Sub.Code : 212

NEB - GRADE XII

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**

Pass Marks:27 (For partial students only)

Group 'A'

Attempt any **fifteen** questions. 15x2=30

1. Write an example of a molecule having trigonal pyramidal geometry. What is the mode of hybridisation on central atom of the molecule ? 1+1

2. What is titration error ? How is it minimized ? 1+1

3. Calculate the P^H of 1×10^{-8}M HCl. 2

4. What products would you expect at cathode and anode when aqueous NaCl is electrolysed using platinum electrode ? 2

5. Define spontaneous process and give one example of it. 1+1

6. Calculate the enthalpy of formation in the following reactions:
   i) $2H_2(g) + O_2(g) \rightarrow 2H_2O(l),\ \Delta H = 136\ Kcal$
   ii) $H_2(g) + I_2(g) \rightarrow 2HI(g),\ \Delta H = 24.8\ Kcal$. 1+1

7. 75% of a first order reaction is completed in 30 minutes. What time will it take to complete 50% of the reaction ? 2

8. How would you convert sodium benzoate into acetophenone ? 1+1

9. What happens when
   i) Benzene diazonium chloride is treated with $Cucl_2$ in the presence of HCl
   ii) Chlorobenzene is heated with chloral in acidic medium ? 1+1

10. Propane-1-*ol* has higher boiling point than propan-2-*ol* though they have same molecular mass. Give reason. 2

Contd...

11. Convert ethoxy ethane to methoxy ethane. 2
12. Identify the major product X and mention its one important use.

    Methanal $\xrightarrow{NH_3}$ X. 1+1

13. Write an example of each of the following reactions
    i) Carboxylation
    ii) Esterification 1+1
14. Give resonance structure of nitrobenzene to show that nitro group is meta-directing group. 1+1
15. Give suitable reaction for the preparation of methanamine from ethanamide. What happens when methanamine reacts with nitrous acid at low temp.?1+1
16. Distinguish between dipeptide and polypeptide. 2
17. Mention one important biological function of each of the followings: 4x0.5
    i) DNA
    ii) RNA
    iii) phospholipids
    iv) carbohydrate.
18. What is meant by co-polymerisation ? Write an example of such polymer.1+1
19. Write a structural formula and one major use of antipyratics. 1+1
20. Write down molecular formula and one use of each of the following :
    i) Mohr's salt
    ii) Green vitriol. 1+1
21. What happens when Zno is
    i) dissolved in excess of caustic alkali
    ii) heated with cobalt nitrate ? 1+1
22. What is meant by frosting of silver ? 2

Group 'B'

Attempt any **five** questions. 5x5=25

23. Define molality of solution. Calculate molality of one litre of 93% H_2SO_4 solution (weight by volume). The density of the solution is 1.84 gm/litre.1+4
24. What meant by
    i) ionic product of water

Contd...

ii) solubility product constant (Ksp) ?
The solubility product of $BaSO_4$ is 1×10^{-10}. Will precipitate form or not if equal volume of 2×10^{-3} M $BaCl_2$ solution and 2×10^{-4} M Na_2SO_4 solution are mixed. 2+3

25. Define the term
i) standard electrode potential
ii) electrochemical series. 2+3
The cost of electricity required to deposit 1gm of Mg is Rs. 6. How much would it cost to deposit 10 gm of Al ? *(At. wt. of Al = 27)*

26. Write down the chemistry of calomel. 5

27. Write an example of each of the followings:
i) DNP test
ii) Rosenmund's reduction
iii) Aldol condensation
iv) Tollen's test
v) Cannizzaro's reaction. 1×5

28. Write down the laboratory method preparation of trichloromethane from ethanol. What product would you obtain when trichloromethane is treated with acetone ? 4+1

29. Write down the structure formula with IUPAC name of each of secondary and tertiary alcohol for $C_4H_{10}O$. How would you prepare there alcohol from CH_3MgBr ? 2+3

Group 'C'

Attempt any **two** questions. 2x10=20

30. Describe the laboratory method of preparation of pure and dry nitrobenzene. Identify the major products Ⓐ , Ⓑ , Ⓒ and Ⓓ in the following reaction sequences

$$\text{Ⓐ} \xrightarrow[\Delta]{NaOH+CaO} \text{Ⓑ} \xrightarrow[AlCl_3]{CH_3Cl/\Delta} \text{Ⓒ} \xrightarrow{CeO_2/H^+} \text{Ⓓ}$$

The compound Ⓑ can be obtained by heating phenol with zinc dust. What major product would you obtain when compound Ⓓ is treated with alc.KCN solution ? 5+5

Contd...

31. i) How is primary, secondary and tertiary amines separated from their mixture by Hoffmann's method ?

ii) An aliphatic haloalkane (A) gives compound (B) when heated with alc.NaOH. The compound (B) reacts with HBr to give major product (C) . On heating the compound (C) with sodium in presence of dry ether yields 2,3-dimethylbutane. What product would you expect when the compound (B) is subjected to ozonolysis ? 5+4+1

32. Define the terms

i) half-life period of reaction ii) rate law

iii) instantaneous rate iv) zero-order reaction

How do surface area of reactant and catalyst affect the rate of chemical reaction ?

The experimental data for the reaction $2A + B_2 \rightarrow 2AB$, are as below:

Expt no.	(A) $molL^{-1}$	(B) $molL^{-1}$	Rate $molL^{-1}$ sec^{-1}
1	0.50	0.50	$1.6x10^{-4}$
2	0.50	1.00	$3.2x10^{-4}$
3	1.00	1.00	$3.2x10^{-4}$

Find overall order of reaction and rate constant. 4+2+4

33. Write short notes on any **two**. 2x5=10

i) Extraction of blister copper from copper pyrites

ii) Manufacture of steel by open hearth process

iii) Gib's free energy change and prediction for the spontaneity of reaction

iv) Laboratory preparation of anhydrous methanoic acid.

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