| | Utech |
|---------------------------|------------------------------------|
| Name: | (4) |
| Roll No.: | To Orange Samuelage Stad Explained |
| Invigilator's Signature : | |

CS/B.TECH(NEW)/SEM-2/CH-201/2013 2013 CHEMISTRY - I

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

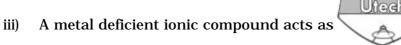
1. Choose the correct alternatives for the following:

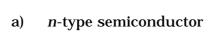
 $10 \times 1 = 10$

- i) For an endothermic reaction
 - a) ΔH is positive
 - b) ΔH is negative
 - c) $\Delta H = 0$
 - d) ΔU is negative.
- ii) Which one of the following has the least bond angle?
 - a) NH_3
 - b) BeF₂
 - c) H₂O
 - d) CH₄.

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- b) *p*-type semiconductor
- c) intrinsic semiconductor
- d) none of these.
- iv) The ion conductance of an ion depends on its
 - a) charge only
 - b) speed only
 - c) charge and speed
 - d) charge, speed and hydration.
- v) The hybridization of Xe in Xe F_2 is
 - a) sp
 - b) $sp^3 d^2$
 - c) sp^3
 - d) $sp^3 d$.



- The calorific value is highest for vi)
 - a) water gas
 - LPG b)
 - c) producer gas
 - d) carburated water gas.
- If a system interacts with the surrounding by exchanging energy only, then it is called as
 - open system a)
 - closed system b)
 - isolated system c)
 - d) none of these.
- viii) Hydrolysis of ethyl acetate in presence of excess water follows
 - 2nd order kinetics a)
 - 1st order kinetics b)
 - zero order kinetics c)
 - d) pseudo-1st order kinetics.

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- ix) The unit of specific conductance is
 - a) ohm-cm
 - b) ohm/cm
 - c) mho
 - d) mho/cm.
- x) Bakelite is an example of
 - a) metal
 - b) thermoplastic
 - c) rubber
 - d) thermoset.

GROUP - B

(Short Answer Type Questions)

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

Draw the conductometric titration curve of strong acid vs weak base and explain the salient features of the curve.

1 + 4

- 3. Write a technical note on octane number and name the unleaded additive that improves octane value. 4 + 1
- 4. Predict the hybridization and shape of PCl $_5$, NH $_3$, BCl $_3$, CO $_2$ and SF $_6$. 5 × 1

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- 5. a) What is calorific value of a fuel?
 - b) Distinguish between Higher or Gross Calorific Value(HCV) and Lower or Net Calorific Value (LCV). 2 + 3
- 6. State and explain Arrhenius equation. What is the significance of activation energy ? How can it be determined ? 2+2+1

GROUP - C

(Long Answer Type Questions)

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

- 7. a) Discuss the defect encountered in ZnO.
 - b) What are the basic postulates of transition state theory?
 - c) Prove that for criteria of spontanicity of ΔG should be negative.
 - d) State and explain Kohlrausch's law of indipendant migration of ions. With the help of this determine the equivalent conductance of acetic acid.

3 + 3 + 3 + 3 + 3

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- 8. a) Prove that Joule-Thomson expansion of gas is isoenthalpic.
 - b) Define Joule-Thomson coefficient and inversion temperature. Discuss their significances.
 - c) Why is first order reaction never complete?
 - d) What is CNG? What are the advantages of CNG?

 Mention two uses of CNG. 4 + 5 + 2 + 4
- 9. a) What is enthalpy? Derive Kirchhoff's equation.
 - b) What is plastic? Distinguish between thermoplastics and thermosetting polymer.
 - c) State Markonikov's rule. Explain Markonikov and anti-Markonikov addition of the HBr to propane. 5 + 5 + 5
- 10. a) What is a Carnot cycle ? Obtain the expression for the efficiency of a reversible Carnot engine and starting from this expression state an appropriate statement of the scond law of Thermodynamics.
 - b) Why does NaCl when heated in presence of Na vapour turn yellow? 12 + 3

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11. Write short notes on any *three* of the following : 3 ×

- a) Inductive effect
- b) Carbocation
- c) Homogeneous catalysis
- d) Schottky and Frenkel defects
- e) Conducting polymer.

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