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Exam.Code:0905
Sub. Code: 6650

2-14

1128
B.E. (Mechanical Engineering)
First Semester
CH-101: Applied Chemistry
(Common with ECE and EEE)

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

- I. Answer the following briefly:
- Why increase in volume of a gas for a given decrease in pressure is less in an adiabatic expansion than in isothermal expansion.
 - Classify the following polymers on the basis of action of heat on them: Bakelite, nylon, polyethylene, polyester
 - List the electronic transitions possible for CH_3Cl and $\text{H}_2\text{C}=\text{O}$.
 - Write the cell reaction for calomel electrode
 - Give the sequence of energy levels of d-orbitals in square planar crystal field.
- (5x2)

UNIT - I

- II. a) 1g of water at 373 K is converted into steam at the same temperature. The volume of water becomes 1671 ml on boiling. Calculate the change in internal energy of the system if the heat of vaporization is 540 cal/g.
- b) State the first law of thermodynamics. With the help of this law show that: (i) Heat absorbed by the system at constant volume is equal to increase in internal energy of the system, (ii) Heat absorbed by a system at constant pressure is equal to an increase in the enthalpy. (5,5)
- III. a) Discuss the mechanism of homogeneous and heterogeneous catalysis.
- b) Explain hydroformylation process and its importance. (5,5)
- IV. a) Write a note on glass electrode.
- b) What do you mean by corrosion inhibitors? Explain their action with examples. (5,5)

P.T.O.

(2)

UNIT - II

- V. a) A polymer consists of 40% by weight of macromolecules of molecular weight 10,000 and 60% by weight of macromolecules of molecular weight 75,000. Calculate number average and weight average molecular weight of the polymer.
- b) Define the term functionality of monomers. Explain its significance with suitable. (5,5)
- VI. a) Arrange the following compounds in the increasing order of their UV absorption maxima
- Ethylene
 - Napthalene
 - Anthracene
 - 1,3-butadiene. Provide reasons for your answers.
- b) How will you distinguish between following pairs of compounds on the basis of IR spectroscopy
- Ethyl alcohol and Diethyl ether (5,5)
 - Acetic Acid and Ethyl Acetate
- VII. a) Give the number of unpaired electrons in a strong and weak octahedral field for
- Cr^{3+}
 - Co^{2+}
 - Fe^{3+}
- b) What do you mean by Crystal Field Stabilization Energy (CFSE)? How do CFSE value relate to the corresponding colors in d-metal complexes. (6,4)