Mock Chem12 T2 L2

Chemistry: Grade 12

مجلس أبوظبي للتعليم
Abu Dhabi Education Council
Education First التعليم أولاً

ADEC Examinations
2016-2017

Read these instructions first:

1. Complete the box above.
2. Write in blue pen.
3. The exam paper contains (11) pages.
4. Read each question well and give one answer only.
5. The mark between ( ) refers to question's mark.
6. For MC questions, circle the symbol of the correct answer, and if you would like to change your answer later cross the wrong answer and circle the new one.
7. For the open-ended questions, write your answer on the line or the space provided.
8. All diagrams are approximately drawn.

Part 1

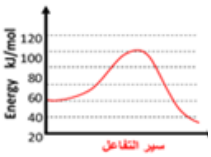
20

Multiple Choice: Identify the letter of the correct choice that best completes or answers the questions. Two points are awaredde for each question.

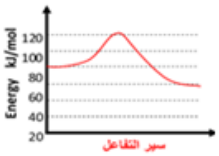
1- Which following units are not used for expressing a reaction rate ?

A. M/s
B. mol/ml.s
C . mol/ L
D . mol/L.s

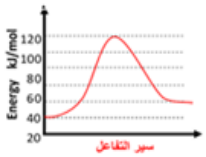
2- Which of the following graphs represents the slowest forward reaction?



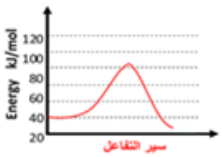
A



B



C



D

3- Which of the following represent a third order reaction?

A. $R=k[A]^2[B]$
B. $R=k[A]\,[B]$
C . ^{2} $R=k[A]^2\,[B]$
D . $R=k[A]\,[B]^3$

4- What do you expect to happen when the energy of the reactants is greater than the the energy of the products energy in a chemical reaction ?

A. reaction rate will decreas
B. reaction is exothermic
C . constant rate will increace
D . reaction is endothermic

5- In the reaction $X + Y \longrightarrow Z$, which of the following increases the rate of reaction ?

A. doubling the concentration of X
B. doubling the concentration of Y
C. reducing the concentration of Y by the half
D. reducing the concentration of X by the half

6- Which of the following equilibrium constant values shows that raction has larger amount of products at equilibrium ?

A. 0.100
B. 0.500
C .0.025
D . 4.50

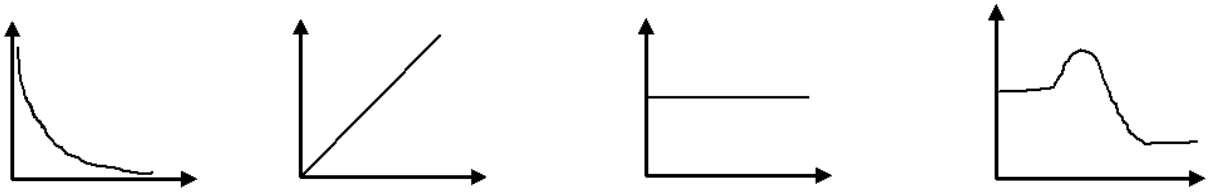
7- In the following equilibrium constant:

Fe^{3+} yellow + SCN^- colorless $\rightleftharpoons$ $[FeSCN]^{2+}$ Dark Red

What is expected to happen to the color of the solution, If we added more Iron (II) ions (Fe3+)?

A. dark red color will increase
B. No change in the color
C. it becomes colorless
D. becomes a strong yellow color

8- Which of the following represents the relationship between the equilibrium constant **Keq** and the temperature of an exothermic reaction ?



