [H_2O^+] = [OH_1] = 1 \times 10^{-7} M$	<b>A.</b> if $T\Delta S$ value = 176kJ <b>B.</b> if $T\Delta S$ value > 176kJ <b>C.</b> if $T\Delta S$ value < 176kJ <b>D.</b> at all temperature
5. The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-	<b>50.</b> At equilibrium :-
A. 6 B. 10 C. 8 D. 12	A. all reaction have ceased  B. only the forward reaction continues
6. The entropy increases by:-	C. only the reverse reaction continues  D. both the forward and reverse reactions continue.
A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them	
7. The molecular formula for the ethyl ethanoate compound is :-	
<b>A.</b> $C_4H_{10}O_2$ <b>B.</b> $C_4H_8O_2$ <b>C.</b> $C_4H_{10}O$ <b>D.</b> $C_4H_8O$	
8. An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :-	
<b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>	
<b>9.</b> At which of the following situation the pH do not change?	
A. adding NH <sub>4</sub> NO <sub>3</sub> solution to the NH <sub>3</sub> solution  B. adding KCN solution to the HCN solution  C. adding a small amount of HCl to NH <sub>3</sub> and NH <sub>4</sub> Cl solution  D. all of them	
<b>0.</b> Increasing the percentage of branched-chain alkanes in gasoline causes to:-	
A. increase octane rating  B. decrease octane rating	
C. increase boiling point D. both (A and C)	

MINISTRY OF EDUCATION

HIGH COMMITTEE OF THE GENERAL EXAMINATION





2<sup>nd</sup> Attempt Time: 3.30 hours



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# Answer the following questions: ( two marks for each right choice )

1. If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system.

**A.** specific heat

**B.** nature

**C.** temperature

**D.** all of them

Subject: Chemistry

**2.** By using the information in the adjacent table, which of the following is catalyst?

A. MnO<sub>2</sub>

**B.** H<sub>2</sub>O<sub>2</sub>

**C.** H<sub>2</sub>O **D.** O<sub>2</sub>

<b>)</b>					
)	mass at the start of the reaction (g)	68	0	0	5
	mass at the end of the reaction (g)	0	36	32	5

**3.** A molecule that donates one electron pair to form a covalent bond is:-

**A.** BF<sub>3</sub>

**B.** NH<sub>4</sub><sup>+</sup>

Substance

**C.** CH<sub>4</sub>

H<sub>2</sub>O<sub>2</sub> H<sub>2</sub>O O<sub>2</sub> MnO<sub>2</sub>

D. NH<sub>3</sub>

**4.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\Delta H_f^0$  value for CaO? If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively

**A.** -814.1kJ/mol

**B.** +814.1kJ/mol

**C.** -634.9kJ/mol

D. +634.9kJ/mol

**5.** At equilibrium :-

A. all reaction have ceased

**B.** only the forward reaction continues

**C.** only the reverse reaction continues

**D.** both the forward and reverse reactions continue.

**6.** When compared dimethyl ether and ethanol, which of the following is **correct**?

A. both have the same a functional group

**B.** both have the same boiling point

**C.** both dissolved in water.

**D.** all of them

**7.** All of the following pair compounds are structural isomers to each ether **except**:-

**A.** pentane and 2,2-dimethyl propane

**B.** hexene and cyclohexane

**C.** pentane and cyclopentane

D. 1,1-dichloro ethane and 1,2-dichloro ethane

**8.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, which of the following is correct? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L

**A.** ionic product> $K_{sp}$ 

**B.** ionic product  $< K_{sp}$ 

**C.** ionic product= $K_{SD}$ 

**D.** precipitate isn't form

**9.** In the following gaseous equilibrium reaction:  $PCl_5 \longleftrightarrow PCl_3 + Cl_2$ , the mole number for each of  $PCl_5$ ,  $PCl_3$ and Cl<sub>2</sub> at equilibrium is (0.084, 0.035, 0.06) respectively in 5L vessel, the value of equilibrium constant is:-

