F. E. (All Branches) (CBCGS) (Sem-II)

[Time: 2 Hours]   [Marks:60]

Please check whether you have got the right question paper.

N.B: 1. **Question No.1. is compulsory.**
        2. Attempt **any three** questions out of remaining five.
        3. Figure to the right indicates full marks.
        4. Atomic weights C=12.S=32.N=14,H=1,O=16,Cl=35.5.

1   Answer **any five** from the following   15
  (a)   Write a reaction for preparation of Biodiesel and explain why is it considered
        as green fuel?
  (b)   Write any one function of binder, pigments and lubricants in paints?
  (c)   Calculate Gross calorific value of a coal sample having composition C = 75%,
        O = 8%, H= 10%, S = 1% and remaining being ash.
  (d)   Write the composition, properties and uses of Gun metal.
  (e)   List any six principles of green chemistry.
  (f)   Define and classify composite materials.
  (g)   Distinguish between anodic coating and cathodic coating.

2 (a) Define corrosion. Explain the mechanism of wet corrosion with respect to   6
        acidic medium.
   (b) i) 0.3 g of coal sample on combustion gave 0.03 g of barium sulphate   3
           precipitate. Calculate the percentage of Sulphur in the sample.
        ii) Write industrial applications of supercritical CO_2.   2
   (c) What are the characteristics of composite materials?   4

3 (a) What is cracking? With the help of diagram explain moving bed catalytic   6
        cracking.
   (b) i) What is shape memory alloys? Write its two applications?   3
        ii) Explain in brief effect of pH on rate of corrosion.   2
   (c) Calculate the percentage atom economy of the following reaction with respect   4
        to the product Ethyl benzene

                              $AlCl_3$
        $C6H6$ + $C2H5Cl$ ----------------> $C6H5C2H5$ + HCl
                                               Ethylbenzene

4 (a) How do the following factors affect the rate of corrosion?   6
        i) Purity of metal,
        ii) Relative Catholic and anodic area,
        iii) Position of metal in electrochemical series
   (b) i) Explain how catalysts help in making the reaction green?   3
        ii) Define matrix phase and dispersed phase   2
   (c) Write applications of powder metallurgy.   4

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5 (a) Calculate weight and volume of air required for complete combustion of 10 kg of coal sample having following composition, C =80%, H =10%, O=5%, S =2%, N =2% and remaining ash. (M.W.of air =28.949)   6

  (b) i) Draw a neat labelled diagram for electrochemical corrosion in neutral medium   3

     ii) What are the applications of fuel cell?   2

  (c) Write conventional and green route for synthesis of Adipic Acid and explain the principle of green chemistry involved in it.   4

6 (a) What is compacting in powder metallurgy? Explain powder injection moulding method with the help of a neat diagram.   6

  (b) i) Write a short note on sandwich panel composites.   3

     ii) Explain the effect of Aluminium oxide film on rate of corrosion.   2

  (c) Explain any four characteristics of good fuel.   4

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