NEB- GRADE XII
Model Question
2079 (2023)
Chemistry

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Time: 3 hrs.   **Full Marks : 75**

Attempt **all** the questions

Group A

Rewrite the correct options of each questions in your answer sheet.   **(11x1= 11)**

1. Identify the equivalent weight of $K_2Cr_2O_7$ in the following reaction?

   (Cr =52, K=39)
   $K_2Cr_2O_7 + 3H_2SO_4 + 5(COOH)_2 \rightarrow K_2SO_4 + Cr_2\{SO_4\}_3 + 10CO_2 + 8H_2O$
   A) 49   B) 294
   C) 98   D) 108

2. In a solution that is at equilibrium, what happens to the concentration of H+ ions if the concentration of

   OH- ions is increased?

   A) The concentration of H+ ions increases

   B) The concentration of H+ ions decreases

   C) The concentration of H+ ions stay the same

   D) It depends on the initial concentration of H+ ions

3. Assuming the rate of a reaction is doubled for every 10^oC rise in temperature how many times

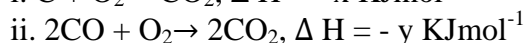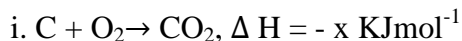   increases the rate of temperature rises from 10^0C to 100^0C?

    A) 112 times   B) 400 times   C) 512 times   D) 614 times

4. forthe given reactions

   i. $C + O_2 \rightarrow CO_2, \Delta H = - x \text{ KJmol}^{-1}$
   ii. $2CO + O_2 \rightarrow 2CO_2, \Delta H = - y \text{ KJmol}^{-1}$
   The enthalpy of formation of CO becomes
    A) 2y-x   B). 2x-y   C) $\frac{y-2x}{2}$ D) $\frac{x-2y}{2}$

5. What product would be obtained if red hot copper wire reacts with steam?

   A)CuO   B) Cu_2O C) Cu_2O_2 D) Cuo_2

6. For which manufacturing process**,** Bessemer converter is used?

   A) Pig iron   B) Steel   C) Wrought iron   D) Cast iron

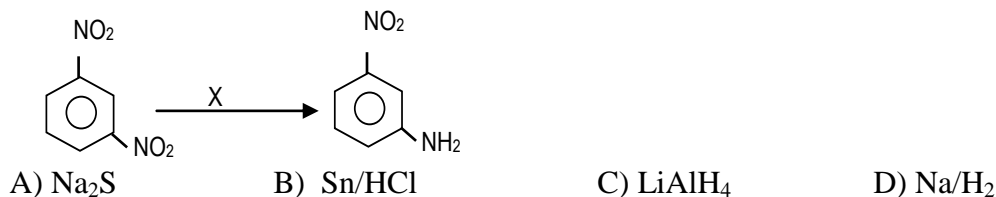7. When Sodium phenoxide reacts with methyl bromide it gives
   A) Cresol   B) Toluene   C) benzene   D) Anisole

8. Identify the X in the following reaction:

    A) Na_2S B) Sn/HCl   C) $LiAlH_4$ D) Na/H_2

9. Which of the following reagents can be used to distinguish between a phenol and a carboxylic acid?
    A) KOH   B) Na   C) NaOH   D) $NaHCO_3$

10. The colorless sweet smelling liquid compound A which exposed in air forms poisonous phosgene and also react with acetone gives sleep-inducing drug. Predict the product when the compound A reduced in a neutral medium?
    A) Methylene chloride   B) Methane   C) Ethyne   D) Ethane

11. Oxygen containing organic compounds upon oxidation forms a carboxylic acid as the major organic product with its molecular mass higher by 14 units. Identify the organic compound.

    A) A primary alcohol   B) An aldehyde   C) A ketone.   D) A secondary alcohol

Group B

Short answer questions   **(8x5= 40)**

12. The addition of solution of required concentration in a reaction mixture yields profitable products and saves reactants.
    a) A solution of HCl is labelled 2M. Clarify its meaning?
    b) In which aspects molarity is different frommolality?
    c) List the significance of normality factor in preparation of standard solution?
    d) Liquor ammonia kept at a corner of your chemistry lab is 25% (w/w) NH_3 and its specific gravity is 0.91. Find the molarity of liquor ammonia.   [1+1+1+2]

13. a) Write down the differences between rate of reaction and rate constant. (2)
b) For the reaction $2A+B \rightarrow$ product, following data were obtained

Experiment	[A], moleLitre^{-1}	[B], moleLitre^{-1}	Initial rate, moleLitre^{-1} S^{-1}
1	0.50	0.50	1.6×10^{-4}
2	0.50	1.00	3.2×10^{-4}
3	1.00	1.00	3.2×10^{-4}

  Find,
  i) order with respect to A and B. (1)
  ii) the value of the rate constant of the reaction (1)
  iii) the rate of reaction when the concentration of A and B is 0.5M and
      0.4 M, respectively. (1)

Or

Four metals A, B, C and D react in the following way:

B displaces only **A** from solution. Only **D** and **C**displaces hydrogen from 1M HCl solution. None of the metals will displace **C** from solution. Answer the followings:

i) Make the activity series of four metals with hydrogen   (1)

ii) The standard potential for the following electrodes are:

$C^{++} + 2e^- \, C, E^o = \geqslant 0.76V$

$D^{+++} + e^- \longrightarrow D^{++}, E^o = +0.77V$

   a) Construct the galvanic cell by pointing out cathode and anode.   (2)

   b) With 1M solution of the ions, what will be EMF of cell?   (1)

   c) Will the reaction occur: $C^{++} + 2D^{++} \to C + D^{+++}$. Occur? Give reasons.   (1)

