

## CBSE PRACTICE QUESTIONS PAPER (2021-22)

## TERM-II

## SUBJECT: CHEMISTRY

Time : 2 Hours

Max. Marks : 35

**General Instructions:**

Read the following instructions carefully.

1. There are 12 questions in this question paper with internal choice.
2. SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.
3. SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.
4. SECTION C- Q. No. 12 is case based question carrying 5 marks.
5. All questions are compulsory.
6. Use of log tables and calculators is not allowed.

**SECTION-A**

1. Arrange the following compounds in increasing order of their property as indicated (Any 2):

[1 × 2 = 2 Marks]

(a) Acetaldehyde, Acetone, Di-tert-butyl ketone, Methyl tert-butyl ketone [Reactivity towards HCN]

(b)  $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{COOH}$ ,  $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{COOH}$ ,  $(\text{CH}_3)_2\text{CHCOOH}$ ,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$

[Acid strength]

(c) Benzoic acid, 4-Nitrobenzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid

[Acid strength]

2. For a reaction:  $2\text{NH}_3(\text{g}) \xrightarrow{\text{Pt}} \text{N}_2(\text{g}) + 3\text{H}_2(\text{g})$

[2 Marks]

Rate = k

- (i) Write the order and molecularity of this reaction.
- (ii) Write the unit of k.

3. (a)  $\text{CH}_3\text{CHO}$  in the presence of dilute NaOH.

[1 × 2 = 2 Marks]

- (b) Give simple chemical tests to distinguish between the following pairs of compounds

Propanal and Propanone

## SECTION-B

4. Account for the following: [1 × 3 = 3 Marks]

- (a) Primary amines ( $R-NH_2$ ) have higher boiling point than tertiary amines ( $R_3N$ ).
- (b) Aniline does not undergo Friedel – Crafts reaction.
- (c)  $(CH_3)_2NH$  is more basic than  $(CH_3)_3N$  in an aqueous solution.

OR

How will you convert:

[1 × 3 = 3 Marks]

- (a) Ethanoic acid into methanamine
- (b) Ethanoic acid into propanoic acid
- (c) Nitromethane into dimethylamine

5. (a) Using valence bond theory, write the hybridisation and magnetic character of the complex  $[Fe(CN)_6]^{4-}$ . (Atomic no. of Fe = 26) [2 + 1 = 3 Marks]

(b) When a coordination compound  $NiCl_2 \cdot 6H_2O$  is mixed with  $AgNO_3$ , 2 moles of  $AgCl$  are precipitated per mole of the compound. Write

- (i) Structural formula of the complex
- (ii) IUPAC name of the complex

OR

(a) Write the electronic configuration of  $d^5$  on the basis of crystal field theory when

- (i)  $\Delta_0 < P$  and [1 + 2 = 3 Marks]
- (ii)  $\Delta_0 > P$

(b) Although both  $[NiCl_4]^{2-}$  and  $[Ni(CO)_4]$  have  $sp^3$  hybridisation yet  $[NiCl_4]^{2-}$  is paramagnetic and  $[Ni(CO)_4]$  is diamagnetic. Give reason. (Atomic no. of Ni = 28)

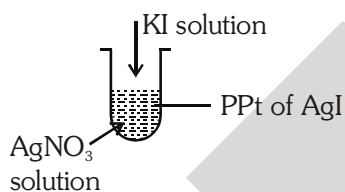
6. Account for the following : [1 × 3 = 3 Marks]

- (a) Transition metals show variable oxidation states.
- (b) Zn, Cd and Hg are soft metals.
- (c)  $E^0$  value for the  $Mn^{3+}/Mn^{2+}$  couple is highly positive (+1.57 V) as compared to  $Cr^{3+}/Cr^{2+}$

7. (A), (B) and (C) are three non-cyclic functional isomers of a carbonyl compound with molecular formula  $C_4H_8O$ . Isomers (A) and (C) give positive Tollens' test whereas isomer (B) does not give Tollens' test but gives positive Iodoform test. Write the structures of (A), (B) and (C).

[1 × 3 = 3 Marks]

8. (a) Write the dispersed phase and dispersion medium of dust.  
 (b) Why is physisorption reversible whereas chemisorption is irreversible ?  
 (c) A colloidal sol is prepared by the method given in the figure. What is the charge on AgI colloidal particles formed in the test tube ? How is this sol represented ? [1 × 3 = 3 Marks]

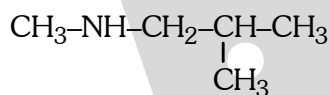


9. Give reasons for the followings : [1 × 3 = 3 Marks]

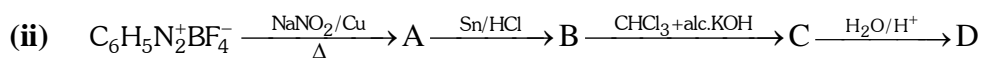
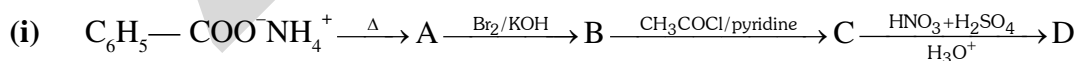
- (a) Acetylation of aniline reduces its activation effect.  
 (b)  $CH_3NH_2$  is more basic than  $C_6H_5NH_2$   
 (c) Although  $-NH_2$  is o/p directing group, yet aniline on nitration gives a significant amount of m-nitroaniline.

OR

- (a) Write the IUPAC name of the given compound:



- (b) Write the structures of A, B, C and D in the following reactions:



10. Calculate the emf of the cell in which the following reaction takes place: [3 Marks]

11. Explain giving reasons :

- (a) Transition metals and many of their compounds show paramagnetic behaviour.
- (b) The enthalpies of atomisation of the transition metals are high.
- (c) The transition metals generally form coloured compounds.

OR

Account for the following :

[1 × 3 = 3 Marks]

- (a) Copper (I) compounds are white whereas Copper (II) compounds are coloured.
- (b)  $E^\circ$  values for ( $Zn^{2+} / Zn$ ) and ( $Mn^{2+} / Mn$ ) are more negative than expected.
- (c) Zn, Cd, Hg are considered as d-block elements but not as transition elements.

### SECTION-C

12. Passage

Molar conductivity of a solution is the conductance of solution containing one mole of electrolyte, kept between two electrodes having unit length between them and large cross sectional area so as to contain the electrolyte. In other words, molar conductivity is the conductance of the electrolytic solution kept between the electrodes of a conductivity cell at unit distance but having area of cross section large enough to accommodate sufficient volume of solution that contains one mole of the electrolyte. It is denoted by  $\Lambda_m$ .

- (a) Write the mathematical expression for molar conductivity.
- (b) What are the units of molar conductivity,  $\Lambda_m$ ?
- (c) How does molar conductivity varies with concentration for strong as well as weak electrolytes?

OR

Why conductivity of  $CH_3COOH$  decreases on dilution?

- (d) Conductivity of 0.00241M acetic acid is  $7.896 \times 10^{-5} S \text{ cm}^{-1}$ . Calculate its molar conductivity in this solution?

[1 + 1 + 1 + 2 = 5 Marks]