(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 BaSO4
       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
       $$CH_3NH_2 + COCl_2 \rightarrow CH_3-N=C=O + 2HCl$$
       methyl iso cyanate.
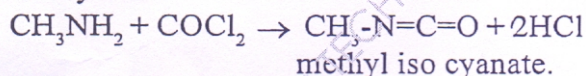
3. (a) A gaseaus fuel has the following composition by volume.   6
       $CH_4 = 35\%$, $C_2H_4 = 5\%$, $CO = 15\%$, $H_2 = 40\%$ $N_2 = 1$ water vapour $=4\%$
       Calculate volume & weight of air required for complete combustin of $1m^3$ of fuel
       [mol.wt of air $= 28.94$]
   (b) Explain conventional & 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.   4

5. (a) What is Bio-diesel ? Explain the trans esterification method for its synthesis. 6
        Mention advantages of biodiesel as fuel.
   (b) What are alloys ? Explain any four purposes of making alloys with suitable example 5
   (c) Discuss the physical factors influencing adhesive action.   4

6. (a) Write a note on differential aeration corrosion.   5
   (b) 2.5 gm of air dried coal sample was taken in a silica crucible , after heating it in an 5
        electric oven at 110^0 C for 1hr the residue was weighed 2.41 gm. The residue was
        heated in Silica crucible covered with vented lid at a temperature 925 ± 25^0 C for
        exactly 7 minutes. After cooling the weight of residue was found to contain 1.98
        gm. The residue was then ignited to a constant weight of 0.246 gm. Report the
        results of above analysis.
   (c) Explain the effects of following elements on alloying :-   5
        (i)   Nickel
        (ii)   Chromium
        (iii) Cobalt
        (iv)   Molybdenum
        (v)   Carbon.