



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, B.E. - Semester End Examination; May / June - 2019

Engineering Chemistry

(Common to All Branches)

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. What are Chemical fuels? How are they classified? Give one example for each. 6
- b. Describe the determination of calorific value of gaseous fuel using Bouyl's calorimeter. 7
- c. Define HCV and LCV. Evaluate the HCV and LCV of gaseous fuel using the following data : 7
 - i) Volume of gaseous fuel burnt = 0.03 m³
 - ii) Mass of water circulated = 2.2 kg
 - iii) Raise in temperature = 16.7°C
 - iv) Mass of water condensed = 0.02 kg
 - v) Specific heat of water = 4.187 kJ/kg/°C
- 2 a. Discuss the fluidized catalytic cracking of heavy oil. 6
- b. Draw and illustrate the phase diagram of two component system. 7
- c. Describe the phase diagram of one component system. 7

UNIT - II

- 3 a. Define standard electrode potential. Describe the origin of electrode potential. 6
- b. Mention the limitations of primary reference electrode. Explain the construction and working of calomel electrode. 7
- c. What is pH? Outline the determination of pH of a solution using glass electrode. 7
- 4 a. Explain the following characteristics of battery : 6
 - i) Voltage ii) % of energy efficiency iii) Capacity
- b. Outline the construction, working and application of Ni-MH battery. 7
- c. What are fuel cells? Explain the construction and working of H₂-O₂ fuel cell. 7

UNIT - III

- 5 a. Outline the electro-chemical theory of corrosion. 6
- b. What is cathodic protection? Explain the prevention of corrosion by cathodic protection. 7
- c. Describe the pitting corrosion and caustic embrittlement. 7
- 6 a. What is metal finishing? Explain the technological importance of metal finishing. 6
- b. What is electro-less plating? Discuss the electro-less plating of copper on PCB. 7
- c. Describe the galvanization and tinning. 7

UNIT - IV

- 7 a. What is Tg? Explain the significance of Tg. 6
- b. Describe the synthesis of;
- i) Poly urethane ii) Poly carbonate iii) Kevlar 7
- c. Explain the compounding of rubber. 7
- 8 a. What is adhesive? Give the synthesis and uses of Epoxy resin. 6
- b. Explain the following properties of Cement :
- i) Quality ii) Shrinkage 7
- iii) Soundness iv) Setting time
- c. Define conducting polymer. Outline synthesis and uses of poly-acetylene. 7

UNIT - V

- 9 a. Define liquid crystal. Differentiate lyotropic and thermo tropic liquid crystals. 6
- b. Explain the top-down and bottom-up approach of nano particles. 7
- c. Discuss the applications of liquid crystals in display system and thermography. 7
- 10 a. What are boiler scales? How they are formed? Explain the ill effects of boiler scales. 6
- b. Describe the purification of water for town supply. 7
- c. Define COD and BOD. Describe the determination of COD of Industrial waste water. 7

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