Con. 6875–13. **(OLD COURSE)** **LJ–10200**

(2 Hours) **[Total Marks : 75**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from remaining **six** questions.
(3) **All** questions carry **equal** marks.
(4) Atomic wts : H = 1, C = 12, N = 14, O = 16, Na = 23, Mg = 24, S = 32, Cl = 35·5, Ca = 40.

1. Solve any **five** from the following :— **15**
   (a) What is galvanic corrosion ?
   (b) Write a note on mining of crude petroleum.
   (c) What are the applications of Composite materials.
   (d) List any six principles of green chemistry.
   (e) Explain the carbon membranes.
   (f) Give the composition, properties and uses of Duralumin.
   (g) By Kjeldahl's method, 1·5 g of coal sample was analysed. The ammonia evolved was absorbed in 50 ml of 0·1 N H_2SO_4. After absorption, the excess H_2SO_4 required 35 ml of 0·1 N NaOH for neutralisation. Calculate the percentage of nitrogen.

2. (a) 2·5 g of air dried coal sample was taken in a silica crucible. After heating it in an electric oven at 105-110°C for 1 hr, the residue weighed 2·410 g. The residue was heated in a silica crucible covered with a vented lid at a temperature of $950 \pm 20°$ for exactly 7 min. After cooling the weight of residue was found to be 1·78 g. The residue was then ignited at 700-750°C to a constant weight of 0·2469 g. Calculate the percentage of fixed carbon in the sample. **6**
   (b) Define corrosion. Explain the effect of the following factors on the rate of corrosion. **5**
      (i) Position of metal in Galvanic series.
      (ii) Relative area of the anodic and cathodic part.
   (c) What is compacting ? Explain the powder injection moulding method. **4**

3. (a) Write notes on (any **two**) :— **6**
      (i) Indergranular corrosion
      (ii) Stress corrosion
      (iii) Metal cladding.
   (b) What is bio-diesel ? Explain the 'trans-esterification' method used for its production. Give its advantages. **5**
   (c) What is powder metallurgy ? How are metal powders prepared ? (any 3 methods). **4**

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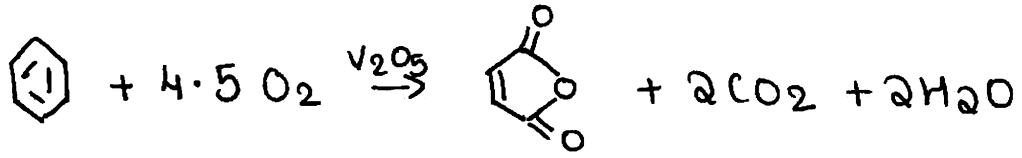
4. (a) Calculate the weight and volume of air required for complete combustion of 5kg coal with the following compositions : C = 85%, H = 10%, O = 5%. **6**
   (b) Define composite materials. Write a note on fibre reinforced composites. **5**
   (c) Calculate the percentage economy for the following reaction. Synthesis of Maleic Anhydride by oxidation of benzene :— **4**



5. (a) Define Catalyst. What are the types of Catalyst ? Discuss the characteristics of an ideal catalyst (any three). **6**
   (b) Define paints. Disucss the functions and examples of the constituents of paints (any two). **5**
   (c) Write a note on non-oxide powder, Silicon Carbide. **4**

6. (a) Give the conventional ? Green chemistry route for production of Adipic acid. Highlight the green chemistry principle addresed in this case. **6**
   (b) What is Catalysis ? Give the various types with appropriate examples. **5**
   (c) What is cathodic Prodection ? Discuss the sacrificial anodic protection method. **4**

7. (a) Explain the adsorption theory of heterogenous catalysis. **6**
   (b) Define cracking. What are the types of cracking methods used ? Differentiate between the tuib. **5**
   (c) Write a note on structural composites. **4**