**A.** 0.005

**B.** 0.05

**C.** 20

**D.** 200

**10.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ?

A.  $Ba(OH)_2(aq)+H_2SO_4(aq) \longrightarrow$ 

**B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ 

C.  $Zn(s)+HCl(aq) \longrightarrow$ 

D. both (A and B)

**11.** Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree (1°C) or one kelvin (1K) is:-

**A.** specific heat **B.** enthalpy of reaction

**C.** enthalpy of formation

**D.** enthalpy of combustion

**12.** The following reaction:  $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-

**A.** if  $T\Delta S$  value = 176kJ **B.** if  $T\Delta S$  value > 176kJ **C.** if  $T\Delta S$  value < 176kJ

**D.** at all temperature

**13.** According to IUPAC system the compound:  $(CH_3-CH_2-CH_2-COH)$ , is called: N: 000024

A. 1-butanol

**B.** propanal

C. butanone

D. butanal

**14.** Which of the following is **incorrect**?

A. the reaction type of methane gas with chlorine gas is addition

**B.** the alkynes don't have geometric formula

C. the graphite is a good electrical conductor

**D.** none of them

15. The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution?

**A.** 0.24

**B.** 0.12

**C.** 0.36

**D.** 0.72

**16.** Which of the following oxides when reacted with water forms acid solution?

**A.** CO<sub>2</sub>

B. CaO

**C.** SO<sub>3</sub>

**D.** both ( A and C )

17. In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). A. 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol

**18.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-

**A.** 6

**B.** 10

**C.** 8

**D.** 12

**19.** Which theories of acids and bases belong to acids and bases conjugate?

**A.** Arrhenius

**B.** Lewis

C. Bronsted-Lowry

**D.** none of them

**20.** If the pH of sea water at 25°C is equal to 8.3, which of the following is **correct**?

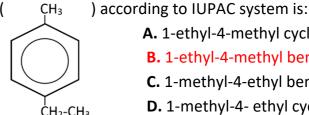
**A.**  $[OH^{-}]=2.0x10^{-6}M$ 

**B.** the sea water is basic

**C.**  $[OH^{-}]=5.0\times10^{-9}M$ 

D. both (A and B)

**21.** The correct name for this compound: (



**A.** 1-ethyl-4-methyl cyclohexane

**B.** 1-ethyl-4-methyl benzene

**C.** 1-methyl-4-ethyl benzene

**D.** 1-methyl-4- ethyl cyclohexane

**22.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**?

**A.** the value of K at 500°C is greater than the value of K at 700°C

**B.** the value of *K* at both temperatures are equal

C. the value of K at 500°C is less than the value of K at 700°C

**D.** none of them

23. The correct order according the pOH value for the following solution is:-

A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub>

**B.** NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK

C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub>

D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl

**24.** The......compounds contribute to the destruction of ozone in the upper atmosphere.

**A.** C<sub>2</sub>F<sub>4</sub>

B. CFCs

C. MTBE

D. PVA

<b>25.</b> By decreasing pressure on the following equilibrium system: $N_2(g) + O_2(g) \iff 2NO(g)$ <b>A.</b> the quantity of $N_2$ decreases <b>B.</b> the quantity of NO decreases	<ul> <li>40. Which of the following is heated with sulfur atoms in vulcanization process?</li> <li>A. isoprene</li> <li>B. neoprene</li> <li>C. poly isoprene</li> <li>D. 2-methyl-1,3 butadiene</li> </ul>
C. the quantity of NO increases  D. the quantities do not change	<b>41.</b> What colligative properties are displayed when antifreeze is added to a car's cooling system?
<ul> <li>26. The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-</li> <li>A. substitution</li> <li>B. addition</li> <li>C. condensation</li> <li>D. elimination</li> </ul>	A. vapor-pressure elevation  C. freezing-point depression  B. boiling point elevation  D. both (B and C)
<b>27.</b> A molecular compound which dissolves in water and it does <b>not ionize</b> :- <b>A.</b> C <sub>2</sub> H <sub>5</sub> OH <b>B.</b> C <sub>6</sub> H <sub>6</sub> <b>C.</b> NH <sub>4</sub> Cl <b>D.</b> HF	<b>42.</b> At which of the following situation the reaction solid zinc with solution of HCl is faster? <b>A.</b> 0.1M HCl at 25°C <b>B.</b> 0.1M HCl at 50°C <b>C.</b> 1M HCl at 50°C <b>D.</b> 1M HCl at 25°C
