

**BHARATIYA VIDYA BHAVAN'S V.M. PUBLIC SCHOOL, BARODA**  
**SAMPLE PAPER 6**  
**CHEMISTRY**

**MM : 70 Marks**

**Time : 3 Hrs**

**Date :**

**Std : XII**

**General Instructions :**

- 1) All the questions are compulsory
- 2) Use log tables, if necessary. Calculators are not permitted
- 3) Weightage of questions
  - a. Q1 to Q5 are of 1 mark each
  - b. Q6 to Q10 are of 2 marks each
  - c. Q11 to Q22 are of 3 marks each
  - d. Q23 is of 4 marks
  - e. Q24 to Q26 are of 5 marks each

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- Q1 : State Kohlrausch law of independent migration of ions (1)
- Q2 : The outer electronic configuration of copper is  $3d^{10} 4s^1$ , yet it is considered a transition element. Give reason. (1)
- Q3 : Why is the reactivity of haloarenes low in nucleophilic substitution reaction? (1)
- Q4 : Give chemical tests to distinguish between phenol and benzoic acid. (1)
- Q5 : What is a ferromagnetic substance? (1)
- Q6 : Giving a suitable example for each explain the following : (2)  
(a) Linkage isomerism  
(b) Ambidentate Ligand

**OR**

Mention two limitations of valence bond theory.

- Q7 : (a)  $SF_6$  is a well known compound but  $SCl_6$  is not known. Explain. (2)  
(b) Bismuth is a strong oxidizing agent in a pentavalent state. Why?
- Q9 : For the reaction  $A \rightarrow B$ , the rate of reaction becomes 27 times when the concentration of A is increased three times. What is the order of the reaction? (2)
- Q10 : Carry out the following conversions :  
(a) Aniline to fluoro benzene  
(b) Methylchloride to ethylamine

Q11. Define molar conductivity. The conductivity of 0.20M solution of KCl at 298K is  $0.0248\text{S cm}^{-1}$ . Calculate its molar conductivity. (2)

Q12 : (a) State the role of silica in the metallurgy of copper.  
(b) What is meant by froth flotation process?  
(c) Write the difference between calcination and roasting? (3)

Q13 : Give reason for the following :  
(a) Oxygen does not show oxidation state of +4 and +6.  
(b) HF has abnormally high boiling point.  
(c) In aqueous solution, the acidic strength in the order  $\text{HCl} < \text{HBr} < \text{HI}$  (3)

Q14 : (a) Write the formula for the following coordination compounds :  
(i) Tetrachloridonickelate (II) ion  
(ii) Potassium tetracyanonickelate (II)  
(b) Write the IUPAC name of the following coordination compound : (3)  
(i)  $\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3]$

Q15 : Explain why ?  
(a) Dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.  
(b) Alkyl halides though polar are immiscible with water  
(c) Grignard reagent should be prepared under anhydrous condition (3)

Q16 : (a) What are multi molecular and macro molecular colloids? Give one example for each.  
(b) What happens in (i) Tyndel phenomenon (ii) Electrophoresis (3)

Q17 : (a) Why is vapour pressure of a solvent lowered on addition of non-volatile solute to it?  
(b) Why is osmotic pressure of 1M KCl solution double than that of 1M urea solution?  
(c) Why is freezing point depressed when a non-volatile solute is dissolved in a liquid? (3)

Q18 : Describe the following with example :  
(a) Cross aldol condensation  
(b) Cannizzaro's reaction (3)

Q19 : State reason for the following :  
(a) Primary amines have higher boiling point than tertiary amines  
(b) Ethyl amine is soluble in water, whereas aniline is not soluble in water (3)

**OR**

a) How will you convert the following :

- (i) Aniline to chlorobenzene
- (ii) Ethanoic acid to methanamine
- (iii) Benzene diazonium chloride to phenol

Q20 : Define the following related to proteins.

- (a) Peptide bond
  - (b) Primary structure
  - (c) Denaturation
- (3)

Q21 : (a) The rate of a particular reaction triples, when temperature increases from 50°C to 100°C. Calculate the activation energy of the reaction.

