

[Time: 2 Hours]

[Total Marks:60]

Please check whether you have got the right question paper.

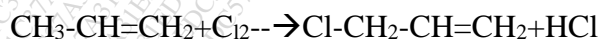
N.B: 1. Question.No.1 is compulsory.

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.

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| 1 | Answer any five from the following | 15 |
| | (a) Define octane number and write its significance. | |
| | (b) What is the difference between anodic and cathodic coatings? | |
| | (c) Calculate higher calorific value of a coal sample containing C=85%,H=1%,N=1.5%,O=5%,S=0.4% and remaining being ash. | |
| | (d) Write the composition, properties and uses of commercial brass. | |
| | (e) Explain the principle “Inherently Safer Chemistry of Accident Prevention” in green chemistry. | |
| | (f) Write the classification of composite materials. | |
| | (g) What are functions of pigments in paints? | |
| 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 CO ₂ ? | 2 |
| | (c) What are large particle reinforced composite materials? Explain with the help of examples. | 4 |
| 3 | (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 | |



Allyl Chloride

- 4 (a) What is anodic protection method of corrosion control? Explain with the help of a neat diagram . 6
- (b)i) What are the industrial applications 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
- 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 1 kg of coal sample.(M.W.of air=28.949) 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 equations ,conventional and green synthesis of adipic acid. 4
- 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 advantages of biodiesel. 4