

## COMMON HALF YEARLY EXAMINATION – 2023

Standard XII

Reg.No. : 

## CHEMISTRY

Time: 3.00 hrs.

Part - I

Marks: 70

15 x 1 = 15

I. Choose the correct answer:

- Which of the following electrolytic solution has the least specific conductance  
a) 1N                      b) 0.01N                      c) 0.1N                      d) 2N
- Which one of the following characteristics are associated with adsorption  
a)  $\Delta G$ ,  $\Delta H$  and  $\Delta S$  all are negative  
b)  $\Delta G$  and  $\Delta H$  are negative but  $\Delta S$  is positive  
c)  $\Delta G$  and  $\Delta S$  are negative but  $\Delta H$  is positive  
d)  $\Delta S$  and  $\Delta H$  are positive but  $\Delta G$  is negative
- Friedel - Crafts reaction is not given by  
a) Benzene                      b) Xylene                      c) Nitrobenzene                      d) Phenol
- $C_6H_5NO_2 \xrightarrow{Fe/HCl} A \xrightarrow{NaNO_2+HCl/273K} B \xrightarrow{H_2O/283K} C$ . 'C' is  
a)  $C_6H_5OH$                       b)  $C_6H_5CH_2OH$                       c)  $C_6H_5CHO$                       d)  $C_6H_5NH_2$
- Williamson synthesis of preparing dimethyl ether is a /an  
a)  $SN^1$  reaction                      b)  $SN^2$  reaction  
c) Electrophilic addition                      d) Electrophilic substitution
- Aspirin is a/an  
a) Acetylsalicylic acid                      b) Benzoyl- salicylic acid  
c) Chlorobenzoic acid                      d) Anthranilic acid
- $\alpha$ -D (+) Glucose and  $\beta$ -D (+) Glucose are  
a) Epimers                      b) Anomers  
c) Enantiomers                      d) Conformational isomers
- The pH of a buffer solution containing 0.20 mole per litre sodium acetate and 0.18 mole per litre acetic acid. ( $K_a$  for acetic acid is  $1.8 \times 10^{-5}$ )  
a) 4.79                      b) 4.74                      c) 5.74                      d) 5.79
- The function of the flux during the smelting of the ore is  
a) To make the ore porous                      b) To remove gangue  
c) To facilitate reduction                      d) To facilitate oxidation
- The basic structural unit of silicates is  
a)  $(SiO_3)^{2-}$                       b)  $(SiO_4)^{2-}$                       c)  $(SiO_4)^{4-}$                       d)  $(SiO)^-$
- The basicity of ortho-phosphoric acid  $H_3PO_4$  is  
a) 4                      b) 2                      c) 3                      d) 5
- The complex forming ability of transition metal element is due to their  
a) Catalytic property                      b) High enthalpy of atomisation  
c) High nuclear charge                      d) All of the above
- A complex in which the oxidation number of the metal is zero is  
a)  $[Ni(CO)_4]$                       b)  $[Fe(CN)_3(NH_3)_3]$                       c)  $[Fe(CO)_5]$                       d) Both 'A' and 'C'
- The co-ordination number of a metal crystallising in a face centred close packed structure is  
a) 4                      b) 12                      c) 8                      d) 6

(2)

15. For a reaction  $A + B \rightarrow C + 2D$ ; experimental results were collected for three trials and the data obtained are given below. The correct rate law of the reaction is

Trial	[A], M	[B], M	Initial rate $M s^{-1}$
1	0.40	0.20	$5.5 \times 10^{-4}$
2	0.80	0.20	$5.5 \times 10^{-4}$
3	0.40	0.40	$2.2 \times 10^{-3}$

- a) rate =  $k[A]^2[B]^2$     b) rate =  $k[A][B]^2$     c) rate =  $k[A][B]$     d) rate =  $k[A][B][C]^2$