(R = 8.314 JK<sup>-1</sup>mol<sup>-1</sup>, log3 = 0.4771)

- (b) Define activation energy of a reaction.
- (3)

Q22 : (a) Write the structures of the monomers of the following polymers :

- (i) Dacron
  - (ii) Polystyrene
  - (b) Give the preparation and uses of PVC
- (3)

Q23 : Shyam Prasad is a farmer. One day two of his friends came to visit him. He takes them to show his crop proudly. One of his friend notices some infections on the leaves of his crop. He advises to him to use DDT. The other friend instead advises him to use dry powder of neem leaves as an insecticide.

- (a) Whose advice should Shyam Prasad should take and why?
  - (b) What effects can DDT pose?
  - (c) Write the values associated with the above decisions.
- (4)

Q24 : (a) The chemistry of corrosion of iron is essentially an electro chemical phenomenon. Explain the reactions occurring during the corrosion of iron in the atmosphere.

(b) A voltaic cell is set up at 25°C with the following half cells :

Al / Al<sup>3+</sup> (0.01 M) and Ni / Ni<sup>2+</sup> (0.5 M)

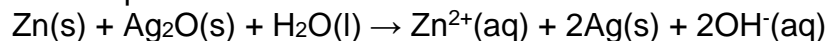
Write an equation for the reaction that occurs when the cell generates an electric current and determine the cell potential.

$E^{\circ} \text{Ni}^{2+}/\text{Ni} = -0.25\text{V}$ ,  $E^{\circ} \text{Al}^{3+}/\text{Al} = -1.66\text{V}$  ( $\log 8 \times 10^{-6} = -0.54$ )

**OR**

(a) Define conductivity and molar conductivity for the solution of an electrolyte. Discuss the variation of molar conductivity with concentration for a weak and strong electrolyte in an aqueous solution.

(b) In the button cell widely used in watches and other devices, the following reactions take place :



Determine  $E^{\circ}$  and  $\Delta G^{\circ}$  for the reaction.

Given  $\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^{-}$ ,  $E^{\circ} = 0.76\text{V}$  and  $\text{Ag}_2\text{O} + \text{H}_2\text{O} + 2\text{e}^{-} \rightarrow 2\text{Ag} + 2\text{OH}^{-}$

$E^{\circ} = 0.344\text{V}$

(5)

Q25 : Explain the following :

- (a) The transition element has great tendency for complex formation.
- (b) There is a gradual decrease in the atomic size of transition element in a series with increasing atomic number.
- (c) Lanthanum and Lutetium do not show coloration in solution. (Atomic number of La = 57 and Lu = 71)
- (d) Transition metals and their compounds are generally found to be good catalyst.
- (e) Metal-metal bonding is more frequent for the 4d and 5d series of transition metals than that for the 3d series.

**OR**

Give reason for the following :

- (a) Nitric oxide becomes brown, when released in air.
- (b) Ammonia acts as a ligand.
- (c) Solid  $\text{PCl}_5$  exhibits some ionic character.
- (d)  $\text{NH}_3$  is a stronger base than  $\text{PH}_3$
- (e) Sulphur has a greater tendency for catenation than oxygen. (5)

Q26 : Bring out the following conversions :

- (a) Acetaldehyde to ethane
- (b) Acetic acid to ethyl amine
- (c) Acetyl chloride to acetaldehyde
- (d) Ethyl benzene to benzoic acid
- (e) Propanone to propane

**OR**

- (a) An organic compound A with molecular formula  $\text{C}_3\text{H}_8\text{O}$  gives positive DNP and iodoform test. It does not reduce Tollens or Fehling's reagent and does not decolourise bromine water. On oxidation with chromic acid, it gives a carboxylic acid B with molecular formula  $\text{C}_7\text{H}_6\text{O}_2$ . Deduce the structure of A and B.
- (b) How would you account for the following?
  - (i) The boiling points of aldehydes and ketones are lower than that of their corresponding acids.
  - (ii) Aldehydes are more reactive than ketones towards nucleophiles (5)

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