Mock Test (2014-2015)
Subject : chemistry
Class : XII

Time : 3 Hrs. **M.M. 70**

General Instructions:

(i) All the questions are compulsory.
(ii) Question numbers 1 to 5 are very short answer questions carrying 1 mark each.
(iii) Question numbers 6 to 10 are short answer question carrying 2 marks each.
(iv) Question numbers 11 to 22 are also short answer questions carrying 3 marks each
(v) Question number 23 is a value based questions carrying 4 marks.
(vi) Question numbers 24 to 26 are long answer questions carrying 5 marks each.
(vii) Use long tables, if necessary. Use of calculator is not allowed.

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1 Define molal elevation constant (K_b) 1

2 What are the dispersed phase and dispersion medium of butter? 1

3 What inspired N. Bartlett for carrying out reaction between Xe and Pt F_6 ? 1

4 Arrange the following compound in decreasing order of SN^1 reactivity : 1

(A) $CH_3(CH_2)_2CH_2\,Br$

(B) $(CH_3)_3Br$ and

(C) $CH_3CH_2CH(CH_3)Br$

5 Name a substance that can be used as an antiseptic as well as disingectant. 1

6 (a) What type of magnetism is shown in the following alignment of magnetic moments?

↑ ↑ ↑ ↑ ↑ ↑

(b) What type of point defect is produced when AgCl is doped with $CdCl_2$?

7 The half-life for decay of radioactive ^{14}C is 5730 years. An archaeobgical artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample. 2

8 Give reasons for the following observations: 2

(a) Scandium (Atomic number: 21) salts are white.

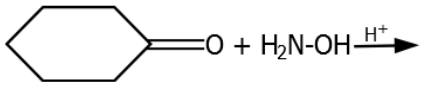
(b) Mn (II) (z= 25) ion exhibit maximum paramagnetic character amongst the bivalent ions of first transition series.

9 Name the following coordination compounds according to IUPAC system of nomenclature: 2

(a) $\left[Co(H_2N\,CH_2\,CH_2\,NH_2)_3\right]_2(SO_4)_3$

(b) $Ag\left(NH_3\right)_2\ \left[Ag(CN)_2\right]$

10 Write the products of the following reactions:

(a) 

(b) $2C_6\,H_5\,CHO + Conc.\ NaOH \rightarrow$

OR

Write the products formed when CH_3CHO reacts with the following reagents:

(a) HCN
(b) Tollens' reagent

11 An element with molar mass 27 g mol^{-1} forms a cubic unit cell with edge length $4.05\times10^{-8}cm$. If the density is 2.7 g cm^3, What is the nature of the cubic unit cell?

12 100 mg of a protein is dissolved in just enough water to make 100mL of solution. If this solution has an osmotic pressure of 13.3 mm Hg at $25°C$, What is the molar mass of protein? (R=0.0821 L atm $mol^{-1}k^{-1}$ and 760 mm Hg= 1 atm)

13 The decomposition of phosphine $4PH_3(g) \rightarrow P_4(g)+6H_2(g)$ 3

Has the rare law, Rate= $K[PH]_3$. The rare constant is $6.0\times10^{-4}\,s^{-1}$ at 300 K and activation energy is 3.05 x 10^5 J mol^{-1}. Calculate the value of rate constant at 310 K.

[Given R=8.314 J $k^{-1}\,mol^{-1}$]

14 How are the following colloid's different from each other in respect of their dispersion medium and dispersed phase?

(a) Aerosol (b) Emulsion (c) Hydrosol

OR

Explain the following terms:

(a) Electrophoresis (b) Dialysis (c) Tyndall effect

15 State the principles of the following methods of refining crude metals:

(a) Zone refining (b) Liquation method (c) Chromatographic method.

16 Describe the preparation of potassium permafrom pyrolusite are. Write the ionic equation for the reaction that takes place between acidified $KMnO_4$ solution and iron (II) ions. 3

17 Draw the structures of optical isomers of each of the following complex ions: 3

$[Cr(C_2O_4)_3]^{3-}$, $[Pt(en)_2Cl_2]^{2+}$ and $Cr(NH_3)_2Cl_2(en)^+$

18 Compound `A` with molecular formula C_4HgBr is treated with aqu. KOH solution. The rate of this reaction depends upon the concentration of the compound 'A' only. When another optically active isomer 'B' of this compound was treated with aq. KOH solution, the rate of reaction was found to be dependent on concentration of compound and KOH both.