28. The rate law for the following hypothetical reaction: A +B → C, is R=k[A]²[B], by what factor does the rate increase if the concentration of each A and B is tripled?  A. 27  B. 16  C. 18  D. 8	<ul> <li>43. In the following reaction: 2NO+O₂ → 2NO₂, the reaction for the fast step is: NO₃+NO → 2NO₂, which of following is correct?</li> <li>A. NO is intermediate</li> <li>B. NO₃ is intermediate</li> <li>C. R=k[NO][O₂]</li> <li>D. both(B and C)</li> </ul>
<ul> <li>29. At which of the following situation the pH do not change?</li> <li>A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution</li> <li>B. adding KCN solution to the HCN solution</li> <li>C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution</li> <li>D. all of them</li> </ul>	<ul> <li>44. An acid is used as a fungicide:-</li> <li>A. CH<sub>3</sub>COOH</li> <li>B. HCl</li> <li>C. HNO<sub>3</sub></li> <li>D. H<sub>3</sub>PO<sub>4</sub></li> <li>45. Salts of weak acids and weak bases can produce basic aqueous solution if:-</li> </ul>
<b>30.</b> An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion :- <b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>	<b>A.</b> $K_a = K_b$ <b>B.</b> $K_a > K_b$ <b>C.</b> $K_b > K_a$ <b>D.</b> $[H_3O^+] > [OH^-]$
<b>31.</b> If 49J of energy are added to 35g of a material at 20°C, what will the final temperature of the material	<b>46.</b> The entropy increases by:- <b>A.</b> decreasing the pressure <b>B.</b> increasing the temperature <b>C.</b> mixing gases <b>D.</b> all of them
be? $(C_p=0.07J/(g.K))$ <b>A.</b> 25°C <b>B.</b> 298K <b>C.</b> 40K <b>D.</b> 40°C	<b>47.</b> In this reaction: $CN^{-}(aq) + H_2O(l) \longrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is <b>incorrect</b> ?
<b>32.</b> The molecular formula for the ethyl ethanoate compound is :-	<b>A.</b> OH <sup>-</sup> is conjugate base <b>B.</b> H <sub>2</sub> O is amphoteric <b>C.</b> CN <sup>-</sup> ion is hydrolyzez <b>D.</b> none of them
<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> <b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> <b>C.</b> C <sub>4</sub> H <sub>10</sub> O <b>D.</b> C <sub>4</sub> H <sub>8</sub> O	<b>48.</b> The boiling point of an aqueous solution containing a nonelectrolyte that freezes at -3.72°C, is:
<ul> <li>A. molecular formula</li> <li>B. empirical formula</li> <li>C. structural formula</li> <li>D. ionic formula</li> </ul>	if $(K_f = -1.86 ^{\circ}\text{C}/m)$ $(K_b = 0.51 ^{\circ}\text{C}/m)$ <b>A.</b> $102.04 ^{\circ}\text{C}$ <b>B.</b> $1.02 ^{\circ}\text{C}$ <b>C.</b> $101.02 ^{\circ}\text{C}$ <b>D.</b> $100.51 ^{\circ}\text{C}$
<b>34.</b> At which of the following concentrations the hydrochloric acid considered a strong electrolyte?	49. Increasing the percentage of branched-chain alkanes in gasoline causes to:-
<b>A.</b> 5M <b>B.</b> 1M <b>C.</b> 0.001M <b>D.</b> all of them	A. increase octane rating  B. decrease octane rating  C. increase heiling point  D. heth (A and C)
<b>35.</b> In the reaction that occurs by one direction(forward), which of the following doesn't effect on	C. increase boiling point  D. both (A and C)
the rate of reaction?  A. presence of catalyst  B. changing concentration of product  C. changing temperature  D. changing concentration of reactant	<b>50.</b> All of the following salts effect on the H <sub>3</sub> O <sup>+</sup> and OH <sup>-</sup> concentration when added to water <b>except</b> : <b>A.</b> NaCN <b>B.</b> KCl <b>C.</b> KNO <sub>2</sub> <b>D.</b> NH <sub>4</sub> Br
<b>36.</b> Which of the following is <b>correct</b> at all temperature in pure water? <b>A.</b> $K_{W}=[H_{3}O^{+}][OH^{-}]$ <b>B.</b> $[H_{3}O^{+}][OH^{-}]=1\times10^{-14}$ <b>C.</b> $[H_{3}O^{+}]=[OH^{-}]=1\times10^{-7}M$ <b>D.</b> all of them.	
<b>37.</b> When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which of the following salts may be formed?	
A. KNO <sub>3</sub> B. KF C. NaF D. both (B and C)	
<b>38.</b> In the following reaction: $HNO_2(aq)+H_2O(l) \longrightarrow NO_2^-(aq)+H_3O^+(aq)$ , the conjugate acid of $NO_2^-$ is:- <b>A.</b> $H_3O^+$ <b>B.</b> $HNO_2$ <b>C.</b> $H_2O$ <b>D.</b> none of them	
<b>39.</b> Suppose that 20mL of 0.01M Ca(OH) <sub>2</sub> is required to neutralize 10mL of HCl solution, which of the following is <b>correct</b> ?	
<b>A.</b> [HCI]=0.02M <b>B.</b> [HCI]=0.04M <b>C.</b> the spectator ions are Ca <sup>2+</sup> and Cl <sup>-</sup> <b>D.</b> both (B and C)	

