BHARATIYA VIDYA BHAVAN'S V.M. PUBLIC SCHOOL, BARODA
PRACTICE PAPER 5
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

Q1 : What do you mean by zeta potential? (1)

Q2 : Complete the following equation (1)
$2MnO_4^- + 6H^+ + 5NO_2^- \rightarrow$

Q3 : Benzyl chloride is more reactive than ethyl chloride towards nucleophilic substitution, why? (1)

Q4 : Give the IUPAC name of $(CH_3)_3C—OC_2H_5$. (1)

Q5 : How do you account for the following? (1)
Firenkel defects are not found in alkali metal halides.

Q6 : Write the hybridization and shape of the following complexes? (2)
i) $[Co(NH_3)_6]^{3+}$ ii) $[NiCl_4]^{2-}$ (Atomic number : Co = 27, Ni = 28)

OR

Out of NH_3 and 'en', which ligand forms more stable complex with metal and why?

Q7. Draw the structures of the following (2)
(i) $H_2S_2O_8$
(ii) $HClO_4$

Q8 : Write an expression for the molar conductivity of acetic acid at infinite dilution according to Kohlrausch law. (2)

Q9 : Define the following terms by giving an example for each (2)
(i) The order of a reaction
(ii) The molecularity of a reaction

Q10 : State reason for the following : (2)
(i) Primary amines have higher boiling point than tertiary amines

(ii) Ethyl amine is soluble in water, whereas aniline is not soluble in water

Q11 : An element occurs in a bcc structure. It has edge length of 250pm. Calculate its molar mass, if its density is 8.0 gm/cm^3. (3)

OR

Calculate the density of silver which has fcc structure. The distance between the nearest silver atoms is 287pm. [Molar mass of Ag = 108g/mol].

Q12 : a) How will you extract copper from low grade ores and scraps? (3)
b) Explain the reactions taking place in the blast furnace for extraction of iron from its ore.

Q13 : Account for the following: (3)
a) Stability of lower oxidation state increases down the group in p block elements.
b) Oxygen has lesser catenation power than sulphur.
c) Helium is used in diving apparatus.

Q14 : (a) Draw the geometrical isomers of complex $[Co(en)_2Cl_2]^+$ (3)
(b) On the basis of crystal field theory, write the electronic configuration for d^4 ion if $\Lambda_0 > P$.
(c) $[NiCl_4]^{2-}$ is paramagnetic while $[Ni(CO)_4]$ is diamagnetic, though both are tetrahedral. Why? (Atomic number of Ni = 28)

Q15 : How will you bring out the following conversions? (3)
(a) Chlorobenzene to phenol
(b) Isopropyl bromide to n-propyl bromide
(c) Aniline to Iodobenzene

Q16 : a) How can a colloidal solution and true solution of the same colour be distinguished from each other? (3)
b) A delta is formed at the point where the river enters the sea, why?

Q17 : (a) What is meant by maximum boiling azeotrope ? (3)
(b) When does the measurement of colligative properties of a solution lead to abnormal molecular masses?
(c) What is the Vant Hoff factor for potassium sulphate?

Q18 : Give chemical tests to distinguish between the following pair of compounds :
(a) Phenol and benzoic acid. (3)
(b) Benzaldehyde and benzophenone.
(c) Ethanol and methanol.

Q19 ; (a) Write short notes on a) Gabriel phthalimide reaction (3)
(b) Hoffman bromamide degradation reaction

Q20 : (a) What is meant by glycosidic linkage? (3)
(b) What is the structural difference between a nucleoside and a neucleotide?
(c) What type of bonding helps in stabilizing the alpha helix structure of proteins?

Q21 : (a) Give an example of Pseudo first order reaction and write the rate equation for the same. (3)
(b) The rate of a reaction becomes four times, when the temperature changes from 293K to 313K. Calculate the energy of activation of the reaction assuming that it doesnot change with temperature. ($R = 8.314\ J\ K^{-1}mol^{-1}$)

Q22 : (a) Name the monomers and the equations for the preparation of Nylon-66. (3)
(b) What is vulcanization and why is it done? Why is diphenyl amine added to rubber?
(c) Some polymers soften on heating and harden on cooling, what are the polymers with property collectively called? Give an example of such polymers.

Q23 : On a visit to your village you find that lot of smoke, dust and some other gases are coming out of the chimney of a recently set up factory near the village. (4)

Answer the following questions;
(a) As chemistry student, what method you will suggest the factory owner to manage dust and smoke?
(b) What is the basic principle involved in your suggestions?
(c) What values are associated with your advice?

Q24 : (a) Define conductivity and molar conductivity. Discuss their variation with concentration.
(b). Write two advantages Hydrogen – Oxygen fuel cell.
(c) Molar conductivities at infinite dilution for NH_4Cl, NaOH and NaCl solutions at 298K are 129.8, 217.4 and 108.9 Scm^2mol^{-1} respectively and the molar conductivity of a $10^{-2}M$ solution of NH_4OH is 9.33 Scm^2mol^{-1}. Calculate degree of dissociation and ionization constant of NH_4OH in this solution.

OR

(a) What type of battery is lead storage battery? Write the anode and cathode reactions and overall cell reactions occurring in the operation of lead storage battery.
(b) Calculate the potential for half cell containing 0.10M $K_2Cr_2O_7(aq)$, 0.20M $Cr^{3+}(aq)$ and $1.0x10^{-4}$ $H^+(aq)$. The half cell reaction is
$Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6e^- \rightarrow 2Cr^{3+}(aq) + 7H_2O(l)$ and the standard electrode potential is given as $E^0 = 1.33V$

Q25. Explain giving reason : (5)
(a) Phosphorus shows high tendency for catenation.
(b) Sulphur in vapour state exhibits paramagnetic behavior
(c) Ammonia has higher boiling point than phosphine

d) The electron gain enthalpy with negative sign is less for oxygen than that for sulphur.

e) Fluorine never acts as the central atom in polyatomic inter halogen compounds

OR

(a) Write the preparation of $KMnO_4$ from pyrolusite ore. Give two reactions to show that $KMnO_4$ acts as an oxidising agent in acidic medium.

(b) Draw the structures of the following :

i) SF_4

ii) XeF_2

(c) Give chemical reactions in support of following observations:

i) +5 oxidation state of Bi is less stable than +3 state

ii) PCl_5 acts an oxidizing agent.

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Q26 : Bring out the following conversions : (5)

(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 C_3H_8O 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 $C_7H_6O_2$. 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

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