## Part - II

6 x 2 = 12

## II. Answer any 6 questions. (Q.No.24 is compulsory)

16. Which type of ores can be concentrated by Froth floatation method? Give two examples for such ores.
17. Suggest a reason why HF is a weak acid, Whereas binary acids of all other halogens are strong acids.
18. Based on VB theory explain why  $[Cr(NH_3)_6]^+$  is paramagnetic, while  $[Ni(CN)_4]^{2-}$  is diamagnetic.
19. Explain common ion effect with an example.
20. State Kohlrausch law.
21. 50ml of 0.05 M  $HNO_3$  is added to 50ml of 0.025M KOH. Calculate the pH of the resultant solution.
22. Boiling point of Ethyl alcohol (351K) is greater than Dimethyl ether (248K). Give reason.
23. Draw the structure of Zwitter ions.
24. An alkene  $C_5H_{10}$  (A) on ozonolysis give propanone and aldehyde (B). When (B) is oxidised (C) is obtained. When propanone is treated with HCN followed by hydrolysis gives (D) Identify A, B, C and D.

## Part - III

6 x 3 = 18

## III. Answer any 6 questions. (Q.No.33 is compulsory)

25. Give the limitation of Ellingham diagram.
26. Complete the following reactions.
- a)  $NaCl + MnO_2 + H_2SO_4 \rightarrow$
- b)  $P_4 + NaOH + H_2O \rightarrow$
27. Why  $Gd^{3+}$  colourless?
28. Define half-life of a reaction. Show that for a zero order reaction half-life is dependent of initial concentration.
29. Explain the following, giving appropriate reasons for your answer. When the rivers meet the ocean, they generally form deltas.
30. Write a note on denaturation of proteins.
31. What are bio-degradable polymers? Give examples.
32. How will you prepare t-butyl alcohol using Grignard reagent?
33. A solution of a salt of metal was electrolysed for 15 minutes with a current of 0.15 amperes. The mass of the metal deposited at the cathode is 0.783g. Calculate the equivalent mass of the metal.



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## Part - IV

## IV. Answer all the questions.

5 x 5 = 25

34. a) Describe the preparation of potassium dichromate. (3 marks)

b) Which is stronger reducing agent  $\text{Cr}^{2+}$  or  $\text{Fe}^{2+}$  (2 marks)

(OR)

c) Write the IUPAC name for the following compounds.

i)  $\text{Na}_2[\text{Fe}(\text{C}_2\text{O}_4)_3]$ ii)  $[\text{CrCl}_2(\text{H}_2\text{O})_4] \text{Cl}$ iii)  $[\text{CoCl}(\text{ONO})(\text{en})_2]^+$  (3 marks)

d) Why tetrahedral complexes do not exhibit geometrical isomerism? (2 marks)

35. a) Write a note on Frenkel defect. (2 marks)

b) In a cubic close packed structure (ccp) of mixed oxide, it is found that lattice site has  $\text{O}^{2-}$  ions and one half of the octahedral voids are occupied by trivalent cations ( $\text{A}^{3+}$ ) and one eighth of the tetrahedral voids are occupied by divalent cations ( $\text{B}^{2+}$ ). Derive the formula of the mixed oxide. (3 marks)

(OR)

c) Derive integrated rate law for a first order reaction.  $\text{A} \rightarrow \text{Product}$ . (5 marks)

36. a) Explain Zone refining process with an example. (3 marks)

b) For the molecule  $\text{XeF}_6$ , state the hybridisation of the central atom and draw the structure of the molecule. (2 marks)

(OR)

c) Write adsorption theory about the action of heterogeneous catalyst. (5 marks)

37. a) Write the mechanism of aldol condensation reaction. (3 marks)

b) Write Lucas test to distinguish between  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  alcohols. (2 marks)

(OR)

c) Deduce the structure of Fructose. (5 marks)

38. a) How is Nylon-6,6 is prepared? (2 marks)

b) Write any three differences between primary, secondary and tertiary amines (3 marks)

(OR)

c) Write short notes on the following.

i) Hoffmann's bromamide degradation reaction.

ii) Diazotisation.

iii) Cannizzaro reaction.

iv) Carbylamine reaction.

v) Reimer-Tieman reaction (5 marks)

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