



Applied Chemistry 2

May 19

Total marks: 80
Total time: 3 Hours

INSTRUCTIONS

- (1) Question 1 is compulsory.
- (2) Attempt any three from the remaining questions.
- (3) Draw neat diagrams wherever necessary.

- Q.1** Answer any five from the following. (15)
- a) Define octane number and write its significance [3]
 - b) What is the difference between Anodic and Cathodic Coating? [3]
 - c) Calculate Higher Calorific Value of coal sample containing C=85%, H=1%, N=1.5%, O=5%, S=0.4% and remaining being Ash. [3]
 - d) Write the composition, properties and uses of commercial brass. [3]
 - e) Explain the principle "inherently safer chemistry of accidental prevention" in green chemistry. [3]
 - f) Write the classification of composite material. [3]
 - g) What are function of pigments in paints? [3]
- Q.2 a)** Define corrosion. Explain the mechanism of wet corrosion with respect to neutral and alkaline media. [6]
- b) i)** 1.4 gm of coal sample on combustion gave 0.3 gm of barium sulphate precipitate. Calculate the percentage of Sulphur in the sample. [3]
- ii)** What are the industrial applications of super critical CO₂? [2]
What are large particle reinforced Composite material? Explain with the help of example.
- Q3 a)** What is cracking? Explain in detail fixed bed catalytic cracking. [6]
- b) i)** What are shape memory alloys? What are their applications? [3]
- ii)** How does the presence of humidity affect the rate of corrosion? [2]
- c)** Calculate the percentage atom economy of the following reaction with respect to the product allyl chloride $\text{CH}_2=\text{CH}=\text{CH}_2 + \text{C}_{12}\text{H}_{22}\text{Cl}_2 \rightarrow \text{Cl}-\text{CH}_2-\text{CH}=\text{CH}_2 + \text{HCl}$ allylchloride [4]
- Q 4 a)** What is anodic protection method of corrosion control? [6]
Explain with the help of a neat diagram.
- b) i)** What are the industrial application of the products from natural materials? [3]
- ii)** What are the functions of matrix phase of composite materials? [2]
- c)** Write a note on heat resisting steel. [4]
- Q 5 a)** A sample of coal was found to contain C=90%, O=5%, H=1%, S=0.5% and remaining being nitrogen. Calculate weight and volume of air required for complete combustion of 1kg of coal sample (M.W. of air = 29=8.949) [6]



- b) i) "The noble metals do not undergo corrosion" Justify the statement. [3]
ii) What are the applications of fuel cell? [2]
c) Explain with suitable equation, conventional and green synthesis of adipic acid. [4]
- Q 6 a)** What is powder metallurgy? Explain powder injection moulding method with the help of a neat diagram. [6]
- b) i) What are the characteristics of composite materials? [3]
ii) What are the characteristics of a paint film? [2]
c) What is biodiesel? Write the advantage of biodiesel. [4]