

Invigilator's Signature :

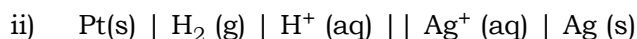
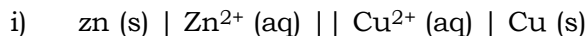
- ### GROUP – B

Answer any *three* of the following. $3 \times 5 = 15$

2. Define enthalpy. Relate the change in molar enthalpy with the change in molar internal energy for a given process of an ideal gas system. Justify that the amount of heat transferred at constant pressure is a measure of the enthalpy change of a system. 1 + 2 + 2
3. Draw the conductometric titration curve for HCl *vs* NaOH and explain the features of the curve. How does the nature of curve change, if pure water is used instead of NaOH ? 3 + 2



4. Write down the electrode reactions and over all reaction of the following cells :



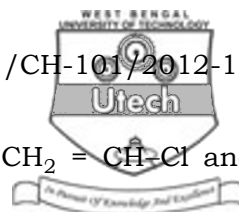
5. a) What is CNG and write its advantage over other fuels ?
 b) What is octane number of a fuel ? How can the octane number be improved ? 3 + 2
6. Explain the number average and weight molecular mass of polymer. Which one is greater and why ? 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What is meant by transport number of an ion ? How is it related with ionic conductance ?
 b) “ H^+ and OH^- ions show very high ionic mobility in aqueous medium.”– explain with mechanism.
 c) What is calomel electrode ? How can we measure the pH of a solution using calomel electrode ?
 d) Discuss the difference among isotactic, syndiotactic and atactic polymers. 3 + 3 + 6 + 3



8. a) Compare the C-Cl bond lengths in $\text{CH}_2 = \text{CH}-\text{Cl}$ and $\text{CH}_3-\text{CH}_2-\text{Cl}$.

- b) Arrange the molecules in their increasing acidity order :

Phenol, 2,6-dimethyl-4-nitrophenol, 3,5-dimethyl-4-nitrophenol

- c) Predict all possible products of neopentyl bromide that undergo solvolysis in aqueous alkali medium.

- d) Distinguish with example :

- i) Carbonium ion and carbenium ion
- ii) Addition reaction and substitution reaction.

$$3 + 3 + 4 + 5$$

9. a) Show that the magnitude of the reversible work done is greater than the magnitude of the irreversible work done during isothermal expansion of an ideal gas.

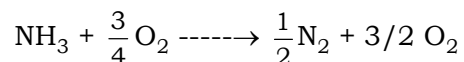
- b) Calculate the work done when one mole of a real gas at 0°C expands adiabatically and reversibly from 1 Lit to 10 Lit. (Given $\gamma = 5/3$)

- c) State and explain Hess's law.



- d) Calculate the heat of formation of ammonia.

Given :



$$\Delta H_c = -90.6 \text{ kcal mole}^{-1}$$



$$4 + 3 + 3 + 5$$

10. a) What do you mean by the activation energy of a reaction? How does the rate constant of a chemical reaction depend on the temperature?
- b) Calculate the activation energy of a reaction whose rate constant is doubled when temperature is increased from 200 K to 300 K.
- c) Show the influence of a positive catalyst on the activation energy of a reaction in the energy profile diagram.
- d) Distinguish between *p*-type and *n*-type semiconductors. Give two important kinds of example of semiconductors.

$$3 + 4 + 3 + 5$$



11. Write notes on any *three* of the following :

- a) Conducting polymer.
 - b) Joule-Thomson expansion and inversion Temperature.
 - c) Gibbs free energy and its use in denoting the spontaneity of a chemical reaction
 - d) Anti-Markownikov's rule
 - e) Schottky defect and Frenkel defect
 - f) Order and Molecularity of the reaction.
-