

Code No: R05010301

**Set No. 1**

I B.Tech Supplementary Examinations, Aug/Sep 2007  
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

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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 meant by desalination? What is its significance?  
(b) Explain the different methods used for the desalination of brackish water. [4+12]
3. (a) What are electrochemical series? How are they useful in determining the rate of corrosion?  
(b) How do you differentiate electrochemical series from galvanic series? [8+8]
4. (a) What is Sheradizing? Explain and discuss its applications.  
(b) Write note colirizing and chromizing. [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. (a) Discuss solid lubricants.  
(b) Explain the mechanism of thin-film lubrication. [8+8]
8. (a) Define a Fuel? How chemical fuels are classified and give examples for each.  
(b) What is meant by Calorific value of a fuel? Define calorie and kilocalorie. [10+6]

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**Set No. 2**

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1. (a) What is hardness of water? 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. Compare the following processes.  
(a) Permutit process with lime soda process.  
(b) Phosphate conditioning with calgon conditioning. [16]
3. Explain the process of wet corrosion by evolution of hydrogen and absorption of oxygen. [16]
4. Differentiate the following with suitable examples. [16]  
(a) Paints from varnishes  
(b) Drying oils from non drying oils.
5. (a) Write the repeat unit in Bakelite, PVC and Nylon?  
(b) Mention any two important compounding ingredients of rubber.  
(c) Write a note on Silicones. [5+6+5]
6. Write a note on lubricants with special reference to their classification, mode of action, examples and applications. [16]
7. Describe the various types of lubrication. [16]
8. (a) Define a Fuel? How chemical fuels are classified and give examples for each.  
(b) What is meant by Calorific value of a fuel? Define calorie and kilocalorie. [10+6]

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1. (a) What is the cause of hardness of water? How is the hardness of water expressed?  
(b) Explain the soap titration method for the estimation of total hardness of water.  
(c) Calculate the temporary hardness of water from the following data by the soap titration method, when 100 ml of the water sample is titrated with soap solution.  
Leather factor = 0.6 ml soap solution  
Total hardness = 18.6 ml soap solution  
Permanent hardness = 6 ml of soap solution.  
Standard hardwater (400 mg/l of  $\text{CaCO}_3$ ) = 36 ml. [4+6+6]
2. (a) What is meant by desalination? What is its significance?  
(b) Explain the different methods used for the desalination of brackish water. [4+12]
3. Justify the following statements by giving suitable examples.  
(a) Electrochemical series gives a basis for the prediction of the process of corrosion.  
(b) Design and material selection help to control metallic corrosion. [8+8]
4. Explain the following terms: [16]  
(a) Drying oil  
(b) Thinners  
(c) Driers  
(d) Fillers.
5. (a) Discuss the compounding of plastics?  
(b) Explain the procedures used in the processing of Natural rubber.  
(c) Write a note on urea formaldehyde resins. [5+5+6]
6. (a) Define flash and fire points.  
(b) Discuss the important functions of lubricants. [16]
7. How to select lubricants for the following: [16]

Code No: R05010301

**Set No. 3**

- (a) cutting tools
  - (b) I.C engines
  - (c) steam engines
  - (d) steam turbines
  - (e) Gears.
8. (a) Define a Fuel? How chemical fuels are classified and give examples for each.
- (b) What is meant by Calorific value of a fuel? Define calorie and kilocalorie.

[10+6]

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1. (a) What is meant by break point chlorination? What is its significance and advantages?  
(b) Explain the sedimentation process for the treatment of municipal water. [8+8]
2. Write short notes on the following: [16]
  - (a) Carry over
  - (b) Ion-exchange process.
3. (a) What is corrosion? What are the units in which it is expressed? How is it different from erosion?  
(b) Explain the mechanism of electrochemical corrosion. [8+8]
4. Explain different types of Metallic Coatings. [16]
5. (a) How is PVC prepared and what are its uses?  
(b) Write down the differences between compression and injection moulding techniques.  
(c) How is Thiokol prepared? Mention its uses. [4+6+6]
6. Write a note on lubricants with special reference to their classification, mode of action, examples and applications. [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) Explain the recovery of by-product from 'Coke oven gas'  
(b) Give the comparison between solid, liquid and gaseous fuels. [8+8]

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