2016
CHEMISTRY

Total marks : 70 Time : 3 hours

General instructions:

i) Approximately 15 minutes is allotted to read the question paper and revise the answers.

ii) The question paper consists of 30 questions. All questions are compulsory.

iii) Marks are indicated against each question.

iv) Internal choice has been provided in some questions.

N.B: Check that all pages of the question paper is complete as indicated on the top left side.

1. The dispersion medium in aerosol is **1**
   (a) water (b) alcohol
   (c) air (d) benzene.

2. Group-16 elements are called **1**
   (a) halogens (b) noble gases
   (c) chalcogens (d) alkali metals.

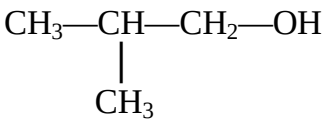
3. The oxidation state of cobalt in the complex $[Co(NH_3)_6]Cl_3$ is **1**
   (a) +2 (b) +6
   (c) +4 (d) +3.

4. Formalin is **1**
   (a) a solution of formaldehyde in alcohol
   (b) liquefied formaldehyde
   (c) a 40% aqueous solution of formaldehyde
   (d) polymerised formaldehyde.

5. The disaccharide present in milk is **1**
   (a) sucrose (b) maltose
   (c) lactose (d) cellobiose.

6. What are the coordination numbers of Na^+ and Cl^- in NaCl? **1**

7. Define molar conductivity. **1**

8. Write the IUPAC name of  **1**

9. What is average rate of a reaction? **1**

10. What is diazotisation reaction? **1**

11. Explain the two types of non-ideal solution with the help of suitable diagram. **2**

12. **a.** Why does nitrogen exists as diatomic (N_2) molecule?

Or **2**

b. Give reason why (i) nitrogen does not form pentahalide,
(ii) electronegativity decreases in going down the group.

13. **a.** Why do transition elements form complexes?

Or **2**

b. What is lanthanide contraction? Why are d-block elements called transition elements?

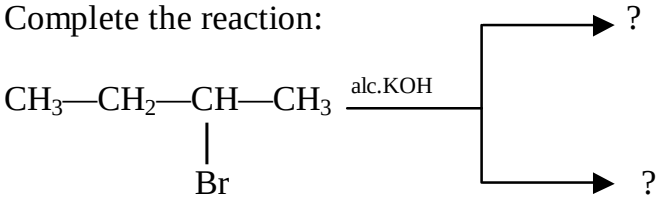
14. **a.** Explain geometrical isomerism in coordination compounds.

Or **2**

b. On the basis of VBT, show that $[CoF_6]^{3-}$ is paramagnetic.

15. Explain Wurtz reaction with suitable reaction. **2**

16. Complete the reaction: **2**



17. A unit cell of an element of atomic mass 108 and density $10.5 gcm^{-3}$ having edge length 409 pm. Find the structure of the crystal lattice. [$N_A = 6.023 \times 10^{23} mol^{-1}$]. **3**

18. **a.** Calculate the boiling point of one molar aqueous solution (density=1.03 gmL^{-1}) of NaCl.K_b for water = 0.52K kg mol^{-1}, atomic mass of Na=23, Cl=35.5.

Or **3**

b. A 5% solution of cane sugar ($C_{12}H_{22}O_{11}$) is isotonic with 0.877% of solute A. Calculate the relative molar mass of A, assuming density to be $1gcm^{-3}$.

19. What is half life of a reaction? If the half life of a first order reaction in A is 2 minutes, how long will it take [A] to reach 25% of initial concentration? **3**

20. Differentiate between adsorption and absorption. **3**

21. **a.** Explain with suitable diagram for the production of steel by Bessemer process.

Or **3**

b. How is zinc obtained from zinc blende? Give chemical reactions.

22. How is $KMnO_4$ prepared from pyrolusite ore? Give one use of $KMnO_4$. **3**

23. Compare the acidic strength of primary, secondary and tertiary alcohols. **3**

24. **a.** How does 1^o, 2^o and 3^o amines react with nitrous acid?

Or **3**

b. What is coupling reaction? What happen when benzenediazonium chloride reacts with phenol. Write the chemical reaction involved.

25. **a.** What are neutral, acidic and basic amino acids? Which vitamin deficiency leads to scurvy? Mention one function of vitamin C.

Or **3**

b. What are reducing and non-reducing sugars? What is the sequence of bases on mRNA molecule that can be synthesized on the following strand of DNA – GATCATGGC?

26. How is nylon-66 obtained? **3**

27. Explain the cleaning action of soap. **3**

28. **a.** Write the Nernst equation for the following cell :
$Zn \mid Zn^{2+}(aq) \parallel Cu^{2+}(aq) \mid Cu$.
Write the reaction occurring at each of the electrode and the net cell reaction. Also determine its cell potential when
$[Zn^{2+}(aq)] = 1M$, $[Cu^{2+}(aq)] = 1M$, $E^{0}_{Zn^{2+}|Zn} = -0.76V$
and $E^{o}_{Cu^{2+}|Cu} = +0.34V$.

Or **5**

b. Explain the recharging of a discharge lead storage battery with electrode reaction.

29. **a.** (i) Explain the steps involved in the manufacture of sulphuric acid by Contact process.

(ii) Arrange the following oxoacids in decreasing order of acidic strength:
$HClO$, $HClO_2$, $HClO_3$, $HClO_4$.

Or **5**

b. (i) How is XeF_4 prepared?

(ii) Draw the structure of XeF_2 , XeF_4 , $XeOF_4$ and mention the type of hybridization of Xe in each case.

30. **a.** (i) What happens when acetone react with HCN?

(ii) The melting point of butanoic acid (C_3H_7COOH) is higher than pentanoic acid (C_4H_9COOH). Explain.

Or **5**

b. (i) What is cross-aldol condensation reaction? Give an example.

(ii) What happens when acetaldehyde reacts with
(a) Hydrazine
(b) Phenyl hydrazine.

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