May - June 2011

[3961] – 108

F.E. (Semester – II) Examination, 2011
APPLIED SCIENCE – II (Chemistry)
(2008 Pattern)

Time : 2 Hours | Max. Marks : 50

Instructions: *1) Answers **3** questions*
*2) Black figures to the **right** indicate **full** marks.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) **Use** of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is **allowed**.*

1. A) What are rocket propellants ? Give different types with example. Explain cetane number of fuel. **7**

   B) Explain the principle and method for determining Calorific value of solid, liquid fuels. **6**

   C) Find the % of C and H in coal sample from the following data- 0.20 gm of coal on burning in a combustion tube in presence of pure oxygen was found to increase in the weight of $CaCl_2$ tube by 0.08 gm and KOH tube by 0.12 gm. **4**

   OR

2. A) Explain merits and demerits of power alcohol.
   Explain octane number of fuel. **7**

   B) Explain production, properties and storage and transportation of H_2 gas. **6**

   C) 2.4 gm of coal sample was weighed in silica crucible. After heating for one hour at 110°C, the residue weighed as 2.25 gm. The crucible was then covered with a vented lid and strongly heated for exactly 7 minutes at 950°C. The residue weighed as 1.42 gm. The crucible was further heated without lid until a constant weight was obtained. The last residue was found to be 0.22 gm. Calculate the % results of the above analysis. **4**

3. A) What is Electrochemical Corrosion ? Explain the mechanism of it. **7**

B) Discuss the various factors affecting corrosion. **6**

C) Explain Cathodic protection method for corrosion. **4**

OR

4. A) Explain the mechanism of corrosion due to oxygen with respect to Na, Mg, Au, Cr, and Mo metals and state Pilling -Bedworth rule. **7**

B) Give different types of surface conversion coatings. **6**

C) Explain concentration cell corrosion. **4**

5. A) What are the scales and sludges ? Give their formation, disadvantages and preventive measures in boiler. **6**

B) i) Find the hardness of water sample from the given data - A zeolite bed gets exhausted on softening 2400 lit. of water and requires 10 lit. of 8% NaCl for regeneration.

ii) 100 ml of water sample requires 4.3 ml of 0.02 N HCl upto phenolphthalein end point and total 11.9 ml upto methyl orange end point. Calculate the type and amount of alkalinity present. **6**

C) In water system, name the phases in equilibrium at the following conditions :

i) – 273°C

ii) 0.0075°C and 4.58 mm pressure

iii) 374°C and 218.5 atm pressure.

iv) 0°C and 1 atm pressure. **4**

OR

6. A) State Gibbs phase rule. Explain the terms involved in it with suitable examples. What are the limitations of Gibbs phase rule. **6**

B) i) 50 ml of standard hard water containing 1 mg of pure $CaCO_3$ per ml consumed 20 ml of EDTA.

50 ml of water sample consumed 25 ml of same EDTA solution using EBT indicator. Calculate total hardness of water.

ii) Calculate the amount of cT ions in water sample, when 100 ml of sample requires 12.2 ml of 0.02 M $AgNO_3$ solution to get the end point in Mohr's method.

Express the answer in terms of $CaCO_3$. **6**

C) Explain phosphate conditioning. of water. **4**
