Enrol. No. _____

END SEMESTER EXAMINATION: DECEMBER, 2014

CHEM01 **APPLIED CHEMISTRY**

[ETD]

Time: 3 Hrs Max Marks: 70

Note: Attempt questions from all sections as directed.

Section - A ***: Attempt any five questions. Each question carries 06 marks.*** **[30 Marks]**

Q1. a) Discuss the ion – exchange method for water softening. [4]

b) Compare its merits with Zeolite method. [2]

Q2, a) Define and give characteristics of a good fuel.

b) Discuss the relative merits and demerits of solid, liquid and gaseous fuel.

Q3. a) What is Beer – Lambert's law in UV – V is spectroscopy? [2]

b) A compound having concentration of 10^{-3} g/l resulted absorbance value 0.20 at λ_{max} 510 nm using 1.0 cm cell. Calculate its absorptivity and molal absorptivity values. Molecular weight of compound is 400. Calculate absorbance if % T = 80.3. [4]

Q4. Define corrosion. Give mechanism of electrochemical corrosion by evolution of H_2. [2,4]

Q5. Write short notes on any two of the following:-

a) Shielding and Desheilding

b) Proximate analysis

c) Waterline corrosion.

Q6. What are lubricants? Give type and explain any one mechanism of lubrications. [2,4]

Section – B **: *Attempt any two questions. Each question carries 10 marks.*** **[20 Marks]**

Q7. a) Discuss boiler problems. How are they caused? Write one internal method to prevent scales formation. [6]

b) How many NMR signal do you expect in the following compounds? Indicate also the splitting pattern of the various signals. [4]

i) CH_3CH_2OH

ii) CH_3OCH_3

Q8. a) What is meant by Gross and Net calorific values for a fuel? Describe with a neat diagram. How it is determined by Bomb Calorimeter. [6]

b) Briefly describe the estimation of hardness of water by EDTA method. Calculate temporary hardness and total hardness of sample of water containing. [4]

$Mg(HCO_3)_2 = 7.3$ Mg/ L

$Ca(HCO_3)_2 = 16.2$ Mg/ L

$MgCl_2 = 9.5$ Mg/L

$CaSO_4 = 13.6$ Mg/L

Q9. (a) Define and give significance of the following:- [4]

i) Cloud and pour points
ii) Flash and fire point

(b) Give the principle of IR spectroscopy. Describe the various molecular vibrations in the technique. [6]

Section - C : ***Compulsory question*** **[20 Marks]**

Q10. a) Explain Cathodic protection for prevention of corrosion. [6]

b) A sample of coal contains C = 93%, H = 6% and ash = 1%. The following data were obtained when then above coal was tested in bomb calorimeter: [4]

i) Wt. of coal burnt = 0.92 gm
ii) Wt. of water = 2200 gm
iii) Water equivalent of bomb calorimeter = 550 gm
iv) Rise in Temperature = 2.42°C
v) Fuse wire connection = 10.0 Cal
vi) Acid Correction = 50.1 Cal

Calculate the gross and net calorific values of the coals, assuming the latent heat of condensation of heat as 580 Cal/gm.

c) What are the absorption spectra? Explain the electronic transition caused by energy observed in the U. V. region? Discuss the absorption and Intensity shifts. [10]