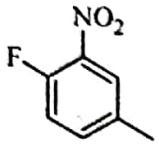
Group A: Multiple Choice Questions

Tick the correct answer. **[11×1=11]**

1. How many mmols of NaOH will be used in the titration with 33mL of 3 M HCl to form NaCl and water?
   a. 10 mmol b. 100 mmol
   c. 3 mmol d. 33 mmol
2. Ionisation constant of formic acid is 1.8×10^{-4} at 298 K. In 0.1 N HCOOH the percentage ionisation of HCOOH acid is
   a. 0.18 b. 42.4
   c. 4.24 d. 2.89
3. $3A \longrightarrow B + C$, it would be a zero order reaction when
   a. the rate of reaction is proportional to square of concentration of A
   b. the rate of reaction remains same at any concentration of A
   c. the rate remains unchanged at any concentration of B and C

d. the rate of reaction doubles, if concentration of B is increased to double

4. The standard emf is .....for hydrogen-oxygen fuel cells.
   a. 3.96 V b. 1.23V
   c. 0.58V d. 2.54V
5. Ligand which can form two coordinate bonds from each ion or molecule to the transition metal ion known as
   a. ligand ion b. dentate ligand
   c. monodentate ligand d. bidentate ligand
6. The method of zone refining of metals is based upon the principle of.....
   a. greater solubility of the impurity in molten state than in solid
   b. greater mobility of pure metal than impurity
   c. higher melting point of impurity than that of pure metal
   d. greater noble character of solid metal than that of the impurity
7. The IUPAC name of the compound



is
   a. 4-fluoro-1-methyl-3-nitrobenzene
   b. 1-fluoro-4-methyl-2-nitrobenzene
   c. 2-fluoro-5-methyl-1-nitrobenzene
   d. 4-methyl-1-fluoro-2-nitrobenzene
8. Which of the following compounds does not give a tertiary alcohol upon reaction with methylmagnesium bromide?
   a. 3-methylpentanal
   b. Ethyl benzoate
   c. 4, 4-dimethylcyclohexanone
   d. 4-heptanone
9. The grade 43 OPC shall be rejected if it remains in bulk storage in the factory for
   a. More than 3 months b. More than 1 months
   c. More than 6 months d. More than 4 months
10. Which of the following has highest penetration action?
   a. α-ray b. β-ray
   c. Y-ray d. cathode ray
11. The ..... is a device for continuously forming, pressing, and drying a web of paper fibers.
   a. Paper machine b. Pulp extractor
   c. Lignin formation d. Jach machine

Group B: Short Answer Questions

Attempt all the questions. **[8×5=40]**

1. This question is related to volumetric analysis.
   a. How do you prepare deci-normal solution of hydrated Oxalic acid? Is this solution a primary or secondary standard? Why? [1+1]
   b. 50 cc of a deci-normal solution of HCl solution required 80 cc of a solution of Na_2CO_3 for complete neutralization. Calculate of strength of Na_2CO_3 in terms of: (i) Normality (ii) Molarity (iii) G/L (iv) % by volume. [3]

   OR

   A first-order reaction is 38.5% complete in 480 s.
   a. Calculate the value of the rate constant. [2]
   b. What is the value of the half-life? [1]
   c. How long will it take for the reaction to reach 95% completion? [2]
2. This question is related to thermochemistry.
   a. $A+B \rightarrow C+D$, $\Delta H = -10{,}000\ J\ mol^{-1}$, $\Delta S = -33.3\ mol^{-1}K^{-1}$.
      i. At what temperature the reaction will occur spontaneously from left to right? [2]
      ii. At what temperature, the reaction will reverse? [1]
   b. For a reaction both ΔH and ΔS are positive. Under what condition will the reaction occur spontaneously? [2]
3. A metal 'M' is good conductor of electricity which has mass number 65 and forms white vitriol with sulphuric acid.
   a. Write two important ores of 'M' [1]
   b. How can you obtain Rinman's green from 'M'? Write its one use. [2]
   c. Write a proper reaction which is involved in extraction of 'M'. [2]
4. A secondary haloaknae (X) having molecular mass 78.5 which is obtained by the reaction of PCl_5 with secondary alcohol (Y).
   a. Which one 'X' or 'Y' gives positive iodoform test? Write its one use. [1]
   b. What product would you obtain when 'X' is heated with sodium metal in the presence of dry ether? [2]
   c. How can you convert 'X' into 2-methylpropanoic acid? [2]
5. An aromatic compound (A) which gives common insecticide with 2,2,2-trichloroethanal in the presence of conc. H_2SO_4.
   a. How can you prepare 'A' with diazonium salt? [1]
   b. Reaction of aqueous NaOH on 'A' is more difficult than aliphatic haloalkane. Give reason. [2]
   c. Write a product when 'A' is heated with sodium metal in the presence of dry ether. [2]
6. The compound (P) is amino substituted aromatic compound which is prepared from haloarene with ammonia. Complete the reaction sequence. Identify the compound P, Q, R, S, T

