

**APEEJAY COMMON EXAMINATION**  
**CLASS XI**  
**SUBJECT CHEMISTRY**  
**Term- II**

M.M. 35

TIME DURATION: - 2Hours

**General instructions:-**

1. There are 12 questions in this question paper.
2. Section A → Q.No. 1 to 3 are very short answer questions carrying 2 marks each.
3. Section B → Q.No. 4 to 11 are short answer questions carrying 3 marks each.
4. Section C → Q.No. 12 is a case based question carrying 5 marks.
5. All questions are compulsory.
6. Use of log tables and calculator is not allowed.

**SECTION-A**

1. Why is Wurtz reaction not preferred for the preparation of alkanes containing odd number of carbon atoms? Illustrate your answer by taking one example. (2)
2. a) What is the order of mobility of alkali metal ions in aqueous solution, also explain the order?  
b) Beryllium and magnesium don't give colour to the flame whereas other alkaline earth metals do so why? (2)
3. a) How will you convert Benzene to Acetophenone?  
b) Arrange the following compounds in order of their decreasing relative reactivity with an electrophile, E<sup>+</sup>  
  
Chlorobenzene, 2,4-dinitrochlorobenzene, p-nitrochlorobenzene (2)

**SECTION-B**

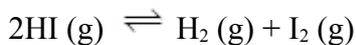
4.  $C_2H_4 + Cl_2 \rightarrow C_2H_4Cl_2$ ;  $\Delta H = -270.6 \text{ KJ/mole}$  and  $\Delta S = -139 \text{ JK}^{-1}\text{mole}^{-1}$ 
  - a) Is the reaction favoured by entropy, enthalpy, both or none?
  - b) Calculate  $\Delta_r G^0$  and find whether it is possible to reduce MgO using carbon at 298 k.  
$$MgO (s) + C (s) \rightarrow MgO (s) + CO (g)$$
$$\Delta_r H^0 = 491.18 \text{ KJ/mole}$$
$$\Delta_r S^0 = 197.67 \text{ JK}^{-1}\text{mole}^{-1}$$

**OR**

- a) Enthalpies of formation of  $CO_{(g)}$ ,  $CO_{2(g)}$ ,  $N_2O_{(g)}$ ,  $N_2O_{4(g)}$  are -110, -393, 81 and 9.7 KJ/mole respectively. Find the value of  $\Delta_r H$  for the reaction.  
$$N_2O_4 (g) + 3CO (g) \rightarrow N_2O (g) + 3CO_2 (g)$$

b) State First law of thermodynamics. (3)

5. a) A sample of HI (g) is placed in a flask at a pressure of 0.2atm. At equilibrium, the partial pressure of HI (g) is 0.04atm. What is the  $K_p$  for the given equilibrium?



b) Write the expression for  $K_c$  for the reaction



6. a) Write the conjugate acid and conjugate base for  $\text{NH}_3$  and  $\text{HSO}_4^-$ .

b) What is the effect of addition of an inert gas at equilibrium? (3)

7. a) The value of  $K_c$  for the reaction  $2\text{HI}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{I}_2(\text{g})$  is  $1 \times 10^{-4}$

At a given time, the composition of reaction mixture is

$$[\text{HI}] = 2 \times 10^{-5} \text{ molL}^{-1}, [\text{H}_2] = 1 \times 10^{-5} \text{ molL}^{-1} \text{ and } [\text{I}_2] = 1 \times 10^{-5} \text{ molL}^{-1}$$

In which direction will the reaction proceed?

b) Do you expect  $\Delta S$  to be ZERO, -ve or +ve for the reaction



8. 2.9g of a gas at  $95^\circ\text{C}$  occupied the same volume as 0.184g of hydrogen at  $17^\circ\text{C}$  at the same pressure. What is the molar mass of the gas? (3)

9. How would you explain the following?

a) LiI is more soluble than KI in ethanol.

b) Lithium forms monoxide and other alkali metals form superoxides.

c) Potassium and caesium, rather than Lithium are used in photoelectric cells.

**OR**

Write balanced chemical equations:

a)  $\text{Li}_2\text{CO}_3$  is heated

b)  $\text{KO}_2$  and water are mixed

c) Water is added to  $\text{Na}_2\text{O}_2$  (3)

**10. Give reasons: -**

a)  $\text{PbI}_4$  does not exist.

b) Aluminium forms  $[\text{AlF}_6]^{3-}$  ion but boron does not form  $[\text{BF}_6]^{3-}$  ion.

c)  $\text{BCl}_3$  acts as a Lewis acid.

**OR**

**Give reasons: -**

- a)  $\text{CCl}_4$  is immiscible in water whereas  $\text{SiCl}_4$  is easily hydrolysed.  
b) Bond length of B-F bond differ in  $\text{BF}_3$  and  $\text{BF}_4^-$  (3)

11. a) Which out of Ga and Al has lower first ionisation enthalpy and why?  
b) Which out of carbon and silicon has a better tendency to catenate and why?

**OR**

- a) What are electron precise molecule? Explain by giving two examples.  
b) Why is graphite used as a lubricant? (3)

### SECTION-C

12. Read the passage given below and answer the questions that follow: (5)

Alkenes are the hydrocarbons characterised by the presence of a double bond. They undergo electrophilic addition reactions, where the electrophile attacks the  $\pi$  electron cloud of alkenes. Alkenes are more reactive towards electrophilic addition reactions than alkynes although the latter has two pi electron clouds.

Alkenes also undergo a number of oxidation reactions to give different products. They are oxidised by air as well as a number of oxidising agents like potassium permanganate, with cold as well as hot alkaline  $\text{KMnO}_4$ . In addition to this, alkenes also show oxidation with Ozone. When Ozone is passed through a solution of an alkene in some inert solvent such as  $\text{CH}_2\text{Cl}_2$ ,  $\text{CHCl}_3$  or  $\text{CCl}_4$  at a low temperature (196-200K), it oxidises alkenes to ozonides. Ozonides are unstable and explosive compounds. Therefore they are not usually isolated but are reduced in situ with zinc dust and water or  $\text{H}_2/\text{Pd}$  to give aldehydes and ketones or a mixture of these.

Alkenes can be hydrated directly or indirectly in the presence of conc.  $\text{H}_2\text{SO}_4$ . In case of unsymmetrical alkenes, addition occurs in accordance with Markovnikov's rule. Less reactive alkenes are indirectly hydrated whereas reactive alkenes can be directly hydrated in the presence of mineral acids.

- a) An alkene on ozonolysis gives propanal and pentan-3-one. What is the structural formula of Alkene. Write its IUPAC name. Write reactions involved.

**OR**

What happens when 2-methylpropene undergo reductive ozonolysis? Write reactions involved and IUPAC name of product(s) formed.

- b) Write the products formed when 2,3-Dimethylbut-2-ene is oxidised with hot alkaline  $\text{KMnO}_4$ .
- c) What will happen when 2-methylpropene undergoes hydration? Write the reaction also.