

[Time: 2 Hrs]

[Marks: 60]

- N.B:
1. Question No.1 is compulsory
 2. All questions carry equal marks.
 3. Answer any Three questions from remaining Five questions
 4. Atomic weights: (Ca=40, Mg=24, Cl=35.5, S=32, H=1, C=12, O=16, Na=23, N=14, Al=27, Fe=56, Ba=137.3).

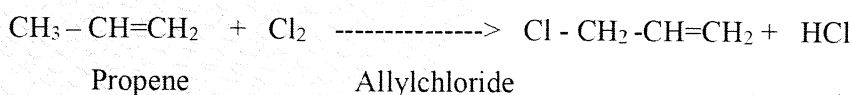
Q. 1 Answer **any FIVE** from the following (15)

- a) Define Corrosion. List the types of corrosion
- b) Define Fuel. Give the characteristics of good fuel
- c) Give composition, properties and uses of Gun Metal
- d) What are green Solvents? Give two industrial applications of green solvents.
- e) Give classification of composite material
- f) What is metal cladding? How is 'alclad' obtained?
- g) 2.55 gm. Of coal was heated in kjeldahl's flask and ammonia gas evolved was absorbed in 50 ml of 0.5 N H₂SO₄. The excess acid required 40 ml of 0.5N KOH for neutralization. Calculate the % of Nitrogen in the coal sample.

Q. 2 a) Explain the following factors affecting the rate of corrosion:- (06)

Relative areas of Anode and Cathode

- i) pH of the medium
 - ii) Over voltage
- b) Explain refining of petroleum with suitable diagram. (05)
 - c) Calculate % Atom Economy for the following reaction with respective Allylchloride. (04)



- Q. 3** a) A gaseous fuel has the following Composition by volume: H₂=10%, CH₄=16%, C₂H₆=20%, CO=22%, CO₂=16%, N₂=8%, O₂=8%. Calculate the volume of air required for complete combustion of 5m³ of this gas. (06)
- b) Explain conventional and Greener route for synthesis of Adipic acid. Highlights the green chemistry principle involved. (05)

c) Explain inter-granular corrosion with suitable diagram. (04)

Q. 4 a) What are Alloy Steel? Explain special effects of the following metals on properties of alloy steels. (06)

i) Ni ii) Co iii) Mo iv) Cr v) W

b) What is metallic coating? Distinguish between Galvanizing and Tinning (05)

c) Explain Laminar composite with suitable example (04)

Q. 5 a) What is meant by knocking in Internal combustion engine? Define Octane and Cetane Number. Name any two antiknock agents (06)

b) Write short note on following :- (05)

i) Compaction ii) Sintering

c) Define matrix phase of composite materials. State functions of matrix phase. (04)

Q. 6 a) With a suitable diagram explain electrochemical mechanism of rusting of Iron in neutral aqueous medium (05)

b) A coal sample was found to contain the following composition by weight: -- (05)
:C=81%,H=5%,S=1%,O =8%,N =1%,And Ash=4%.Calculate the minimum amount of air required for complete combustion of 2 kg of coal

c) i) Distinguish between Brass and Bronze (03)

ii) Give composition and uses of the Duralumin (02)
