

Time:1 1/2hour

Maximum marks :45

NB:

- 1) Question No.1 is Compulsory
- 2) Attempt any two questions from the remaining four questions
- 3) Draw neat diagrams and write chemical equations wherever necessary.
- 4) Figures to the right indicate full marks.

- Q. 1 Attempt any **five** of the following: (15)
- a) What are advantages of gaseous fuels over solid and liquid fuels?
 - b) Distinguish between galvanizing and tinning.
 - c) Why are alloys preferred over pure metals in many applications?
 - d) Explain viscoelasticity property of polymer.
 - e) Define Matrix phase and dispersed phase of composites.
 - f) What is supercritical CO₂, and how does it differ from liquid and gaseous CO₂.
 - g) 1 gm. of coal sample was used for determination of nitrogen. The ammonia evolved was passed into 50ml of 0.1 N H₂SO₄, the excess acid required 42 ml. of 0.1N NaOH for neutralization Calculate % of N.
- Q.2 a) How do following factors affects the rate of corrosion i) P^H medium ii) Purity of metal iii) Area of anode and cathode. (6)
- b) Explain the determination of sulphur present in coal sample and write its significance. (5)
- c) Write an informative note on biodiesel. (4)
- Q.3 a) In a polymer sample 30% molecules have a molecular mass 20,000, 40% have molecular mass 30,000 and the 30% have 60,000. Calculate the weight average, number average molecular weight and polydispersity of polymer sample. (6)
- b) What is condensed phase rule equation? Write merits and limitation of phase rule. (5)
- c) Write a short note on sandwich panel of structural composite write its applications. (4)
- Q.4 a) Give the definitions and significance of following properties of polymer. Tensile strength, insulation resistance and refractive index. (6)
- b) Explain synthesis of Adipic acid by traditional and green pathway. Also write the principle of green chemistry involved in this reaction. (5)
- c) A sample of coal has the following composition C = 84 %, O = 8.4 %, H = 5.5 %, S = 1.5%, N = 0.6 %, Calculate the higher and lower calorific values of coal. (4)
- Q.5 a) How material selection and proper design of equipments can prevent corrosion. Explain with the help of diagram and designing principles. (6)
- b) Explain fiber reinforced composite and write its applications and limitations. (5)
- c) An alloy of Cd and Bi contain 25% of Cd Find the mass of eutectic in 1kg of solid Alloy, if the eutectic contains 40 % of Cd. (4)
