

I B.Tech Regular Examinations, May/June 2006

ENGINEERING CHEMISTRY

(Common to Mechanical Engineering, Mechatronics, Production
Engineering and Automobile Engineering)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Give an account of the disadvantages of hard water.
(b) Distinguish between temporary and permanent hardness of water. [8+8]
2. Write a brief account on the following:
(a) Caustic embrittlement
(b) Priming and foaming. [16]
3. Differentiate the following with suitable examples.
(a) Galvanic series and electrochemical series.
(b) Pitting corrosion and stress corrosion. [8+8]
4. Write short note on: [16]
(a) Tinning
(b) Metal Cladding
(c) Electroplating.
5. (a) Describe the preparation, properties and engineering, uses of polyethylene.
(b) What is meant by Fabrication of plastics? Mention the different fabrication techniques. [8+8]
6. Explain the following two theories for the mechanism of the lubricants.
(a) Boundary lubrication
(b) Extreme pressure lubrication. [8+8]
7. (a) What are the functions of lubricants?
(b) Write a note on extreme pressure lubrication. [8+8]
8. (a) Explain Higher Calorific Value and Lower Calorific Value and distinguish the both.
(b) What are the characteristics of a good fuel? [8+8]

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1. What is meant by disinfection? What is its significance? Explain the different methods used for disinfection of surface waters. [16]
2. Write short notes on the following: [16]
 - (a) Carry over
 - (b) Ion-exchange process.
3. Explain how corrosion control can be brought about by the following methods.
 - (a) Modifying the environment
 - (b) Cathodic protection. [8+8]
4. Explain different types of Metallic Coatings. [16]
5. (a) What are polymers? How are they classified? Give examples.
(b) How is Bakelite manufactured? Discuss its important uses and properties. [8+8]
6. (a) Define flash and fire points.
(b) Discuss the important functions of lubricants. [16]
7. How to select lubricants for the following: [16]
 - (a) cutting tools
 - (b) I.C engines
 - (c) steam engines
 - (d) steam turbines
 - (e) Gears.
8. (a) Describe the manufacture of Gasoline by Bergius process.
(b) What is meant by knocking in I.C. engine? Explain the mechanism of knocking in chemical terms. [8+8]

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1. Write a brief account on the following:
 - (a) Treatment of water for drinking purpose.
 - (b) Determination of chlorides in water. [8+8]
2. (a) What is the chemical composition of Zeolite? How are they classified? Explain the mechanism of the treatment of hard water by zeolites.
(b) A zeolite softener was exhausted and regenerated by passing 100 litres of NaCl solution containing 585 gms per litre. Calculate the total hardness of the water sample in ppm, if the zeolite softener can soften 1000 litres of water before regeneration. [8+8]
3. Write a short account on the following:
 - (a) Pitting corrosion
 - (b) Stress corrosion. [8+8]
4. Discuss about
 - (a) Varnishes
 - (b) Lacquers. [16]
5. (a) Distinguish between addition and condensation polymerization.
(b) Explain the differences between Thermoplastics and Thermosetting Plastics.
(c) What is meant by Degree of Polymerization? [6+6+4]
6. Explain the following two theories for the mechanism of the lubricants.
 - (a) Boundary lubrication
 - (b) Extreme pressure lubrication. [8+8]
7. Describe the various types of lubrication. [16]
8. (a) Describe the manufacture of Gasoline by Bergius process.
(b) What is meant by knocking in I.C. engine? Explain the mechanism of knocking in chemical terms. [8+8]

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1. (a) What is hardness of water due to? How do you express the hardness? What are the units to express the hardness?
(b) Give an account of the disadvantages of hard water. [8+8]
2. Give a detailed account on the following: [16]
 - (a) Caustic embrittlement
 - (b) Boiler corrosion.
3. Explain the process of wet corrosion by evolution of hydrogen and absorption of oxygen. [16]
4. (a) What is Paint? What are the requisites of a good paint?
(b) Write note on metal Cladding. [8+8]
5. (a) Write a note on properties and uses of Teflon.
(b) Differentiate the Natural Polymer and synthetic polymer.
(c) Write a note on silicone rubbers. [4+6+6]
6. Explain the following two theories for the mechanism of the lubricants.
 - (a) Boundary lubrication
 - (b) Extreme pressure lubrication. [8+8]
7. Write notes on: [16]
 - (a) Blended oils
 - (b) Petroleum oils
 - (c) Extreme pressure additives
 - (d) Antioxidants.
8. (a) Describe the determination of C.V of a gaseous fuel using Boy's gas calorimeter
(b) The following data were obtained in a Boys gas calorimeter experiment.
Volume of gas used = 0.1 m^3 at STP
Weight of water heated = 26 kg
Temperature of inlet water = 26°C

Temperature of out let water = 36°c

Weight of steam condensed = 0.030 kg

Calculate the higher and lower C.V. per m^3 at STP. Take the heat liberated in Condensing water vapor and cooling the condensate as 580 kcal/kg. [8+8]