Subject: Chemistry

MINISTRY OF EDUCATION
HIGH COMMITTEE OF THE GENERAL EXAMINATION

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وهلامي نموونهيي



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General Examinations Study year (2024-2025	•	162 de 1845	nd Attempt Time:	3.30 hours	T
Answer the follo	wing questions: (	two marks for each rig	ht choice )	Ţ	
1. The net ionic equati	ion for which of th	e following reaction is:	H₃O⁺(aq)+OH⁻(aq) -	<b>→</b> 2H <sub>2</sub> O( <i>l</i> )?	
<b>A.</b> Ba(OH) <sub>2</sub> (aq)+H <sub>2</sub> SO	₄(aq) →	<b>B.</b> Sr(OH) <sub>2</sub> (aq)+H	Cl(aq)──		
C. Zn(s)+HCl(aq) →		<b>D.</b> both ( A and B	)		
following is correct?		is required to neutralize			
<b>A.</b> [HCl]=0.02M		<b>C.</b> the spectator io			(B and C)
the following salts ma		k acid titrated with 50m	iL of 0.1M potassiu	im hydroxide,	which of
A. KNO <sub>3</sub>	B. KF	<b>C.</b> NaF	<b>D.</b> both (l	B and C)	
	•	eaction: PCl <sub>5</sub> ←→ PCl <sub>3</sub> +0 0.06) respectively in 5L v <b>C.</b> 20		equilibrium o	
<b>5.</b> If 49J of energy are be? $(C_p=0.07J/(g.)$	_	material at 20°C , what <b>B.</b> 298K	will the final temp		e material 40°C
		kJ $\longrightarrow$ NH <sub>3</sub> (g)+HCl(g), o ue > 176kJ		ly:- <b>D.</b> at all temp	erature
7. Which theories of a	cids and bases belo	ong to acids and bases o	conjugate?		
<b>A.</b> Arrhenius	<b>B.</b> Lewis	C. Bronsted-Lov	wry	<b>D.</b> none of the	nem
<b>8.</b> The rate law for the rate increase if the co		etical reaction: A+B—— ch A and B is tripled? <b>C.</b> 18	<b>•</b> C , is R=k[A]²[B], b <b>D.</b> 8	y what factor	does the
<b>9.</b> Salts of weak acids a	and weak bases ca	n produce basic aqueou	us solution if:-		
<b>A.</b> $K_a = K_b$	<b>B.</b> $K_a > K_b$	<b>C.</b> $K_b > K_a$		D <sup>+</sup> ]>[OH <sup>-</sup> ]	
<b>10.</b> Which of the follo	wing is heated wit	h sulfur atoms in vulcar	nization process?		
A. isoprene	<b>B.</b> neoprene	<b>C.</b> poly isoprene		nethyl-1,3 but	adiene
<b>11.</b> An ion that forms <b>A.</b> Mg <sup>2+</sup>	precipitate with su	ulfate ion, but doesn't fo	orm precipitate wit <b>D.</b> Al <sup>3+</sup>	ch sulfide ion	:-
<b>12.</b> The entropy increa	ases by:-				
A. decreasing the pre	ssure <b>B.</b> increa	sing the temperature	C. mixing gases	<b>D.</b> all of the	em
<b>13.</b> All of the following <b>A.</b> NaCN	g salts effect on the	e $H_3O^+$ and $OH^-$ concent <b>C.</b> KNO <sub>2</sub>	tration when added <b>D.</b> NH <sub>4</sub> B		cept:

**14.** In the reaction that occurs by one direction(forward), which of the following doesn't effect on the rate of reaction? **A.** presence of catalyst B. changing concentration of product **C.** changing temperature **D.** changing concentration of reactant **15.** In the following gaseous equilibrium system:  $2CO_2+167kJ \rightleftharpoons 2CO+O_2$ , which of the following is **true**? **A.** the value of K at 500°C is greater than the value of K at 700°C **B.** the value of K at both temperatures are equal C. the value of K at 500°C is less than the value of K at 700°C **D.** none of them **16.** After mixing  $Ca^{2+}$  ions with concentration 2.4x10<sup>-4</sup>M and  $CO_3^{2-}$  ions with concentration 1.2x10<sup>-4</sup>M, which of the following is **correct**? If the solubility of CaCO<sub>3</sub> in its saturated solution is 5.3x10<sup>-5</sup>mol/L **A.** ionic product> $K_{sp}$ **B.** ionic product $< K_{sp}$ **C.** ionic product= $K_{sp}$ **D.** precipitate isn't form 17. All of the following pair compounds are structural isomers to each ether except:-A. pentane and 2,2-dimethyl propane **B.** hexene and cyclohexane **C.** pentane and cyclopentane **D.** 1,1-dichloro ethane and 1,2-dichloro ethane **18.** Which of the following oxides when reacted with water forms acid solution? **A.** CO<sub>2</sub> B. CaO **C.** SO<sub>3</sub> **D.** both ( A and C ) **19.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). **A.** 65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol **B.** -65kJ/mol **20.** The correct order according the pOH value for the following solution is:-A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub> **B.** NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub> D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl **21.** Which of the following is **correct** at all temperature in pure water? **A.**  $K_W = [H_3O^+][OH^-]$ **B.**  $[H_3O^+][OH^-]=1x10^{-14}$ **C.**  $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ **D.** all of them. **22.** The......compounds contribute to the destruction of ozone in the upper atmosphere. B. CFCs A. C<sub>2</sub>F<sub>4</sub>C. MTBE D. PVA 23. At which of the following situation the reaction solid zinc with solution of HCl is faster? **A.** 0.1M HCl at 25°C **B.** 0.1M HCl at 50°C **C.** 1M HCl at 50°C **D.** 1M HCl at 25°C **24.** The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution? **A.** 0.24 **B.** 0.12 **C.** 0.36 **D.** 0.72 **25.** If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by the.....differences between the objects within system. **A.** specific heat **B.** nature **C.** temperature **D.** all of them **26.** In the following reaction: CaCO<sub>3</sub>(s)+ 179.2kJ  $\longrightarrow$  CaO (s)+ CO<sub>2</sub>(g), what is the  $\Delta H_f^0$  value for CaO?

