(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 199221 Roll No. | | | | | | | | | |

B. TECH.

Theory Examination (Semester-II) 2015-16

ENGINEERING CHEMISTRY

Time : 3 Hours ***Max. Marks : 100***

Section-A

Q.1 Attempt all parts. All parts carry equal marks. Write answer of each part is Short. **(2×10=20)**

a. Boiling Point of water (H_2O) is higher than that of by dragen Fluoride (HF). Explain why.

b. Define the Symmetry elements of a crystal. Explain the lathice plane and the unit cell in sodium chloride crystals.

c. Account for the fine structure in H-NMR Spectrum of C-H protons in ethanol (CH_3 CH_2 OH).

d. Natural Rubber needs wuleanizations. Give Reasons.

What is meant by calorific value of a fuel?

Write short note on biomass.

Section-B

Q.2 Attempt any five parts from the following (10×5=50)

a. The density of Nacl is 2.163 g/cc. Calculate the edge of its cubie cell, assuming that four molecules of Nacl are associated per unit cell.

Calculate the mass of air needed for complete combustion of 5.0 kg of coal containing 80% carbon 15% hydrogen and rest oxygen.

c. Explain the corrosion phenomenou involving oxide film growth law.

g. (i) S_N^1 lead by racemic mixture. Where as S_N^2 gives rise to inverted product.

(ii) Optical isomerism of lactic acid.

h. Define infrared spectroscopy? Describe the various molecular vibrations in the technique.

Section-C

Q.3 Attempt any two questions from this section (15×2=30)

(a) What are the fullerenes? Discuss their properties and uses.

(b) Calculate the bond order of N_2^-, CO, NO, and O_2^+.

Q.4 (a) How is the calorific value of a solid fuel determine using bomb calorimetes experiments?

(b) Why is it conventional of express hardness of water in terms of $CaCo_3$ at the international level? Write other units also.

5. (a) What are corrosion unhibitor? Explain with examples how anodic and cathodic inhibitor provide protection against corrosion.

(b) Sample of coal contains C=93%, H=6% and ash=1%. The following data was obtained when the above coal was tested in bomb calorimeter.

(i) Wt. of coal burnt=0.92 g

(ii) Wt of water taken=2200g.

(iii) Water equivalent of bomb calorimetes=550g

(iv) Rise in temperature=2.42°C

(v) Fuse wire correction = 10.0 cal

(vi) Acid correction = 50.0 cal.

Calculate gross and net calorific value of the coal, assuming the latent heat of condensation of steam as 580 cal/g.

(c) Explain Zeolite process of water softering.