B.Tech I Year II Semester (R15) Supplementary Examinations November 2017

ENGINEERING CHEMISTRY

(Common to CE, EEE and CSE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) Name and define any two units used for expressing hardness of water.
(b) State the principle of reverse osmosis for desalination of water.
(c) How is Thiokol (polysulfide rubber) is prepared? Mention its uses.
(d) Write the repeating unit in the Bakelite and PVC.
(e) Calculate the standard electrode potential of lead electrode, if the electrode potential is -0.180 V at 301 K and a concentration of Pb^{2+} solution is 0.0096 M.
(f) Explain the working principle of methanol – oxygen fuel cell.
(g) Distinguish between Octane number and Cetane number.
(h) Write the equation for the determination of calorific value of a liquid fuel by Junker's calorimeter.
(i) Give a flow chart of cement manufacturing process.
(j) What are the characteristics of a good solid lubricant?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Explain in detail the determination of total hardness of water by EDTA method.

OR

3 With a neat diagram, explain the ion-exchange process for the purification of water. Discuss the merits and demerits of this process.

UNIT – II

4 Give methods of preparation and important uses of the following synthetic rubbers:
(a) Buna-S.
(b) Polyurethane.

OR

5 (a) What are conducting polymers? How they are classified
(b) Explain the mechanism of conduction in polyacetylene.

UNIT – III

6 With a neat sketch, explain the construction and working principle of hydrogen – oxygen fuel cells. Give the half-cell reactions and advantages of these cells.

OR

7 Explain corrosion control by anodic protection technique.

UNIT – IV

8 How is coke manufactured by Otto–Hoffmann method? Discuss the various byproducts formed during the process.

OR

9 On burning 0.83 g of a solid fuel in a bomb calorimeter, the temperature of 3500 g water is increased from 25.5°C to 29.2°C water equivalent of calorimeter is 385 g and latent heat of steam is 587 cal/g. Calculate the gross and net calorific values of fuel if percentage of hydrogen in fuel is 0.7%.

UNIT – V

10 Describe the important properties and applications of refractories.

OR

11 With appropriate examples, describe various types of lubricants

*****