If the  $\Delta H_f^0$  value for each of CO<sub>2</sub> and CaCO<sub>3</sub> equal to (-393.5, -1207.6) kJ/mol respectively

**B.** +814.1kJ/mol

A. -814.1kJ/mol

**D.** +634.9kJ/mol

<b>27.</b> By using	g the information in the adjace	ent table	e, whic	h of	the follo	owing is catalyst?	<b>42.</b> When compared dimethyl ether and ethanol, which of the following is <b>correct</b> ?
A. MnO <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>		A. both have the same a functional group B. both have the same boiling point
<b>B.</b> H <sub>2</sub> O <sub>2</sub>	mass at the start of the reaction (g)	68	0	0	5		C. both dissolved in water.  D. all of them
<b>C.</b> H <sub>2</sub> O <b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)	0	36	32	5		<b>43.</b> By decreasing pressure on the following equilibrium system: $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ <b>A.</b> the quantity of $N_2$ decreases <b>B.</b> the quantity of NO decreases
<b>28.</b> An acid	is used as a fungicide:-						C. the quantity of NO increases  D. the quantities do not change
<b>A.</b> CH₃COC	B. HCl	(	<b>C.</b> HNC	)3		<b>D.</b> H <sub>3</sub> PO <sub>4</sub>	44. A molecule that donates one electron pair to form a covalent bond is:-
<b>29.</b> At whic	h of the following situation the	e pH do	not ch	ange	e?		<b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub>
•	$NH_4NO_3$ solution to the $NH_3$ so a small amount of HCl to $NH_3$ a		Cl solu	tion		ing KCN solution to the HCN solution of them	<b>45.</b> What colligative properties are displayed when antifreeze is added to a car's cooling system? <b>A.</b> vapor-pressure elevation <b>B.</b> boiling point elevation
<b>30.</b> At whic	h of the following concentration	ons the	hydrod	chlor	ic acid c	considered a strong electrolyte?	C. freezing-point depression  D. both (B and C)
<b>A.</b> 5M	<b>B.</b> 1M				<b>C.</b> 0.0	D. all of them	<b>46.</b> Which of the following is <b>incorrect</b> ?
<b>31.</b> A moled <b>A.</b> C₂H₅OH	cular compound which dissolve ${f B.}\ {f C_6}{f H_6}$	es in wa <b>C.</b> Ni		d it d	loes <b>not</b>	ionize:- D. HF	A. the reaction type of methane gas with chlorine gas is addition  B. the alkynes don't have geometric formula
<b>32.</b> The rea	•	us soluti			ooxylic a	acids and amines are mixed is called:- <b>D.</b> elimination	C. the graphite is a good electrical conductor D. none of them
	eaction: CN⁻(aq)+ H₂O( <i>l</i> ) ← → Honjugate base B. H₂O is am		-	• •		•	<b>47.</b> In the following reaction: $HNO_2(aq)+H_2O(l) \longleftrightarrow NO_2^-(aq)+H_3O^+(aq)$ , the conjugate acid of $NO_2^-$ is:- <b>A.</b> $H_3O^+$ <b>B.</b> $HNO_2$ <b>C.</b> $H_2O$ <b>D.</b> none of them
<b>34.</b> The boi	ling point of an aqueous soluti $S^{\circ}C/m$ ) ( $K_b=0.51^{\circ}C/m$ )		taining		nelectro	olyte that freezes at -3.72°C, is: <b>D.</b> 100.51°C	48. The correct name for this compound: ( CH <sub>3</sub> ) according to IUPAC system is:  A. 1-ethyl-4-methyl cyclohexane  B. 1-ethyl-4-methyl benzene
<b>35.</b> Accordi <b>A.</b> 1-butan	ng to IUPAC system the compo ol <b>B.</b> propanal	ound:(C			₂-COH), i anone	is called:- <b>D.</b> butanal	C. 1-methyl-4-ethyl benzene  CH <sub>2</sub> -CH <sub>3</sub> D. 1-methyl-4- ethyl cyclohexane
<b>36.</b> At equil							<b>49.</b> Amount of energy required to raise the temperature of one gram of a substance by one Celsius degree
A. all react	ion have ceased reverse reaction continues			•		ard reaction continues  ard and reverse reactions continue.	(1°C) or one kelvin (1K) is:- <b>A.</b> specific heat <b>B.</b> enthalpy of reaction <b>C.</b> enthalpy of formation <b>D.</b> enthalpy of combustion
	mber of hydrogen atoms in the	e 1,1-din <b>C.</b> 8				ne compound is equal to:-	<b>50.</b> If the pH of sea water at 25°C is equal to 8.3, which of the following is <b>correct</b> ? <b>A.</b> [OH <sup>-</sup> ]=2.0x10 <sup>-6</sup> M <b>B.</b> the sea water is basic <b>C.</b> [OH <sup>-</sup> ]=5.0x10 <sup>-9</sup> M <b>D.</b> both (A and B)
						.2	
<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	lecular formula for the ethyl e B. C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>	thanoat		pour <sub>4</sub> H <sub>10</sub> (		<b>D.</b> C <sub>4</sub> H <sub>8</sub> O	
<b>39.</b> A chem	ical formula that shows the typ	pe of co	valent	bon	d in orga	anic compound:-	
A. molecul	ar formula <b>B.</b> empirical f	ormula		<b>C.</b> 5	structura	al formula <b>D.</b> ionic formula	
	ollowing reaction: 2NO+O <sub>2</sub> — ollowing is <b>correct</b> ?	•2NO <sub>2</sub> ,	the rea	actio	n for the	e fast step is: NO₃+NO─→2NO₂,	
<b>A.</b> NO is in	termediate <b>B.</b> NO <sub>3</sub> is in	ntermed	diate		<b>C.</b> R= <i>k</i>	[NO][O <sub>2</sub> ] D. both(B and C)	
	ng the percentage of branche	d-chain	alkane	es in	gasoline	e causes to:-	
	e octane rating					ne rating	
<b>C.</b> increase	boiling point		<b>D.</b> bo	oth (	A and C	)	

