QB365

Model Question Paper - 1

12th Standard CBSE

Chemistry

Reg.No. :

Time : 02:00:00 Hrs

Total Marks : 100

Section - A

1) Iodine molecules are held in the crystals lattice by..... . **1**

(a) London forces (b) dipole-dipole interactions (c) covalent bonds (d) coulombic forces.

2) Cations are present in the interstital site in..... . **1**

(a) Frenkel defect (b) Schottky defect (c) Vacancy defect (d) Metal deficiency defect

3) The osmotic pressure of 0.1 M aqueous solution of NaCl is ..... Osmotic pressure of 0.1 M aqueous solution of glucose **1**

(a) equal to (b) less than (c) half of (d) nearly double

4) Colligative properties depend on **1**

(a) the nature of the solute particles dissolved in solution (b) the number of solute particles in solution

(c) the physical properties of the solute particles dissolved in solution (d) the nature of solvent particles

5) Equivalent conductivity at infinite dilution for sodium potassium oxalate, $(COO^-)_2$ Na^+ K^+ , will be (given, molar conductivities of oxalate, K^+ and Na^+ ions at infinite dilution are 148.2, 50.1, 73.5 S cm^2 mol^{-1} respectively) **1**

(a) 271.8 S cm^2 eq^{-1} (b) 67.95 S cm^2 eq^{-1} (c) 543.6 S cm^2 eq^{-1} (d) 135.9 S cm^2 eq^{-1}

6) Standard reduction potentials of the half reactions are given below : **1**

$F_2(g) + 2e^- \longrightarrow 2F^-(aq); E^0 = +2.85V$ The strongest oxidizing and reducing agents respectively are :

$Cl_2(g) + 2e^- \longrightarrow 2Cl^-(aq); E^0 = +1.36V$

$Br_2(s) + 2e^- \longrightarrow 2Br^-(aq); E^0 = +1.06V$

$I_2(s) + 2e^- \longrightarrow 2I^-(aq); E^0 = +0.53V$

(a) Cl_2 and Br^- (b) Cl_2 and I_2 (c) F_2 and I^- (d) Br_2 and Cl^-

7) An example of autocatalysis is **1**

(a) oxidation of NO to NO_2 (b) oxidation of SO_2 to SO_3 (c) decomposition of $KClO_3$ to KCl and O_2

(d) oxidation of oxalic acid by acidified $KMnO_4$

8) The coagulation of 200 mL of a positive colloid took place when 0.73 g HCl was added to it without changing the volume much. The flocculation value of HCl for the colloid is **1**

(a) 0.365 (b) 36.5 (c) 100 (d) 150 (e) 200

9) A number of elements are available in earth,s crust but most abundant elements are **1**

(a) Al and Fe (b) Al and Cu (c) Fe and Cu (d) Cu and Ag

10) Electrolytic refining is used to purify which of the following metals? **1**

(a) Cu and Zn (b) Ge and Si (c) Zr and Ti (d) Zn and Hg

11) Which of the following is not hydrolysed ? **1**

(a) $AsC1_3$ (b) PF_3 (c) $SbC1_3$ (d) NF_3

12) The following two reactions of HNO_3 with Zn are given as (equations are not balanced) **1**

$Zn + conc.\, HNO_3 \longrightarrow Zn(NO_3)_2 + \boxed{X} + H_2O$.....(A)

$Zn + dil.\, HNO_3 \longrightarrow Zn(NO_3)_2 + \boxed{Y} + H_2O$.....(B) In reactions A and B, the compounds X and Y respectively are

(a) NO_2 and NO (b) NO_2 and NO_2 (c) NO and NO_2 (d) NO_2 and NH_4NO_3

13) Which of the following oxidation state is common for all lanthanoids ? **1**

(a) +2 (b) +3 (c) +4 (d) +5

14) Among the following pairs of ions, the lower oxidation state in aqueous solution is more stable than the other, in **1**

(a) Ti^+,Ti^{3+} (b) Cu^+,Cu^{2+} (c) Cr^{2+},Cr^{3+} (d) V^{2+},VO^{2+}

15) The conversion of m-nitrophenol resorcinol involves respectively **1**

(a) hydrolysis,diazotization and reduction (b) diazotisation,reduction and hydrolysis

(c) hydrolysis,reduction and diazotization (d) reduction,diazotization and hydrolysis

16) When propionic acid is treated with aqueous sodium bicarbonate, CO_2 is liberated. The 'C' of CO_2 comes from **1**

(a) methyl group (b) carboxylic acid group (c) methylene group (d) bicarbonate

17) Benxaldehyde and acetone can be best distinguished using **1**

(a) Fehling's solution (b) sodium hydroxide solution (c) 2, 4-DNP (d) Tollens' reagent

18) Novolac, the linear polymer used in paints is **1**

(a) a copolymer of 1,3-butadiene and styrene

(b) obtained by the copolymerization of methyl methacrylate

(c) mitial product obtained in the condensation of phenol and formaldehyde

(d) obtained by the polymerization of caprolactam (e) copolymer of melamine and formaldehyde

19) Which of the following processes can be used to prepare polystyrene? **1**

(a) Anionic (b) Cationic (c) Free radical (d) Ziegler-Natta

20) Which of the following is not a target molecule for drug function in body ? **1**

(a) Carbohydrates (b) Lipids (c) Vitamins (d) Proteins

Section - B

21) Which compound led to the discovery of the compounds of noble gas? **2**

22) Which is least acidic ? SbH_3, Ph_3, NH_3,AsH_3 **2**

23) What is the most stable oxidation state of Mn (Z=25)? **2**

24) Zinc, cadmium and mercury are generally not considered as transition metals, Give reasons . **2**

25) Define aluminothermy. **2**

26) Distinguish between (i) Hexagonal and monoclinic unit cell (ii) Face-centred and end-centred unit cell. **2**

27) Name one example each of (i) acidic flux (ii) basic flux. **2**

28) Discuss briefly giving an example in each case the role of coordination compounds in: **2**

(a) biological systems,

(b) analytical chemistry,

(c) medicinal chemistry and

(d) extraction/metallurgy of metals.

