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[4756]-22

F.E. (Second Semester) EXAMINATION, 2015

APPLIED SCIENCE-II

(Chemistry)

(2008 Pattern)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Solve Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Assume suitable data, if necessary.

1. (a) Define Gross Calorific Value (GCV) and explain Boy's Calorimeter method for determination of GCV. [7]

(b) Explain refining of crude petroleum by fractional distillation method and give composition, boiling range, CV and uses of any *three* fractions obtained. [6]

(c) 1.96 gm coal was analysed by Kjeldahl's method and liberated ammonia was passed in 50 ml 0.1 N H_2SO_4 . Unreacted acid required 8.4 ml 0.1 N NaOH for neutralisation, calculate percentage of Nitrogen.

2.8 gm of coal sample when analysed by Eschka method gave 0.190 gm $BaSO_4$ precipitate. Calculate percentage of sulphur. [4]

P.T.O.

Or

2. (a) What is Biodiesel ? Give its synthesis, merits and demerits. [7]
- (b) Define carbonisation of coal and differentiate between low temperature and high temperature carbonisation. [6]
- (c) A gaseous fuel has the following composition by volume :
- $H_2 = 20\%$, $CH_4 = 8\%$, $CO = 24\%$, $CO_2 = 4.5\%$, $O_2 = 4\%$ and $N_2 = 39.5\%$.
- Calculate volume of air required for combustion of 1 m^3 of gaseous fuel. [4]
3. (a) Define atmospheric corrosion and explain mechanism of atmospheric corrosion due to oxygen. [6]
- (b) Define electroplating and explain its process and applications. [6]
- (c) Differentiate between e.m.f. series and galvanic series. [4]

Or

4. (a) Give Pilling-Bedworth rule and explain nature of oxide films. [6]
- (b) Explain cathodic protection method with sacrificial anode and impressed current method. [6]
- (c) Explain any *one* method of hot dipping of metallic coating. [4]

5. (a) Define priming and foaming. Explain their causes, prevention and disadvantages. [7]
- (b) Explain curves, points and regions of water system with the help of phase diagram. [6]
- (c) Give the types of alkalinities in water and explain method for alkalinity determination. [4]

Or

6. (a) State Gibbs' phase rule and its equation. Explain terms involved in it with suitable example. [7]
- (b) Define hardness of water and explain phosphate conditioning and calgon conditioning for water softening. [6]
- (c) An exhausted zeolite softener was regenerated by passing 64 lit of 14% NaCl solution. How many litres of hard water having hardness 350 ppm can be soften by this softener ? [4]