May - June - 2012

[4161] – 108

Seat No.	

F.E. (Semester – II) Examination, 2012
APPLIED SCIENCE – II (Chemistry)
(2008 Pattern)

Time : 2 Hours Max. Marks : 50

Instructions *:1)* ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
2) Black figures to the ***right*** *indicate* ***full*** *marks.*

1. a) Draw neat labelled diagram and give the construction, working of Bomb calorimeter to determine G.V.C. of a fuel. State the formula with corrections to calculate GVC. 7

   b) What is the composition of natural gas ? Give its properties and uses. How is hydrogen gas produced by steam reforming process ? Give reactions involved . 7

   c) A gas has following composition by volume.
   $H_2 = 20\%$, $CH_4 = 6\%$, $CO = 22\%$, $CO_2 = 4\%$, $O_2 = 4\%$, $N_2 = 44\%$.
   Find the volume of air if 5% excess is supplied per m^3 of this gas. 4

   OR

2. a) What are rocket propellants ? Explain the working of rocket propellant. Give its types with example of each. 7

   b) What do you understand by knocking of IC engine ? Define octane number and explain the effect of chemical structure of fuel on knocking characteristics of petrol. 7

   c) 0.5 gm of a coal sample on burning in a combustion chamber in the current of pure oxygen was found to increase weight of 'U' tube with anhydrous $CaCl_2$ by 0.145 gm and of KOH 'U' tube by 0.90 gm. Find 'C' and 'H' percentage in coal. 4

P.T.O.

3. a) Explain hydrogen evolution mechanism and oxygen absorption mechanism of wet corrosion. 6

   b) Describe cathodic protection method to prevent corrosion. 6

   c) When coating is ruptured, iron is protected in galvanized sheet but not in tin coated sheet ? Explain why ? 4

   OR

4. a) Define corrosion and explain dry corrosion due to oxygen. Explain with examples how nature of oxide film affects corrosion. 6

   b) Discuss the factors affecting the rate of corrosion based on nature of metal. 6

   c) What is blacodizing ? Give its advantages and applications. 4

5. a) Explain causes, disadvantages and prevention of 6
      i) Priming and foaming in boilers.
      ii) Caustic embrittlement in boilers.

   b) State Gibb's phase rule ? Define the terms involved in it. Explain with example. 6

   c) 50 ml of an alkaline water sample requires 5.2 ml of N/50 HCl up to phenolphthalein end point and 15.4 ml for complete neutralisation. Find the type and amount of alkalinity in the water sample. 4

   OR

6. a) Draw phase diagram for water system and explain with respect to areas, curves and triple point. 6

   b) Explain EDTA method of determining total hardness of water sample. Draw metal EDTA complex and give chemical reactions involved. 6

   c) A zeolite bed exhausted by softening 4000 liters of water requires 10 liters of 15% NaCl solution for regeneration. Calculate the hardness of water sample. 4
