CLASS—XII (H.P.)

CHEMISTRY

Time Allowed : 3 Hours **Maximum Marks : 60**

Special Instructions : Same as in Model Test Paper—1.

1. Fog is colloidal system of :
   (*a*) Liquid in gas (*b*) Gas in gas
   (*c*) Gas in liquid (*d*) Solid in gas.
2. The arrangement ABC ABC ..... is referred to as :
   (*a*) Octahedral close packing
   (*b*) Hexagonal close packing
   (*c*) Tetrahedral close packing
   (*d*) Cubic close packing.
3. On mixing 10 ml. of acetone with 50 ml of chloroform the total volume of the solution is :
   (*a*) Less than 60 ml (*b*) More than 60 ml
   (*c*) Equal to 60 ml (*d*) Unpredictable.
4. Which of the following metals can deposit copper from copper sulphate solution :
   (*a*) Mercury (*b*) Iron
   (*c*) Gold (*d*) Platinum.
5. Potassium dichromate is manufactured from :
   (*a*) Chromite ore (*b*) Chromyl chloride
   (*c*) $CrCl_3$ (*d*) None.
6. Which one belongs to second transition series ?
   (*a*) Copper (*b*) Cobalt
   (*c*) Gold (*d*) Silver.
7. Define osmosis.
8. Define peptisation.
9. How is degree of dissociation is related to Van't Hoff Factor ?
10. What is H – S – H bond angle in H_2S ?
11. What is the distance between Na^+ and Cl^- ions in NaCl crystalline solid if the density is 2.165 g cm^{-3} ? NaCl crystalline is face centred cubic lattice ($N_A = 6.02 \times 10^{23}$).
12. How will you prepare colloidal solution of (*i*) Sulphur (*ii*) Gold ?
13. Calculate the molarity of KCl solution in water given that depression in freezing point is 2K. [K_f for water = 1.86 K kg mol^{-1}]
14. How are antiseptics different from disinfectants ? Give the name of a substance which can act both as antiseptic and disinfectant.
15. Write the IUPAC names of the following compounds :

(*i*)
$$CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}} - CH_2 - CH_2 - CHO$$

(*ii*) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOCH_3$.

16. Explain the following :

(*i*) Reimer-Tiemann reaction (*ii*) HVZ reaction.

17. Distinguish between slag and flux.

18. Phenol is more acidic than ethyl alcohol. Explain.

How will you convert phenol into

(*i*) Phenolphthalein (*ii*) Salicylic acid ?

19. A compound A with molecular formula $C_5H_{10}O$ gave positive 2, 4-D.N.P. test but a negative Tollen's test. It was oxidised to carboxylic acid B with molecular formula $C_3H_6O_2$ when treated with alkaline $KMnO_4$ under vigorous conditions. Sodium salt of B gave a hydrocarbon C on Kolbe's electrolytic reaction. Identify A, B and C and write the chemical equations.

20. (*a*) Discuss the mechanism of nitration of benzene.

(*b*) What happens when nitrobenzene is reduced in alkaline medium ?

(*c*) Write two uses of nitro compounds.

21. The half life period for a reaction $N_2O_5 \longrightarrow 2NO_2 + 1/2O_2$ is 2.4 hours at 30°C.

(*a*) Starting from 100 grams of N_2O_5, how many grams will remain after a period of 9.6 hours.

(*b*) What time would be required to reduce 5×10^{10} molecules of N_2O_4 to 10^8 molecules ?

22. A galvanic cell consists of metallic lead plate immersed in 0.02 M lead nitrate solution and a zinc plate immersed in 0.1 M zinc nitrate solution. Calculate emf of the cell at 25°C. Write the chemical equations for the electrode reactions. Given that :

$$E^\circ_{Zn^{2+}/Zn} = -0.76 \text{ V} ; E^\circ_{Pb^{2+}/Pb} = -0.13 \text{ V} .$$

23. (*a*) Illustrate optical isomerism in co-ordination compounds with a suitable example.

(*b*) Explain the bonding and structure of $[Fe(CN)_6]^{3-}$ using valence bond theory.

24. What is mutarotation ? Why is sucrose regarded as reducing sugar ?

Or

What is structural difference in Nylon-6 and Nylon–66 ? Give the synthesis of Nylon–66.

25. How will you convert chloro benzene into :

(*a*) Benzene (*b*) DDT

(*c*) Diphenyl.

26. (*a*) What are interhalogen compounds ? Write the structures of ClF_3 and IF_7.

(*b*) Arrange the following in order of increasing acidic strength :

HClO, HBrO, HIO.

(*c*) How will you account for the following :

(*ii*) Sn^{2+} ion is more common than Sn^{4+} ion.

(*iii*) H_3BO_3 is a monobasic acid, why ?

27. (*a*) What is lanthanide contraction ? Explain its cause. Give one consequence of it.

(*b*) Compare and contrast lanthanides and actinides.

28. (*a*) Why do transition metals show variable oxidation states and form complex compounds ?

(*b*) Discuss the preparation of potassium dichromate from chromite.

(*c*) Discuss the chemistry of chromyl chloride test.

(*d*) Write the structure of the chromate and dichromate ions.

Or

(*a*) Describe the preparation of $KMnO_4$ from pyrolusite ore.

(*b*) Give the structure of MnO_4^- ion.

(*c*) Explain why *d*-block elements

(*i*) form coloured ions

(*ii*) show catalytic properties ?