Code: 13A51101 **R13**

B.Tech I Year (R13) Supplementary Examinations June 2017

ENGINEERING CHEMISTRY

(Common to all branches)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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

(a) Explain the construction of hydrogen – oxygen fuel cell.

(b) Calculate the emf of a Daniel cell at 25℃ when the concentration of $ZnSO_4$ and $CuSO_4$ are 0.001 M and 0.1 M, respectively. The standard potential of cell is 1.2 volts.

(c) What is meant by compounding of rubber?

(d) Give the representative formula and two important applications of PVC.

(e) What is meant by octane number of a gasoline?

(f) Calculate the gross and net calorific value of coal having the following compositions. C = 85% H = 8%, S = 1%, N = 2%, ash = 4% and latent heat of steam = 587 cal/g.

(g) Explain the mechanism of setting and hardening of cement.

(h) What is a rocket propellant? Discuss briefly the requirements for the selection of a propellant.

(i) How can scale formation be prevented by Calgon conditioning?

(j) Write a short note on caustic embrittlement.

PART - B

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

UNIT - I

2 Discuss with a neat sketch, the construction and working principle of:
(i) Lead-acid battery. (ii) Methanol – oxygen fuel cell.

OR

3 (a) Explain various measures available for controlling corrosion.

(b) What is cathodic protection? Explain sacrificial anode method.

UNIT - II

4 Discuss the preparation procedure and engineering applications of Buna-S and Buna-N rubbers.

OR

5 Discuss the preparation procedure and applications of conducting polymers.

UNIT - III

6 What is power alcohol? Discuss the manufacturing process of power alcohol.

OR

7 A sample of coal have the following percentage composition $C = 75\%$, $H = 5.2\%$, $O = 12\%$, $N = 3.2\%$ and ash = 4.5%. Calculate the minimum amount of air necessary for complete combustion of 1 kg of coal.

UNIT - IV

8 (a) Discuss the principle underlying lubrication.

(b) Write a note on functions and applications of lubricants.

OR

9 What are refractories? Write a note on essential requirements of good refracting material.

UNIT - V

10 Give a detailed note on reverse osmosis and electrolysis.

OR

11 A sample of 50 mL water consumed 15 mL of 0.01 M EDTA before boiling and 5 mL of the same EDTA after boiling. Calculate the degree of total hardness, temporary hardness and permanent hardness.

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