KURDISTAN REGION GOVERNMENT -IRAQ IN THE NAME OF ALLAH **Subject: Chemistry** fingerprint MINISTRY OF EDUCATION HIGH COMMITTEE OF THE GENERAL EXAMINATION **General Examinations for Preparatory Stage** 2<sup>nd</sup> Attempt Study year (2024-2025) (Grade twelve scientific) Time: 3.30 hours Answer the following questions: (two marks for each right choice) 1. At which of the following concentrations the hydrochloric acid considered a strong electrolyte? **A.** 5M **B.** 1M **C.** 0.001M **D.** all of them **2.** The correct order according the pOH value for the following solution is:-A. NaCl>CH<sub>3</sub>COOK>NH<sub>4</sub>NO<sub>3</sub> B. NH<sub>4</sub>NO<sub>3</sub>>NaCl>CH<sub>3</sub>COOK C. CH<sub>3</sub>COOK>NaCl>NH<sub>4</sub>NO<sub>3</sub> D. NH<sub>4</sub>NO<sub>3</sub>>CH<sub>3</sub>COOK>NaCl **3.** The net ionic equation for which of the following reaction is:  $H_3O^+(aq)+OH^-(aq) \longleftrightarrow 2H_2O(l)$ ? **B.**  $Sr(OH)_2(aq)+HCl(aq) \longrightarrow$ **A.** Ba(OH)<sub>2</sub>(aq)+H<sub>2</sub>SO<sub>4</sub>(aq)  $\longrightarrow$ C.  $Zn(s)+HCl(aq) \longrightarrow$ **D.** both (A and B) 4. The total number of ions moles which are produced by dissociation 500mL an aqueous solution of sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) is 0.36mol, what is the molarity of solution? **A.** 0.24 **B.** 0.12 **C.** 0.36 **D.** 0.72 **5.** According to IUPAC system the compound:(CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-COH), is called:-A. 1-butanol D. butanal **B.** propanal **C.** butanone **6.** At which of the following situation the pH do not change? B. adding KCN solution to the HCN solution A. adding NH<sub>4</sub>NO<sub>3</sub> solution to the NH<sub>3</sub> solution C. adding a small amount of HCl to NH<sub>3</sub> and NH<sub>4</sub>Cl solution D. all of them **7.** The rate law for the following hypothetical reaction: A+B  $\longrightarrow$  C, is R=k[A]<sup>2</sup>[B], by what factor does the rate increase if the concentration of each A and B is tripled? **A.** 27 **C.** 18 **D.** 8 **B.** 16 **8.** An acid is used as a fungicide:-A. CH<sub>3</sub>COOH B. HCI C. HNO<sub>3</sub> **D.** H<sub>3</sub>PO<sub>4</sub> **9.** All of the following salts effect on the  $H_3O^+$  and  $OH^-$  concentration when added to water **except**:-. A. NaCN B. KCI C. KNO<sub>2</sub> D. NH<sub>4</sub>Br 10. When compared dimethyl ether and ethanol, which of the following is correct? **A.** both have the same a functional group **B.** both have the same boiling point **C.** both dissolved in water. **D.** all of them **11.** Increasing the percentage of branched-chain alkanes in gasoline causes to:-A. increase octane rating B. decrease octane rating **D.** both (A and C) **C.** increase boiling point **12.** In a reaction, the value of the forward activation energy equals 100kJ/mol and the enthalpy change for reverse reaction equals -35kJ/mol, the value of E<sub>a</sub> is:-(place the reactants at energy level zero). **A.** 65kJ/mol **B.** -65kJ/mol **C.** 35kJ/mol **D.** 135kJ/mol **13.** The number of hydrogen atoms in the 1,1-dimethyl cyclopropane compound is equal to:-**A.** 6 **C.** 8 **D.** 12 **B.** 10 100