$$P \xrightarrow[\text{cold}]{NaNO_2 + HCl} Q \xrightarrow[\Delta]{H_2O} R \xrightarrow[\Delta]{CHCl_3 / KOH} S \xrightarrow[[O]]{K_2Cr_2O_7 / H^+} T$$

7. Copper forms three common complex ions: $[Cu(H_2O)_6]^{2+}$, $[Cu(NH_3)_4(H_2O)_2]^{2+}$ and $[CuCl_4]^{2-}$
   a. What is the general name given to groups such as water, ammonia or chloride ions which surround the central metal ion? [2]
   b. How are these groups bound to the central metal ion? [2]
   c. What colours are the $[Cu(H_2O)_6]^{2+}$ and $[Cu(NH_3)_4(H_2O)_2]^{2+}$ ions? [1]
8. a. What are the monomer of Teflon and nylon-6,6? [2]
   b. Write the name and structure of antipyretic drug which is used as lowering body temperature. [1]
   c. Write two difference between OPC and PPC cement and which one is best for construction work? [2]

   OR

   List of some compounds are given below. [1+1+1+1+1]

   C_6H_5OH, C_6H_5Cl, C_6H_5CN, C_6H_5COOH, $(C_6H_5CO)_2O$

   From the above list, prepare a sequence of reaction with suitable condition and reagent.

Group C: Long Answer Questions **[3×8=24]**

9. a. Two half-cell reactions of an electrochemical cell are given below:

   $MnO_4^-(aq) + 8H^+(aq) + 5e^- \longrightarrow Mn^{2+}(aq) + 4H_2O(l)$, $E^\circ = +1.51\ V$

$Sn^{2+}(aq) \longrightarrow 4\ Sn^{4+}(aq) + 2e^-,\ E^\circ = +0.15\ V$

i. Construct the redox equation from the two half-cell reactions. [2]

ii. Predict if this reaction favours formation of reactants or product. [1]

b. Can a solution of 1 M $ZnSO_4$ be stored in a vessel made up of copper? If not why?

[$E^0_{Zn^{+2}/Zn} = -0.76\ V$, $E^0_{Cu^{+2}/Cu} = 0.34V$]

c. Enthalpy of formation of compounds are given below:

Benzene	55 kJ
Water	-395 kJ
Carbon dioxide	-285 kJ

Calculate the enthalpy of combustion of benzene. [3]

OR

a. What is pH of 1M CH_3COOH solution? To what volume must one litre of this solution be diluted so that the pH of resulting solution will be twice the original value? Given : $K_a = 1.8 \times 10^{-5}$ [1+ 4]

b. How much AgBr could dissolve in 1.0 L of 0.4 M NH_3? Assume that $[Ag(NH_3)_2]^+$ is the only complex formed given, $K_f [Ag(NH_3)_2^+] = 1.0 \times 10^8$, Ksp (AgBr)= 5.0×10^{-13} [3]

10. a. An organic compound (A) with molecular formula C_8H_8O forms an orange-red precipitate with 2,4-DNP reagent and gives yellow precipitate on heating with iodine in the presence of sodium hydroxide. It neither reduces Tollens' or Fehlings' reagent nor does it decolourise bromine water or Baeyer's reagent. On drastic oxidation with chromic acid, it gives a carboxylic acid (B) having molecular formula $C_7H_6O_2$. Identify the compounds (A) and (B) and explain the reactions involved. [2.5+2.5]

b. An organic compound 'Z' is known as oil of mirbane which is prepared by the nitration of benzene.

i. What product would you expect when 'Z' is reduced in $LiAlH_4$? [2]

ii. Convert 'Z' into p-hydrazobenzene. [1]