29) What are ambident nucleophiles? Explain with an example. **2**

30) CHF_3 is less acidic than $CHCl_3$. Explain **2**

31) Why does bromination of aniline, even under very mild conditions give 2, 4, 6- tribromoaniline instantaneously? **2**

32) How can you convert p-toluidine to 2-bromo-4-methylaniline? **2**

33) Why is paracetamol preferred over aspirin? **2**

34) Lithium borohydride,$LiBH_4$,crystallize in an orthorhombic system with 4 molecules per unit cell.The unit cell dimensions are: a=6.81$\overset{0}{A}$,b=4.43$\overset{0}{A}$ and c=7.17 $\overset{0}{A}$.Calculate the density of the crystal.Take atomic mass of Li=7,B=11 and H=1 a.m.u. **2**

35) Why molecularity is applicable only for elementary reactions and order is applicable for elementary as well as complex reactions? **2**

36) Which sugar is called invert sugar? Why is it called so? **2**

37) Benzene (C_6H_6) and Toluene (C_7H_8) form a nearly ideal solution. At 313 K, the vapour pressure of pure benzene is 150 mm Hg and of pure benzene is 150 mm Hg and pure toluene is 50 mm Hg. Calculate the vapour pressure of a mixture of these containing equal masses at 313 K. **2**

38) Describe the following about halogen family (group 17 elements): (i) Relative oxidising power (ii) Relative strength of their hydrides (iii) Oxyacids and their related oxidising ability. **2**

39) Define the following and give one example of each: **2**

(a)Isoelectric point

(b)Mutarotation

(c)Enzymes

40) Mention one use each of the following drugs: (i) Ranitidine (ii) Paracetamol (iii) Tincture of iodine **2**

Section - C

41) Compound 'A' with molecular formula C_4H_9Br is treated with aq. 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. **5**

42) Compounds having general molecular formula AFe_2O_4 are called ferrites and posses spinel type structures. Some common examples are $MgFe_2O_4$ and $ZnFe_2O_4$ They may be thought of being formed by replacing Fe^{2+} ions present in Fe_3O_4 by bivalent cations such as Mg^{2+}, Zn^{2+} ions etc. Now answer the following questions : **5**

(i) What types of materials are ferrites?

(ii) What are the main uses of ferrites?

43) Gasoline is being used worldwide for running automobile, aeroplane etc. Due to the presence of nitrogen and sulphuric compounds in gasoline, the exhaust gases contain oxides of nitrogen and sulphur which are major pollutants in the environment in contrast, ethanol is a much cleaner fuel because it produces only CO2 and Hp. Now answer the following questions: **5**

(a) Besides being a cleaner fuel, what are the other advantages of using ethanol as a fuel in automobile?

(b) What are the disadvantages of using ethanol as a fuel? What are the value associated with its use?

44) (a) Write the structures of main products when aniline reacts with the following reagents: **5**

(i) Br_2 water

(ii) HCI

(iii) $(CH_3CO)_2O$ / pyridine

(b) Arrange the following in the increasing order of their boiling point:

$C_2H_5NH_2$, C_2H_5OH, $(CH_3)_3N$

(c) Give a simple chemical test to distinguish between the following pair of compounds:

$(CH_3)_2NH$ and $(CH_3)_3N$

45) Study the given passage carefully and answer the questions that follow: **5**

Shalini studied a chapter on Polymers in school and came across the following paragraph: The durability, strength, low cost, water and chemicals resistance, welding properties, lesser'. energy, fewer atmosphere emissions and light weight are advantages of plastic bags. Shalini is confused as she has been reading in the newspaper about the ban on the usage of plastic substances. She further finds that despite the durability, the use of these materials has presented mankind with serious waste disposal problem as these materials do not disintegrate by themselves. In view of this, certain polymers are being developed which are broken down rapidly by micro-organisms. Shalini feels relaxed that such kinds of biomaterials are being developed.

(i) Name the class of these useful polymers which do not harm the environment.

(ii) Give anyone example of these polymers and name its monomers.

(iii) Comment on the qualities of Shalini.

46) Calculate the standard electrode potential of Cu^+/Cu half cell. Given that the standard reduction potentials of Cu^{2+}/Cu and Cu^{2+}/Cu^+ are 0.337 V and 0.153 V respectively. **5**

47) EMF of Daniell cell was found using different concentrations of Zn^{2+} ion and Cu^2 ion. A graph was then plotted between E_{cell} and $\log \frac{[Zn^{2+}]}{[Cu^{2+}]}$. The plot was found to be linear with intercept on E_{cell} axis equal to 1.10 V. Calculate E_{cell} for Zn | Zn^{2+} (0.1 M) || Cu^{2+} (0.01 M) | Cu **5**

48) 20% of surface sites are occupied by N_2 molecules. The density of surface sites is 6.023×10^{14} cm^{-2} and total surface area is 1000 cm^2 . The catalyst is heated to 300 K while N_2 is completely disorbed into a pressure of 0.001 atm and volume 2.46 cm^3. Find the active sites occupied by each N_2 molecule. **5**

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