(i) Write down the structural formula of both compounds 'A' and 'B'

(ii) Out of these two compounds, which one will be converted to the product with inverted configuration?

19 How would you obtain the following : 3

(a) Picric acid from phenol

(b) 2-Methyl propan-2-ol from methyl magnesium bromide

(c) Propan-2-ol from propene

20 State reason for the following: 3

(a) pK_b value for aniline is more than that for methylamine.

(b) Ethylamine is soluble in water whereas aniline is not soluble in water.

(c) Primary amines have higher boiling points than isomeric tertiary amines.

21 What happen when D-glucose is treated with the following regents?

(a) Hl

(b) Br_2 water

(c) HNO_3

22 (a) Why is use of aspartame limited to cold foods and soft drinks? 3

(b) Which are antiseptics? Give an example.

(c) Which one of the following is a food preservative?

Equanil, Morphine, Sodium benzoate

23 In a school farewell party of Class XII, Kapil wants to use Thermacol/plastic disposable cups and plates for refreshment of students. Mohan a class XII chemistry student insists on using either plates/cups or unbreakable crockery. 4

(a) Name the polymers used for making unbreakable crockery. Write the name of chemical formula of is monomers.

(b) Is this polymer a condensation or an addition polymer?

(c) Mention the values exhibited by Mohan in the above decision.

24 (a) Define the following terms:

(i) Limiting molar conductivity (ii) Fuel cell

(b) Resistance of a conductivity cell filled with 0.1 mol L^{-1} KCL solultion is 100. If the resistance of the same cell when filled with 0.02 mol L^{-1} KCl solution is 520 Ω, calculate the conductivity and molar conductivity of 0.02 mol L^{-1} KCl solution. The conductivity of 0.1 mol L^{-1} KCl solution is $1.29 \times 10^{-2} \Omega^{-1}$ cm^{-1} .

OR

(a) The conductivity of 0.2 M solution of KCl at 298 K is 0.025 S cm^{-1}. Calculate its molar conductivity.

(b) Calculate e.m.f. of the following cell at 298 K: Mg (s) Mg^{2+} (0.1M) Cu^{2+} (0.01M) Cu(s)

[E ce;;= 2.71V, F= 96500 C mol^{-1}]

25 (a) Draw the structure of the following :

(i) XeF_4 (ii) ClF_3

(b) Account for the following:

(i) Helium is used in diving apparatus.

(ii) PH_3 has lover boiling point than NH

(iii)H_3PO_3 is a diprotic acid.

OR

(a) Complete the following chemical equations:

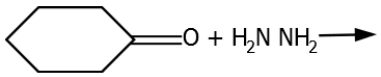
(i) $Cl_2 + NaOH$ (Hot and Conc.) $\rightarrow$

(ii) $Xe F_4 + H_2 O \rightarrow$

(iii) $Fe^{3} + SO_{2} + H_{2}O \rightarrow$

(b) Draw the structures of white phosphorus and red phosphorus. Which one of these two types of phosphorus is more reactive and why?

26 (a) Write the products of the following reactions: 5

(i) 

(ii) 2 HCHO + Conc. NaOH

(iii) $CH_3COOH \xrightarrow{(i)P/Cl \atop (ii)HO}$

(b) Account for the following:

(i) CH_3CHO is more reactive then CH_3COCH_3 towards reaction with HCN.

(ii) Electrophilic substitution is benzoic acid takes place at m-position.

OR

(a) Write the chemical equations to illustrate the following name reactions:
(i) Aldol condensation reaction
(ii) Decarboxylation reaction
(iii) Wolff-Kishner reduction.

(b) Although phenoxide ion has more number of resonating structures than Carboxylate ion, yet carboxylic acid is a stronger acid than phenol. Give two reasons.