

Code No: R05010301

Set No. 1

I B.Tech Supplementary Examinations, Aug/Sep 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

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. Write short notes on the following: [16]
 - (a) Carry over
 - (b) Ion-exchange process.
3. (a) Give an account of the various factors which influence the rate of corrosion.
(b) Write a brief account on pilling-bedworth rule. [8+8]
4. Write note on: [16]
 - (a) Phosphate coatings
 - (b) Chemical oxide coatings
 - (c) Anodized coatings.
5. (a) Identify the thermo sets and thermoplastics among the following:
 - i. PVC.
 - ii. Polyethylene.
 - iii. Silicone.
 - iv. Polyester fibre.
 - v. Bakelite.
(b) What is bakelite? How is it manufactured and mention its uses? [5+11]
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) Describe the ultimate analysis of coal and its significance.
(b) Describe the manufacture of coke by Beahive oven method with a neat diagram. [8+8]

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Answer any FIVE Questions
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1. Write a brief account on the following:
 - (a) Alkalinity of water
 - (b) Complexometric method of estimation of hardness of water. [8+8]
2. (a) With the help of a neat diagram, explain the reverse osmosis method for desalination of brackish water.
(b) Write a brief account on boiler corrosion. [8+8]
3. Write short notes on:
 - (a) Galvanic corrosion
 - (b) Concentration cell corrosion. [8+8]
4. Explain different types of Metallic Coatings. [16]
5. (a) What are the drawbacks of raw rubber? How are its properties improved?
(b) How is Buna - S Rubber prepared? Write its uses. [8+8]
6. Write a note on lubricants with special reference to their classification, mode of action, examples and applications. [16]
7. Discuss the various types of liquid lubricants. [16]
8. A petrol sample contains 84% carbon and 16% Hydrogen by weight. Its flue gas composition by volume is $CO_2 = 12.1\%$, $CO = 1.0\%$, $Oxygen = 1.4\%$ and $N_2 = 85.5\%$. Calculate
 - (a) minimum air for complete combustion of 1.0 kg of petrol.
 - (b) Actual air supplied per kg of petrol and
 - (c) the C.V of the petrol sample. [16]

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Set No. 3

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Answer any FIVE Questions
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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. 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 to help to control metallic corrosion. [8+8]
4. Explain the following terms: [16]
 - (a) Drying oil
 - (b) Thinners
 - (c) Driers
 - (d) Fillers.
5. (a) Identify the thermo sets and thermoplastics among the following:
 - i. PVC.
 - ii. Polyethylene.
 - iii. Silicone.
 - iv. Polyester fibre.
 - v. Bakelite.
(b) What is bakelite? How is it manufactured and mention its uses? [5+11]
6. Write short notes on the following properties of lubricants.
 - (a) Pour point
 - (b) Fire point
 - (c) Neutralization number

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- (d) Emulsification. [4x4]
7. (a) What are the functions of lubricants?
(b) Write a note on extreme pressure 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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Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the different sources of water and their composition.
(b) With the help of the relevant chemical equations give an account of the effect of water on rocks and minerals. [8+8]
2. (a) Explain the method of softening of water by hot lime soda process.
(b) A sample of water contains the following dissolved impurities
 $\text{CaCO}_3 = 100$ ppm, $\text{Mg}(\text{HCO}_3)_2 = 14.6$ ppm, $\text{CaSO}_4 = 13.6$ ppm,
 $\text{MgCl}_2 = 9.5$ ppm, $\text{Al}_2(\text{SO}_4)_3 = 34.2$ ppm and silica = 9 ppm. Calculate the amount of lime and soda required for the purification of 1000 litres of water. [8+8]
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. Describe the process of dipping methods. [16]
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) 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]