A. B. C. D.

9- Which of the following shows the equilibrium expression for this reaction ?

$$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_{2(g)}$$

D. $K_{eq} = \frac{[Fe_2O_3][H_2]^4}{[Fe][H_2O]^4}$ **C.** $K_{eq} = \frac{[H_2]^4}{[H_2O]^4}$ **B.** $K_{eq} = \frac{[H_2]}{[H_2O]}$ **A.** $K_{eq} = [H_2]^4$

10- In the equilibrium reaction , which of the following concentration would equal $K_{eq} = 1$

A. [x]= 2M , [Y] = 1M
B. [x]= 1M , [Y] = 1M
C .[x]= 1M , [Y] = 2M
D .[x]= 1.4 M , [Y] = 1M

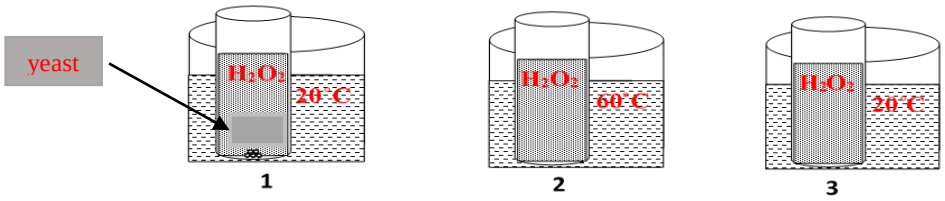
Part 2

25

Match each description in Column B to the correct term in Column A by writing the number for description into the space in front of the term . Two marks are wareded for each question.

COLUMN A Terms		COLUMN B Description
( )	Specific rate constant	1- A state of equilibrium that occurs when the reactants and products of a reaction are present in more than one physical state.
( )	Reactant order	2- Produces an insoluble ionic compound when 2 ionic solutions are mixed together
( )	Heterogeneous Equilibrium	3- The change in concentration of a reactant per unit time
( )	Catalyst	4- An ion that is common to two or more ionic compounds
( )	Activation energy	5- The state in which the forward and the reverse reaction balance each other because they occur at equal rates
( )	Endothermic	6- A substance that decrease the rate of a chemical reaction but is not itself consumed in the reaction
( )	Precipition	7- A numerical value that relates reaction rate and concentration of a reactant at a specific temperature
( )	Chemical equilibrium	8- The order of a reactant in the reaction
( )	Reaction rate	9- A chemical reaction with positive **ΔH**
( )	Common Ion	10- The minimum amount of energy required by reacting particles in order to form the activated complex
		11- A substance that increases the rate of a chemical reaction but is not itself consumed in the reaction

***Use the figures below to answer questions 12-14**



12- Compare dissociation speed of **H_2O_2** in tubes 2,3?

_____

_____

Explain your answer :

_____

_____

13- Compare the dissociation speed of **H_2O_2** in tubes 1 , 3

_____

_____

Explain your answer

_____

_____

14- If you know that **H_2O_2** dissociation speed in tube 3 is **4.00** mol/L.min , predicte the value of the reaction rate when temperature is **30.0** ^{0}C

_____

_____ 5

Part 3

25

15- In the reaction ($2NO_{2(g)} \longrightarrow 2NO_{(g)} + O_{2(g)}$) if you know that **NO_2** concentration at the beginning of the reaction equals **0.0079** mol/L, After **50.00 min of the reaction** it became **0.0079** mol/L , calculate the average reaction rate during this period

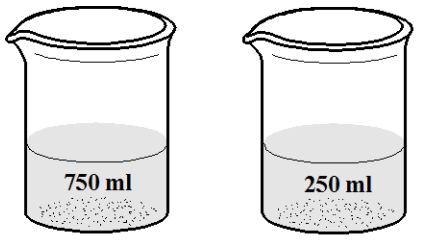
_____

_____

_____

_____ 4

16- **As shows in the next figures:**



0.0025 M NaOH **0.0200 M $MgCl_2$**

(B) **(A)**

Predict if a precipitate of $Mg(OH)_2$ will form , when you add solution A to B , note that K_{sp} of the compound equal **5.60×10^{-12}** **?**

_____

_____ 5

17- Calculate the solubility of tin hydroxide ll Sn(OH)2 in pure water if K_{eq} equals 5.45 x $10^{-}27$

