

Code No: 07A1BS07

**Set No. 1**

**I B.Tech Regular Examinations, May/June 2008**  
**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. (a) Estimation of free chlorine in water samples.  
(b) Discuss the impurities in water and their effects. [9+7]
2. (a) Describe the demineralisation of water by ion - exchange method.  
(b) Mention the disadvantages of using hard water for any two industries. [12+4]
3. (a) What is meant by differential aeration corrosion? Illustrate with suitable examples.  
(b) How is rate of corrosion influenced by
  - i. Nature of corrosion product
  - ii. Relative anodic to cathodic areas
  - iii. Temperature and moisture. [7+9]
4. (a) Discuss how the surface of a metal is prepared prior to the application of a protective coating.  
(b) Write the important applications of protective coating.  
(c) Why is moderate current density employed during electroplating? [10+4+2]
5. (a) Explain the preparation, properties and uses of Bakelite.  
(b) Describe with a neat sketch, the process of compression moulding. [10+6]
6. (a) What is pyrometric cone equivalent? How it is determined for a refractory? What is its significance?  
(b) Write a short note on:
  - i. porosity
  - ii. Thermal Conductivity
  - iii. Dimensional Stability.
  - iv. strength [8+8]
7. (a) Give the functions of lubricants.  
(b) Describe the mechanism of extreme pressure lubrication.  
(c) How a viscous lubricant is converted into grease? [6+6+4]
8. (a) Explain how fuels are classified with suitable examples.

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(b) Explain the significance of the following constituents present in coal.

- i. Moisture
- ii. Volatile matter
- iii. Ash and
- iv. Fixed carbon.

[8+8]

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1. (a) What is the principle of EDTA method? Explain the estimation of hardness of water by complexometric method.  
(b) Mention the dis-advantages of using hard water for industrial purpose. [12+4]
2. Write short notes on :
  - (a) Priming and Foaming
  - (b) Phosphate conditioning
  - (c) Caustic embrittlement. [5+6+5]
3. (a) Explain the following factors influencing the rate of corrosion.
  - i. Nature of corrosion product
  - ii. Position in electrochemical series
  - iii. pH.(b) Differentiate between dry corrosion and wet corrosion. [8+8]
4. (a) What are organic paints? Name their important constituents and their respective functions with an example?  
(b) Mention the functions of pigment and vehicle in a paint. [12+4]
5. (a) What are elastomers? Give the preparation, properties and uses of Buna S.  
(b) Describe a method for moulding of thermoplastic resin. [8+8]
6. (a) What are refractories? How important are the properties - refractoriness under load and thermal conductivity for industrial applications?  
(b) Compare acidic and basic refractories with examples. [10+6]
7. Discuss the important properties of lubricating oils which are useful for their evaluation. [16]
8. (a) Discuss the relative merits and demerits of solid, liquid and gaseous fuels.  
(b) Explain the significance of the following constituents present in coal.
  - i. Total carbon
  - ii. Hydrogen
  - iii. Nitrogen

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**Set No. 2**

- iv. Sulphur and
- v. Oxygen.

[6+10]

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1. Write a short notes on the following:
  - (a) Break - point chlorination
  - (b) Dissolved oxygen
  - (c) Hardness of water
  - (d) Sedimentation and coagulation. [4+4+4+4]
  
2. Write short notes on :
  - (a) Priming and Foaming
  - (b) Phosphate conditioning
  - (c) Caustic embrittlement. [5+6+5]
  
3. (a) What is oxidation corrosion and how does it take place? Describe the mechanism of oxidation corrosion.  
(b) Describe the various factors influencing the rate of chemical corrosion. [8+8]
  
4. (a) Describe the mechanism of drying of conjugated oils.  
(b) Name any four important drying oils.  
(c) Define the following:
  - i. Acid value of an oil
  - ii. Saponification Value
  - iii. Iodine Value. [8+2+6]
  
5. (a) Why are Silicones called inorganic polymers? Discuss the synthesis of linear chain Silicones.  
(b) Why Bakelite can't be remoulded and write its repeating unit?  
(c) Describe condensation polymerization with an example [6+4+6]
  
6. Discuss any FOUR essential properties of a good refractory in detail. [16]
  
7. Explain the various mechanisms of lubrication in detail. [16]
  
8. (a) Discuss the relative merits and demerits of solid, liquid and gaseous fuels.  
(b) Explain the significance of the following constituents present in coal.

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**Set No. 3**

- i. Total carbon
- ii. Hydrogen
- iii. Nitrogen
- iv. Sulphur and
- v. Oxygen.

[6+10]

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1. (a) Why is sterilization of water necessary? Discuss any two methods of sterilisation.  
(b) 0.5 g of  $\text{CaCO}_3$  was dissolved in dil.HCl and diluted to 1000 mL. 50 mL of this solution required 48 mL of EDTA solution for titration. 50 mL of hard water sample required 15 mL of EDTA solution for titration. 50 mL of same water sample on boiling, filtering etc, required 10 mL of EDTA solution. Calculate the different kinds of hardness in ppm. [9+7]
2. Write short notes on :
  - (a) Priming and Foaming
  - (b) Phosphate conditioning
  - (c) Caustic embrittlement. [5+6+5]
3. (a) What is oxidation corrosion and how does it take place? Describe the mechanism of oxidation corrosion.  
(b) Describe the various factors influencing the rate of chemical corrosion. [8+8]
4. (a) Describe the process of sheradizing? Mention its applications?  
(b) Distinguish between anodizing and electroplating.  
(c) Define Anodizing. [8+6+2]
5. (a) How is HDPE is prepared? Give its properties and uses?  
(b) Explain the injection moulding process with a neat diagram? Mention its advantages. [8+8]
6. (a) What is pyrometric cone equivalent? How it is determined for a refractory? What is its significance?  
(b) Write a short note on:
  - i. porosity
  - ii. Thermal Conductivity
  - iii. Dimensional Stability.
  - iv. strength [8+8]
7. (a) Give the functions of lubricants.

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**Set No. 4**

- (b) Describe the mechanism of extreme pressure lubrication.
- (c) How a viscous lubricant is converted into grease? [6+6+4]
8. (a) What do you understand by the term knocking in IC engines? Explain its relationship with chemical constituents of fuels.
- (b) A sample of coal contains 60% carbon, 33% Oxygen, 6.0% Hydrogen, 0.5% Sulphur, 0.2% Nitrogen and 0.3% Ash. Calculate GCV and NCV of coal. [8+8]

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