FE. (SEM. II) (CBGS) NOV - DEC 2013
Applied chemistry - II
02/12/13

VT-S.H.Exam. Oct(I).-13- 20

Con. 5731–13. **(REVISED COURSE)** **GX–10141**

(2 Hours) **[Total Marks : 60**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from remaining **five** questions.
(3) **All** questions carry **equal** marks.
(4) **Atomic Weights :** H = 1, C = 12, N = 14, O = 16, S = 32, Cl = 35·5, Ba = 137·3.

1. Answer any **five** of the following :– **15**
   (a) Define Octane number of gasoline, Name any two anti-knock agents.
   (b) Why is galvanization of iron articles preferred to tinning ?
   (c) Give composition, properties and uses of Wood's metal.
   (d) Explain 'prevention of waste' principle in Green Chemistry.
   (e) Define 'matrix phase' of composite material. State functions of matrix phase.
   (f) State characteristics of a good paint.
   (g) A coal sample was subjected to ultimate analysis. 1·5g of coal on combustion in a Bomb calorimeter gave 0·42g of $BaSO_4$. Calculate percentage sulphur in the coal sample.

2. (a) How do the following factors affect the rate of corrosion ? **6**
      (i) Retative areas of anodic and cathodic parts.
      (ii) Passive character of metal.
      (iii) pH of medium.
   (b) What is Biodiesel ? Give 'Trans-estinfication reaction in preparation of Biodiesel from vegetable oils. What are the advantages of Biodiesel ? **5**
   (c) Calculate percentage atom economy for the following reaction with respect to acetophenone :– **4**

$$\underset{\text{benzene}}{C_6H_6} + CH_3COCl \xrightarrow{AlCl_3} \underset{\text{acetophenone}}{C_6H_5COCH_3} + HCl$$

3. (a) A gaseous fuel has the following composition by volume :– **6**
   H_2 = 50%, CO = 10%, CH_4 = 30%, C_2H_4 = 5%, N_2 = 1%, O_2 = 2% and CO_2 = 2%.
   Calculate volume and weight of air required for complete combustion of 1 m^3 of fuel. (Mol. wt. of air = 28·949).
   (b) Explain conventional and green chemistry route of production of adipic acid. Highlight the green chemistry principle involved. **5**
   (c) Discuss differential aeration corrosion with the help of a suitable example. **4**

[TURN OVER

4. (a) What are alloy steels ? Explain special effects of the following metals on properties of alloy steels :– **6**
   (i) Chromium
   (ii) Nickel
   (iii) Cobalt
   (iv) Tungsten.

   (b) What is the principle of cathodic protection method of corrosion control ? Discuss any *one* method of corrosion control by cathodic protection. **5**

   (c) Write a note on 'sandwich panel' type layered composites. **4**

5. (a) What is cracking ? With a schematic diagram, explain any *one* method of catalytic cracking. **6**

   (b) What is powder metallurgy ? How are metal powders prepared ? **5**

   (c) Discuss the influence of *any two* physical factors on adhesive action. **4**

6. (a) What is 'oxidation corrosion' ? Discuss the role of nature of oxide formed in oxidation corrosion. **5**

   (b) A sample of coal has the following composition by weight :– **5**
   C = 82%, H = 6%, O = 8%, S = 0·5%, N = 3% and Ash = 0·5%. Calculate the Gross and Net Calorific value using Dulong's formula.

   (c) What is an alloy ? Explain any four purposes of alloying with suitable examples. **5**

****