4

*To measure the primary speed of the following reaction ,three laboratory experiments were conducted under identical conditions. The concentration of the reactants were changed (variable) . Use the data shown in the table below to answer questions 18 and 19

$$A + B \longrightarrow C$$

Experimental Data			
Trial	Initial concentration M [A]	Initial concentration M [B]	Initial speed $M.min^{-1}$
1	4.0	6.0	1.60
2	2.0	6.0	0.80
3	4.0	3.0	0.40

18- Write the law for the reaction rate

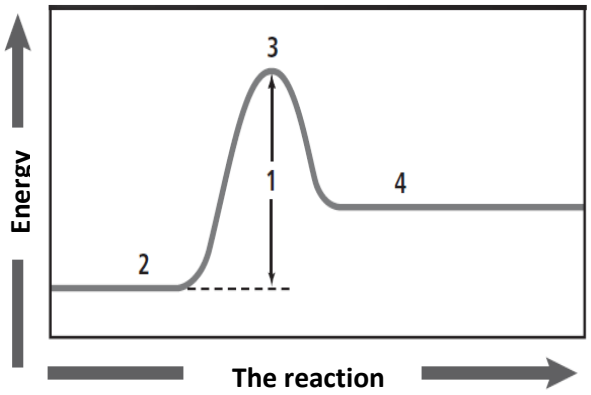
19- Find the specific rate constant and its unit

8

***The following figure shows the energy curve for a reaction ,use the graph to answer questions 20 – 21**

20- Determine wherther the reaction is exothermic or endohermic?

_____



21- What do the numbers represent in the graph?

1- _____

2- _____

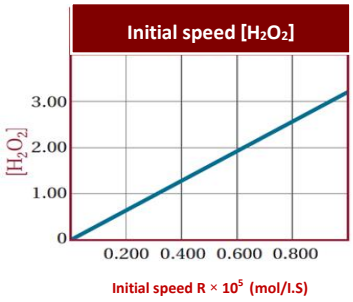
3- _____

4

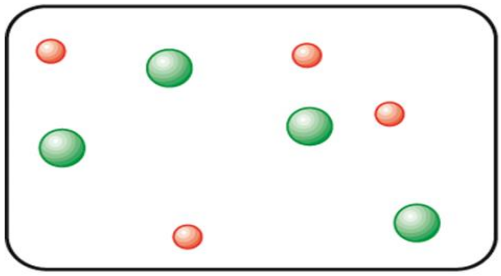
PART 4

30

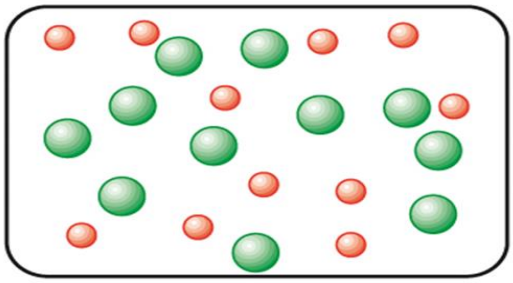
Study the following figures and use them to answer questions 22 to 24



A



B



C

22- Use figure (A) to identify the type of relationship between the concentration and the Reaction rate ?

_____

23- What is the reaction rate when [H2O2] concentration = 2.5 mol/L

_____

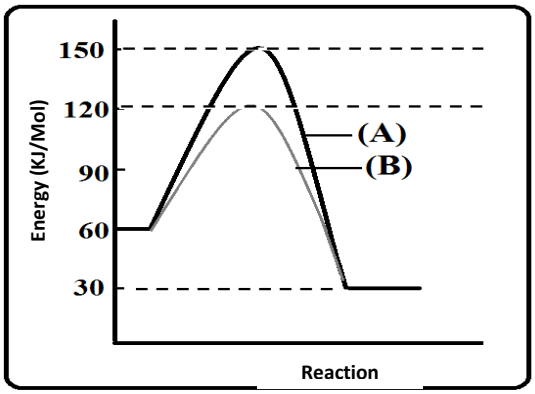
_____

24- Which reactants (B) or (C) is faster. Use the collision theory to explain your answer

_____

_____ 6

25- Use the energy graph for the reaction to answer the following questions :



Which paths (A or B) needs more activation energy ?

