

**B TECH**  
**(SEM II) THEORY EXAMINATION 2018-19**  
**ENGINEERING CHEMISTRY**

**Time: 3 Hours****Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- Boiling point of water (H<sub>2</sub>O) is higher than that of Hydrogen Fluoride (HF) explain why.
  - Explain why Ethylene polymerizes but Ethane does not.
  - Explain why iron is corroded while gold does not.
  - State the significance of Triple point.
  - What is meant by calorific value of fuel?
  - What is plaster of paris? Give reaction for its preparation.
  - Natural Rubber needs vulcanization. Give reasons.
  - What is Biofuel?
  - Calculate the GCV of the following coal having the following compositions C=85%,H=8%,S=1%,N=2% and ash =4% (latent heat of water vapour =587 cal/gm)
  - Why is calgon conditioning better than phosphate conditionings?

**SECTION B**

- 2. Attempt any three of the following: 10x3=30**
- How do you prepare the following polymers  
(i) Bakelite (ii) Nylon-6 (iii) Buna-S (iv) Dacron
  - Define infrared spectroscopy? Describe the various molecular vibrations in the technique.
  - Differentiate between Higher calorific value and Lower calorific value. Calculate the mass of air required for complete combustion of 5 kg of coal containing 80 % carbon and 15% Hydrogen and rest oxygen.
  - What is optical activity? Write the possible optical isomerism in tartaric acid.
  - Drive Bragg's equation for diffraction of X-Rays crystals. The density of NaCl is 2.163 g/cc. calculate the edge of its cubic cell, assuming that four molecules of NaCl are associated per unit cell.

**SECTION C****Note: Attempt all the questions of this section. Each question is of 10 marks. 10x5=50**

- 3. Attempt any one part of the following:**
- What are the organometallic compounds? Give the preparation and applications of Grignard reagent.
  - Give the stereochemical aspect of SN<sup>1</sup> and SN<sup>2</sup> reactions with their mechanism. Explain the factors affecting their stability.
- 4. Attempt any one part of the following:**
- What are the fullerenes. discuss their properties and applications.
  - How many protons signals would you expect in the NMR spectra of the following Compound: Chlorobutane, 2- Chloropropane, Cyclohexane, N-Butanol, and Acetic acid.
- 5. Attempt any one part of the following:**
- What is crystal imperfection? Explain the one and two dimensional imperfection in solid.
  - What is Portland Cement? Give chemical reactions involved during setting and hardening of cement.
- 6. Attempt any one part of the following:**
- Explain sacrificial anodic and impressed cathodic protection method for protection of corrosion.
  - What is hardness of water? Describe zeolite process for softening of hard water.
- 7. Attempt any one part of the following:**
- What are chromophours and auxochromes? Explain electronic transitions states in UV spectroscopy
  - What are lubricants? Explain the classification and mechanism of lubrication.