F.E. (REV) (CBSGS), Sem-II

Sub:- Applied chemistry-II

(REVISED COURSE) **Q.P. Code : 1049**

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

N.B. : (1) Question **No. 1** is **Compulsory.**
(2) Attempt any **three** from remaining fix questions
(3) All **questions** carry **equal** marks.
(4) Figures to the right indicate full marks.
(5) Atomic weights : H=1, C=12, S=32, N=14, O=16 ,Cl=35.5, Ba=137.3, Na=23, Mg=24.

1. Answer any **five** from the following :- **15**
   (a) What are propellants ? State importants characteristics of good propellant.
   (b) Compare Galvanizing and Tinning.
   (c) Give composition, properties and uses of Wood's Metal.
   (d) Write a note on 'Green Reagent'.
   (e) Define terms :-
   (i) Composite material (ii) Matrix phase (iii) Dispersed phase.
   (f) List three main constituents of Varnish & give functions of each.
   (g) A coal sample was subjected to ultimate analysis :
   1.6 gm of coal on combustin in a Bomb calorimeter gave 0.47 gm of $BaSO_4$
   Calculate % of sulphur in the coal sample.

2. (a) What is dry corrosion ? Explain with example how nature of oxidised product affect the rate of corrosion. **6**
   (b) What is cracking ? Explain fixed bed catalytic cracking with diagram. **5**
   (c) Calculate percentage atom economy for the following reaction w.r. to methy iso-cyanate **4**

$$CH_3NH_2 + COCl_2 \rightarrow CH_3\text{-}N{=}C{=}O + 2HCl$$

methyl iso cyanate.

3. (a) A gaseaus fuel has the following composition by volume. **6**
   $CH_4 = 35\%$, $C_2H_4 = 5\%$, $CO = 15\%$, $H_2 = 40\%$ $N_2 = 1$ water vapour $= 4\%$
   Calculate volume & weight of air required for complete combustin of $1m^3$ of fuel [mol.wt of air = 28.94]
   (b) Explain conventional & green synthesis of adipic acid. Mention the green chemistry principle involved. **5**
   (c) How the rate of corrosion influenced by following factors. **4**
   (i) PH of medium (ii) Over voltage.

4. (a) What is powder Metallurgy ? How are metal powders prepared using. **6**
   (i) Atomization (ii) Chemical reduction
   (b) What is cathodic protection ? Explain Impressed current method of corrosion control. **5**

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(c) Write a note on 'Sandwitch panel' type layered composites.

5. (a) What is Bio-diesel ? Explain the trans esterification method for production of bio-diesel. Mention advantages of biodiesel as fuel.
   (b) What are alloys ? Explain any four purposes of adding alloying elements in steel.
   (c) Discuss the physical factors influencing adhesive action.

6. (a) Write a note on differential aeration corrosion.
   (b) 2.5 gm of air dried coal sample was taken in a silica crucible and kept in an electric oven at 110°C for 1hr the residue was weighed and it was 2.4 gm. It was heated in Silica crucible covered with vented lid at a temperature of 950°C for exactly 7 minutes. After cooling the weight of residue was found to be 2.25 gm. The residue was then ignited to a constant weight of 0.2 gm. Find the results of above analysis.
   (c) Explain the effects of following elements on alloying steel.
      (i) Nickel
      (ii) Chromium
      (iii) Cobalt
      (iv) Molybdenum
      (v) Carbon.