_____

Which paths (A or B) represent the catalyst ?

_____

What is the **ΔH** value of path A ?

_____

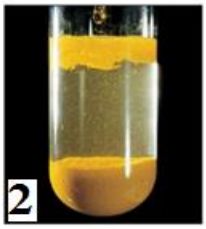
What is the activation energy value for path B?

_____

Label path B on the graph with X to show where the activated complex step takes place

5

*Picture (1) shows the solution of Lead(**II**) chromate (**$PbCrO_4$)** in equillibrium state with its ions. Picture (2) shows what happen when adding drops of lead(II) nitrate (Pb(NO3)2) to the same solution ?



26- what happened ?

_____

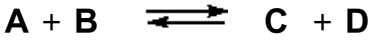
_____

Explain your answer :

_____

_____ 3

27- Assume the below reaction happened in (1L) container . The concentration of reactant A and B is equal **1.00** mol/L at the beginning of the reaction. When the reaction reaches a state of equillibrium , the concentration of reactant (A) is 0.045 mol/L



- Calculate the concentrations of the products at equilibrium.

_____

_____

_____

_____

- Calculate the Equilibrium Constant

_____

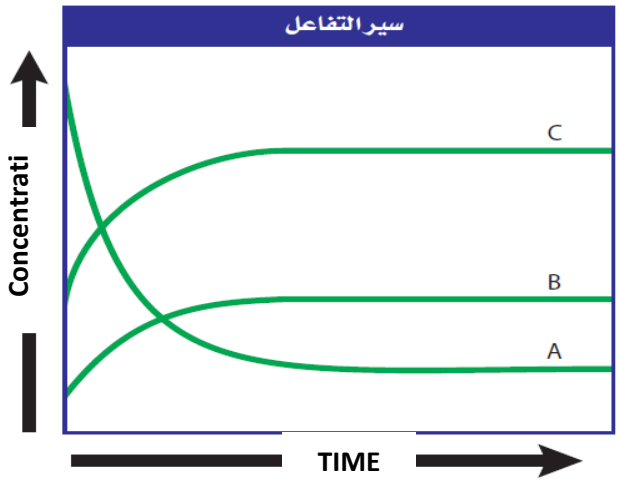
_____

_____

_____

5

*Use the graph to answer the questions 28 to 30



28- Describe the change in the concentration of reaction (B) showing in the graph ?

29- Is it possible that the concentration of the reactants to equal zero, when the reaction is complete? explain your answer

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30- Predicted the Keq of reaction , is the value of $\mathbf{K_{eq}}$ bigger than one, smaller than one or equal to one?

5

31. Use the balanced chemical reaction in answering the following question

$$H_{2(g)} + F_{2(g)} + Heat \rightleftharpoons 2HF_{(g)}$$

- What is the effect of increasing the pressure (reducing the volume) on the equilibrium shift?

_____

- Is the reaction endothermic or exothermic?

_____

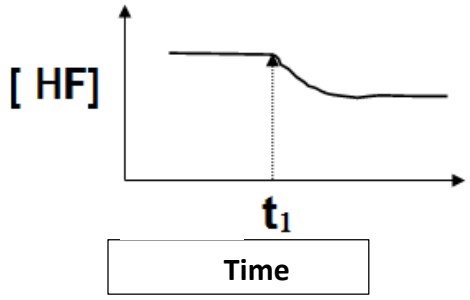
- What is the effect of increasing the temperature on K_{eq} of this reaction

_____

- what is the affect of using a catalyst on the concentration of the reactants ?

_____

- Suggest a reason why the concentration of Hydrogen Fluoride has changed, as shown in the graph .



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