

Exam.Code:0905  
Sub. Code: 6650

1119  
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. Calculator is allowed.*

x-x-x

- I. Answer the following briefly:-
- What are state functions? How do these differ from path functions?
  - Why are catalysts important in industrial processes?
  - PVC is soft and flexible; whereas Bakelite is hard and brittle. Give reasons
  - State the selection rule for vibrational spectra.
  - Small anodic area results in intense corrosion. Give reason (5x2)

UNIT – I

- II. a) The heat of combustion of ethylene at 17°C and at constant volume is -332.19 kcal. Calculate the heat of combustion at constant pressure considering water to be in liquid state. (R = 2Cal/degree/mol).
- b) Explain Gibbs Duhem equation. Give its significance. (2x5)
- III. a) Explain Michaelis-Menten Kinetic model for enzyme catalysis.
- b) Explain Acetic Acid Process and discuss its importance. (2x5)
- IV. a) Calomel electrode is used as a reference electrode, give reasons. Describe its construction and working.
- b) Explain the mechanism of (i) Stress corrosion (ii) Intergranular Corrosion

UNIT – II

- V. a) A polymer sample contains equal masses of molecules with molecular weights 20,000 and 40,000. Calculate number average and weight average molecular weights.
- b) Discuss co-ordination polymerization. (2x5)

P.T.O.

(2)

- VI. a) Discuss the principle of IR spectroscopy. Arrange the following compounds in order of their increasing wave number of carbonyl absorption in the infra-red spectrum, (i) Acetophenone, (ii) p-nitroacetophenone, (iii) p-aminoacetophenone.
- b) Compare the UV absorption spectrum of benzene and pyridine. The peak in UV spectrum of benzene shift slightly towards the red portion of the spectrum on changing the solvent from hexane to methanol. Account for this change. (2x5)
- VII. a) Discuss the structure of following on the basis of Crystal Field Theory
- i)  $[\text{Co}(\text{NH}_3)_6]^{3+}$
  - ii)  $[\text{CoF}_6]^{3-}$
  - iii)  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
  - iv)  $[\text{Fe}(\text{CN})_6]^{4-}$
  - v)  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$
- b) How will you account for non-existence of tetrahedral complexes with low spin configuration? (2x5)

x-x-x