		t of energy required to raise th	ie temp	eratu	e of	one grar	n of a substance	by one Celsius degre	96
	A. specific					f format		alpy of combustion	
	<b>15.</b> At which	SN: 000026 h of the following situation the	e reacti	on soli	d zin	c with so	olution of HCl is	faster?	
	<b>A.</b> 0.1M HC					И HCl at		1M HCl at 25°C	
		ixing $Ca^{2+}$ ions with concentration is correct? If the soduct> $K_{sp}$ <b>B.</b> ionic product	olubilit	y of Ca	CO <sub>3</sub>		urated solution		
	<b>A.</b> vapor-p	olligative properties are display ressure elevation -point depression	B. bo		oint (	elevation		oling system?	
		ling point of an aqueous soluti	on con	taining	g a no	nelectro	olyte that freeze	s at -3.72°C, is:	
	if $(K_f = -1.86)$ <b>A.</b> 102.04°	$(K_b = 0.51^{\circ}C/m)$ <b>B.</b> 1.02°C		C.	101.0	02°C	<b>D.</b> 10	0.51°C	
	<b>19.</b> By decre	easing pressure on the followi	ng equi	libriun	n syst	tem: N <sub>2</sub> (	g)+ O₂(g) <del>←</del> 21	NO(g)	
	A. the quar	ntity of N <sub>2</sub> decreases			B. tl	ne quant	tity of NO decrea	ases	
		ollowing reaction: CaCO₃(s)+	+ 179.2	kJ →					C
		value for each of CO <sub>2</sub> and C						-	
	<b>A.</b> -814.1kJ	/mol <b>B.</b> +814.1kJ/	'mol		C.	-634.9k	J/mol	<b>D.</b> +634.9kJ/mol	
		ollowing reaction: 2NO+O <sub>2</sub> — ollowing is <b>correct</b> ?	▶2NO <sub>2</sub>	the re	actio	n for the	e fast step is: NC	) <sub>3</sub> +NO—→2NO <sub>2</sub> ,	
	A. NO is int	termediate <b>B.</b> NO <sub>3</sub> is in	nterme	diate		<b>C.</b> R= <i>k</i>	$[NO][O_2]$	<b>D.</b> both(B and C)	
	<b>22.</b> In the fo	ollowing reaction: HNO <sub>2</sub> (aq)+H B. HNO <sub>2</sub>	I <sub>2</sub> O( <i>l</i> ) <b>←</b>		₂ (aq) . H₂C			te acid of $NO_2^-$ is:-	
	<b>23.</b> By using	g the information in the adjace	nt tabl	e, whi	ch of	the follo	owing is catalyst	?	
	A. MnO <sub>2</sub>	Substance	H <sub>2</sub> O <sub>2</sub>	H₂O	O <sub>2</sub>	MnO <sub>2</sub>			
	<b>B.</b> H <sub>2</sub> O <sub>2</sub>	mass at the start of the reaction (g)	68	0	0	5			
	<b>C.</b> H <sub>2</sub> O <b>D.</b> O <sub>2</sub>	mass at the end of the reaction (g)	0	36	32	5			
		weak acids and weak bases ca	n prod	uce ba	sic ac	queous s	solution if:-		
	<b>A.</b> $K_a = K_b$	<b>B.</b> $K_a > K_b$		<b>C.</b> <i>K</i> <sub>b</sub> >			<b>D.</b> [H₃O <sup>+</sup>	]>[OH <sup>-</sup> ]	
		ollowing gaseous equilibrium r equilibrium is (0.084, 0.035, 0. <b>B.</b> 0.05				5L vesse			
	<b>26.</b> In the r	eaction that occurs by one o	directio	n(for	ward	), which	n of the followin	ng doesn't effect or	1
		f reaction?		`				_	
	A. presend	ce of catalyst		B. ch	angii	ng conc	entration of pro	oduct	
	<b>C.</b> changing	g temperature	I	<b>).</b> char	nging	concent	tration of reacta	nt	
1									

