

Sub. Code: 212'D'

**HSEB - GRADE XII**

**2070 (2013)**

**Chemistry**

*Candidates are required to give their answer 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

**Group 'A'**

Attempt any fifteen questions:

15×2=30

1. Why do  $\text{NH}_3$  and  $\text{BF}_3$  have dissimilar geometries? 2
2. What volume of water should be added to 500 ml of 2N ( $f=0.98$ )  $\text{Na}_2\text{CO}_3$  to make it exactly N/10? 2
3. Define Lewis acid and Lewis base giving one example of each. 1+1
4. How many number of coulombs are required to deposit 81 gm of Aluminium when the electrode reaction is:  
$$\text{Al}^{+++} + 3\text{e}^- \rightarrow \text{Al}$$
 2
5. State first law of thermodynamics. 2
6. How would you predict the spontaneity using the relation  
$$T\Delta S_{\text{total}} = -\Delta G_{\text{sys}}$$
 2
7. Draw energy profile diagram for catalyzed and uncatalyzed reactions. 2
8. What happens when:  
i. Benzene is heated with acetic anhydride in presence of anhydrous  $\text{AlCl}_3$ . 1+1  
ii. Sodium benzoate is heated with sodalime. 1+1
9. Convert 1-bromopropane to 2-bromopropane. 2
10. What is the laboratory test of ethanol? 2
11. Prepare  $\text{CH}_3\text{-O-CH}_2\text{CH}_3$  and  $\text{C}_6\text{H}_5\text{-OCH}_3$  by using Williamson's ether synthesis. 1+1
12. How does methanal react with  
i.  $\text{NH}_3$       ii. Conc.  $\text{NaOH}$  1+1
13. Write the functional isomer of ethanoic acid and its IUPAC name. 1+1

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14. Why is  $-\text{NO}_2$  group a metadirecting towards the electrophilic aromatic substitution? 2
15. How are sulphanilic acid and acetanilide prepared from aniline? 1+1
16. Distinguish between sugars and non-sugars. 2
17. What is a peptide linkage? Give an example of dipeptide. 1+1
18. What are chemical fertilizers? Give two examples. 1+1
19. Write a method of preparation of each of the following polymers:  
i. Bakelite                      ii. PVC 1+1
20. What is Nessler's reagent? How is it prepared? 1+1
21. What happens when :  
i. Zinc white is heated with cobalt nitrate.  
ii. Metallic zinc is dissolved in hot conc. NaOH 1+1
22. Why is open-hearth process more advantageous than Bessemer process of manufacture of steel? 2

Group 'B'

Attempt any five questions:

5×5=25

23. How is ethoxyethane prepared in the laboratory in pure and dry state? 5
24. Write any three methods of preparation of Iodoethane. What happens when Iodoethane is heated with :  
i) Sodium in presence of dry ether  
ii) alc. NaOH. 3+2
25. What happens when nitrobenzene is reduced in acidic, neutral, alkaline and electrolytic conditions? 5
26. Define normality, 0.8gm of a divalent metal was dissolved in 100ml of 1.28N HCl and the solution was diluted to 200ml. Then, 50ml of the solution required 54.6 ml of 0.22N NaOH for neutralization. Find the atomic weight metal. 1+4
27. What is meant by degree of ionization? 0.41g of NaOH is placed in 100ml of 0.1N  $\text{H}_2\text{SO}_4$ . Find the pH of the resulting solution. 1+4
28. Represent graphically the variation of equivalent conductivity of strong electrolyte and weak electrolyte with concentration. Why do equivalent conductivity of strong electrolyte and weak electrolyte vary differently with dilution? 2+3
29. Write the preparations, properties and uses of Blue vitriol.
- Or
- How is mercury extracted from its ore and refined? 5

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**Group 'C'**

Attempt any two questions: 2×10=20

30. a) How is nitrobenzene prepared in the laboratory in pure and dry state? 5  
 b) What are amines? How would you separate 1°, 2° and 3° amines from their mixture by Hofmann's method? 1+4

31. a) Show your acquaintance with Cannizzaro reaction and Perkin Condensation. What happens when propanone is treated with 2,4-dinitrophenyl hydrazine. 2+2+1  
 b) 
$$A \xrightarrow{NH_3} B \xrightarrow{Br_2/aq.KOH} C \xrightarrow{HNO_2} D \xrightarrow{NaOH/I_2} E$$
 Compound E produces ethyne when heated with silver powder. 5×1=5

32. a) How is the free energy change of a reaction related with the enthalpy change and entropy change? Discuss the criteria of spontaneity and non-spontaneity of a reaction on the basis of its free energy change? 2+3  
 b) For a reaction,  $2X+Y \rightarrow X_2Y$ , the following data were obtained by experiment.

| Experiment No. | [X] mol L <sup>-1</sup> | [Y] mol L <sup>-1</sup> | Rate, mol <sup>-1</sup> s <sup>-1</sup> |
|----------------|-------------------------|-------------------------|---|
| 1              | 0.10                    | 0.10                    | $1.3 \times 10^{-4}$                    |
| 2              | 0.10                    | 0.20                    | $2.6 \times 10^{-4}$                    |
| 3              | 0.20                    | 0.20                    | $1.4 \times 10^{-3}$                    |

i) Find the order of reaction with respect to X, Y and overall reaction.  
 ii) Find the value of rate constant with its units.  
 iii) What is the initial rate of the reaction when the initial concentration of X and Y are 1M and 0.5M respectively. 2.5+1+1.5

33. Write short notes on any two: 2×5=10

a) Chemistry of white vitriol.  
 b) Rusting of iron.  
 c) Distinction between 1°, 2° and 3° alcohols by Victor Meyer's method.  
 d) Hess's Law of constant heat summation.

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