14. An ammonia solution is added to the sulphate of coinage metal **A**,the blue

    Precipitates (**B**) which appears dissolves in excess of reagent to form deep blue

    Solution(**C**). Answer the followings:

    a) Identify A, B and C with sequence of chemical reaction.   (3)

    b) Predict the electronic configuration of this metal A.   (1)

    c) Select the suitable methods for the purification of metal A?   (1)

15. What is meant by d-d electron transitions? List the characteristics of transition metals.   1+4=5

16. Write down the structural formula and IUPAC name of tertiary alcohol with formula $C_4H_{10}O$. How would you apply Victor Meyer's method for the distinction of 1- propanol and 2- propanol ? Explain.   1+4

17. An organic compound X reacts with methyl magnesium bromide followed by acidic hydrolysis yields the compound Y. The compound Y On oxidation with acidified $KMnO_4$ yields Z. All three gives positive iodoform test. Answer the followings:
    a). Predict the compounds X , Y and Z with sequence of reaction and give their IUPAC names.   (3)
    b) Make the product by reacting Z with dilute NaOH?   (2)

OR

An organic compound(X) when heated with acetone gives hypnotic and nervous sedatives drugs and form carbonyl chloride when it exposes to air
    a) Predict the organic compound (X)   (1)
    b) Write the reactions for the formation of (X) from ethanol. A   (2)
    c) Predict compound the new compound by treating (X) withconcnitric acid?   (1)
    d) Convert (X) into acetylene.   (1)

18. .a) Nitro group in nitrobenzene is meta-directing group towards electrophilic substitution reaction, why? How does nitrobenzene react with?
       i) Zn/ NH_4Cl ii) $LiAlH_4$ (2+2)
    b) What are the isomers of formula C_2H_7N?   (1)

19. Give an example of the following reactions   1x5=5
   (a) RiemerTiemann's reaction   (b) Perkin's condensation reaction
   (c) Williamson's ether synthesis   (d) Cannizzaro's reaction
   (e) Sandmeyer's reaction

Group C

Long answer questions   **(3 x 8 =24)**

20. The expressions of Ostwald's dilution law is,
$$\propto = \sqrt{\frac{K_a}{C}}$$
   a) Derive it.
   b) What information can you obtain from this expression?
   c) Will strong electrolytes obey this expression, why?
   d) 0.1M ethanoic acid is 1.34% ionized. Find its dissociation constant.

                                                                              (3+ 2+1+2)

Or

a) Hess' law is applied to calculate different types of enthalpy of reaction.
   i) Illustrate the Hass law of constant heat summation.
   ii) Standard enthalpy of combustion of c (g); H_2 (g) and C_2H_2 (g) are -394 KJ mol^{-1}, -286 KJ mol^{-1} and
      -1300 KJ mol^{-1} respectively. Calculate enthalpy of formation of acetylene.   (2+4)
b) Draw the energy profile diagram of exothermic and endothermic reaction.   (1+1)

21. An organic compound $C_2H_4O_2$ has two functional isomers **A** and **B**. Isomer **A** changes blue litmus into
    red and **B** has fruity smell.

   a) Give the reaction for the formation of **A** by using Grignard's reagent.   (1)
   b) Convert the isomer **A** into isomer**B?**   (2)
   c) Write a suitable test reaction to distinguish **A** frommethanoic acid.   (1)
   d) Arrange the following in the decreasing order of their acidic strength and give reason for your
      answer.
         CH_3COOH, $ClCH_2COOH$, FCH_2COOH, C_6H_5COOH (2)
   e) Identify A and B of the following reactions.   (2)

OR

Amines are formally derivatives of ammonia, wherein one or more hydrogen atoms have been replaced
by a substituent such as an alkyl or aryl group which may respectively be called alkyl amines and aryl
amines.
   a) Give a test to distinguish alkyl amine and aryl amine.   (2)
   b) How can you separate ethylamine and dimethylamine present in mixture byHoffmann's method? (3)

   c) Arrange the following amines In terms of increasing order of basic strength.   (1)
         Propyl amine,ethyl methylamine, trimethylamine.
   d) Convert: ethanamine to methanamine   (2)

22. a. How are cement classified on the basis of hardening and setting behavior? (2)

  b. Differentiate between

    i. paper and pulp (2)

    ii. artificial and natural radio activity (2)

    iii .addition and condensation polymer (2)

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Format for Weightage of different level of cognitive domain given in Chemistry Question Paper

Grade: XII
Subject: Chemistry
Year:
Full Marks: 75
Pass Marks:

Cognitive Level	Weightage given in SG	Question Number			Marks given in various types of questions			Marks and percentage given in the question paper
		VSQ/ MCQ	SAQ	LAQ	VSQ/ MCQ	SAQ	LAQ	
Knowledge	12	6, 7	12c,15 ,19		2	1+10 =11		12 (16%)
Understanding	18	1, 3, 5 8, 9	12b,18 ,	22	5	1+5 =6	8	18 (24%)
Application	21	2, 4, 10	12a 12d 16	20	3	3+5 =8	8	21(28%)
Higher Ability	24	11	13, 14, 17	21	1	15	8	24 (32%)
Total	100%	**11**	**8**	**3**	**11**	**40**	**24**	**75 (100%)**