11. a An organic compound 'A' which has characteristic odour, on treatment with NaOH forms two compounds 'B' and 'C'. Compound 'B' has the molecular formula C_7H_8O which on oxidation with CrO_3 gives back compound 'A'. Compound 'C' is the sodium salt of the acid. 'C' when heated with soda lime yields an aromatic hydrocarbon 'D'. Deduce the structures of 'A', 'B', 'C' and 'D'. [4]

b. Give reasons:

i. Electrophilic substitution in Benzoic acid takes place at meta position. [2]

ii. Carboxylic acids do not give characteristic reactions of carbonyl group. [2]

OR

a. Arrange the following compounds in an increasing order of basic strengths in their aqueous solutions: NH_3, CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$. [1]

b. Give a chemical test to distinguish between ethylamine and aniline. [2]

c. How may methyl bromide be preferentially converted to methyl isocyanide? [2]

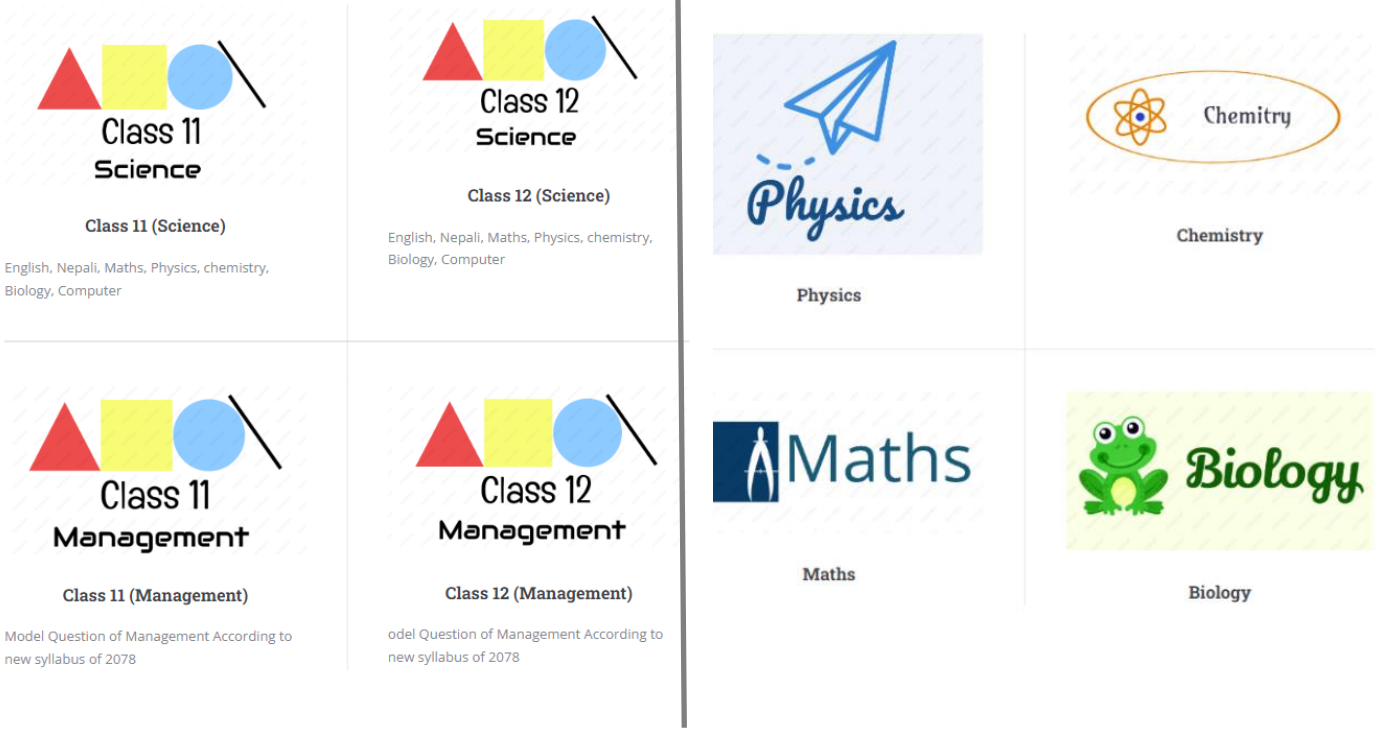
d. Complete the following reaction equations: [3]

i. $C_6H_5N_2Cl + H_3PO_2 + H_2O \longrightarrow$

ii. $C_6H_5NH_2 + Br_2\ (aq) \longrightarrow$

BIPO's notes

Class 12 complete notes and paper collection and solutions.



Feedbacks:

admin@bipinkhatri.com.np | bipinkhatri.ram@gmail.com

Contact:

@im.bipo www.bkhatri.com.np @im.bipo