

ANNA UNIVERSITY - 2007
B.E/B.TECH II SEMESTER DEGREE EXAMINATION
APPLIED CHEMISTRY
(MARINE ENGINEERING)

TIME-3HOUR
MARK-100

ANSWER ALL QUESTIONS

PART A (10 X 2 = 20)

1. How is LPG obtained?
2. What is meant by calorific value of a fuel?
3. Define single electrode potential.
4. What is meant by differential aeration corrosion?
5. Calculate the mass of air needed for the complete combustion of 1 kg of carbon.
6. What is leaded petrol?
7. What is a paint? What are the different constituents of a paint?
8. Write a short note on vitreous coating.
9. What are explosives? Give examples.
10. What is the degree of freedom for the system containing the mixture of and in any proportion.

PART B (5 X 16 = 80)

11. (i) Describe an experiment to determine the EMF of a cell.

(ii) Calculate the EMF of a Daniel cell at 25° C, when the concentration of and are 0.001 M and 0.1 M respectively. The standard potential of the cell is 1.1 volts.

(iii) Write an account on Galvanic series.
12. (a) (i) Describe in detail catalytic cracking of petroleum and Fisher-Tropsch method.

(ii) How is water gas produced?

Or

(b) (i) Describe proximate analysis of coal and point out the significance.

(ii) A sample of fuel was found to have the following percentage composition :
C = 75%; H = 5.2%, O = 12.1%, N = 3.2% and ash = 4.5% Calculate the GCV and NCV of the sample.
13. (a) (i) Explain the Orsat method of flue gas analysis.

(ii) The percentage composition of a sample of bituminous coal by weight was found to be : C = 76%, H = 5.25%, O = 12.8%, N = 2.7%, S = 1.2% and ash = 2.1%. Calculate the minimum

(1) weight

- (2) volume at NTP of air necessary for complete combustion of 1 kg of coal and
(3) percentage composition by weight of dry products.

Or

(b) (i) Write notes on : spontaneous ignition temperature and explosive range.

(ii) A gaseous fuel has the following composition by volume = 22%, CH₄ = 4%, CO = 20%, = 6%, = 45%. If 40% excess of air is used, find the weight of air actually supplied per m³ of the gas.

(iii) The coal has the following on analysis : C = 54%, H = 6.5%, O = 3%, moisture = 17.3% and remaining is ash. This coal on combustion with excess air gave 21.5 kg of dry flue gases per kg of coal burnt. Calculate the percentage of excess air used for combustion.

14. (a) (i) Explain the following terms with suitable examples : Degrees of freedom, Triple point Eutectic point and Metastable equilibrium.

(ii) Discuss salient features of the phase diagram of lead-silver system.

Or

(b) (i) Discuss the application of phase rule to sulphur system.

(ii) Write short note on Smoke bomb and Rocket flares.

15. (a) Explain the processes and practical uses of

(i) Hot dipping

(ii) Metal Cladding.

(iii) Electroplating and

(iv) Anodizing.

Or

(b) Write short notes on :

(i) Varnishes.

(ii) Lacquers.

(iii) Epoxy resin coatings.

(iv) Marine paints.