<ul> <li>7. A chemical formula that shows the type of covalent bond in organic compound:-</li> <li>A. molecular formula</li> <li>B. empirical formula</li> <li>C. structural formula</li> <li>D. ionic formula</li> <li>8. Thecompounds contribute to the destruction of ozone in the upper atmosphere.</li> </ul>	<b>41.</b> If a piece of hot copper metal is dipped in cool water, the energy is transferred as heat, the direction of energy transfer is determined by thedifferences between the objects within system.
The compounds contribute to the destruction of evens in the unper atmosphere	
•• Thecompounds contribute to the destruction of ozone in the apper atmosphere.	A. specific heat B. nature C. temperature D. all of them
<b>A.</b> C <sub>2</sub> F <sub>4</sub> <b>B.</b> CFCs <b>C.</b> MTBE <b>D.</b> PVA	<b>42.</b> The following reaction: $NH_4Cl(s) + 176kJ \longrightarrow NH_3(g) + HCl(g)$ , occurs spontaneously:-
<b>9.</b> Which of the following oxides when reacted with water forms acid solution?	<b>A.</b> if T $\Delta$ S value = 176kJ <b>B.</b> if T $\Delta$ S value > 176kJ <b>C.</b> if T $\Delta$ S value < 176kJ <b>D.</b> at all temperature
<b>A.</b> $CO_2$ <b>B.</b> $CaO$ <b>C.</b> $SO_3$ <b>D.</b> both ( A and C )	<b>43.</b> In this reaction: $CN^{-}(aq) + H_2O(l) \longleftrightarrow HCN(aq) + OH^{-}(aq)$ , which of the following is <b>incorrect</b> ?
<b>0.</b> Which of the following is <b>incorrect</b> ?	<b>A.</b> OH⁻ is conjugate base <b>B.</b> H₂O is amphoteric <b>C.</b> CN⁻ ion is hydrolyzez <b>D.</b> none of them
A. the reaction type of methane gas with chlorine gas is addition B. the alkynes don't have geometric formula	<b>44.</b> An ion that forms precipitate with sulfate ion, but doesn't form precipitate with sulfide ion: <b>A.</b> Mg <sup>2+</sup> <b>B.</b> Ca <sup>2+</sup> <b>C.</b> Pb <sup>2+</sup> <b>D.</b> Al <sup>3+</sup>
C. the graphite is a good electrical conductor	<b>45.</b> If the pH of sea water at 25°C is equal to 8.3, which of the following is <b>correct</b> ?
<b>D.</b> none of them	<b>A.</b> [OH <sup>-</sup> ]=2.0x10 <sup>-6</sup> M <b>B.</b> the sea water is basic <b>C.</b> [OH <sup>-</sup> ]=5.0x10 <sup>-9</sup> M <b>D.</b> both (A and B)
f 1 . If 49J of energy are added to 35g of a material at 20°C , what will the final temperature of the materi	46. The entropy increases by:-
be? $(C_p=0.07J/(g.K))$ <b>A.</b> 25°C <b>B.</b> 298K <b>C.</b> 40K <b>D.</b> 40°C	A. decreasing the pressure B. increasing the temperature C. mixing gases D. all of them
<ol> <li>The reaction that occurs when aqueous solutions of carboxylic acids and amines are mixed is called:-</li> <li>substitution</li> <li>condensation</li> <li>elimination</li> </ol>	<b>47.</b> The correct name for this compound: ( CH <sub>3</sub> ) according to IUPAC system is: <b>A.</b> 1-ethyl-4-methyl cyclohexane
3. All of the following pair compounds are structural isomers to each ether except:-	B. 1-ethyl-4-methyl benzene
A. pentane and 2,2-dimethyl propane B. hexene and cyclohexane	C. 1-methyl-4-ethyl benzene
C. pentane and cyclopentane  D. 1,1-dichloro ethane and 1,2-dichloro ethane	CH <sub>2</sub> -CH <sub>3</sub> <b>D.</b> 1-methyl-4- ethyl cyclohexane
4. A molecular compound which dissolves in water and it does not ionize:-	<b>48.</b> Suppose that 20mL of 0.01M Ca(OH) <sub>2</sub> is required to neutralize 10mL of HCl solution, which of the
<b>A.</b> $C_2H_5OH$ <b>B.</b> $C_6H_6$ <b>C.</b> $NH_4CI$ <b>D.</b> $HF$	following is correct?
5. The molecular formula for the ethyl ethanoate compound is :-	<b>A.</b> [HCl]=0.02M <b>B.</b> [HCl]=0.04M <b>C.</b> the spectator ions are Ca <sup>2+</sup> and Cl <sup>-</sup> <b>D.</b> both (B and C)
<b>A.</b> C <sub>4</sub> H <sub>10</sub> O <sub>2</sub> <b>B.</b> C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> <b>C.</b> C <sub>4</sub> H <sub>10</sub> O <b>D.</b> C <sub>4</sub> H <sub>8</sub> O	49. Which of the following is heated with sulfur atoms in vulcanization process?
<b>6.</b> Which of the following is <b>correct</b> at all temperature in pure water?	A. isoprene B. neoprene C. poly isoprene D. 2-methyl-1,3 butadiene
<b>A.</b> $K_W = [H_3O^+][OH^-]$ <b>B.</b> $[H_3O^+][OH^-] = 1 \times 10^{-14}$	<b>50.</b> A molecule that donates one electron pair to form a covalent bond is:-
<b>C.</b> $[H_3O^+] = [OH^-] = 1 \times 10^{-7} M$ <b>D.</b> all of them.	<b>A.</b> BF <sub>3</sub> <b>B.</b> NH <sub>4</sub> <sup>+</sup> <b>C.</b> CH <sub>4</sub> <b>D.</b> NH <sub>3</sub>
7. Which theories of acids and bases belong to acids and bases conjugate?  A. Arrhenius  B. Lewis  C. Bronsted-Lowry  D. none of them	
<b>8.</b> In the following gaseous equilibrium system: $2CO_2+167kJ \longleftrightarrow 2CO+O_2$ , which of the following is <b>true A.</b> the value of $K$ at $500^{\circ}$ C is greater than the value of $K$ at $700^{\circ}$ C <b>B.</b> the value of $K$ at both temperatures are equal <b>C.</b> the value of $K$ at $500^{\circ}$ C is less than the value of $K$ at $700^{\circ}$ C <b>D.</b> none of them	?
9. At equilibrium :-	
<ul> <li>A. all reaction have ceased</li> <li>B. only the forward reaction continues</li> <li>D. both the forward and reverse reactions continue.</li> </ul>	
.  When 50mL of 0.1M monoprotic weak acid titrated with 50mL of 0.1M potassium hydroxide, which on the following salts may be formed?	f
A. KNO <sub>3</sub> B. KF C. NaF D. both (B and C)	