

[Time: 2 Hours]

[Marks:60]

Please check whether you have got the right question paper.

- N.B:
1. Question No.1 is compulsory.
 2. All questions carry equal marks.
 3. Answer any three questions from remaining five questions.
 4. Atomicweights:(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 M]

- a) Differentiate between anodic and cathodic coatings.
- b) What is the significance of proximate analysis of coal?
- c) Give Composition, Properties and Uses of **Duralumin**.
- d) Mention any four properties of composite materials.
- e) State any six principles in green chemistry.
- f) What are the main constituents of paints?
- g) 2.5 g of the coal sample in a Bomb-calorimeter experiment gave 0.82g BaSO₄. Calculate percentage of S in the coal sample.

Q.2] a) Explain the mechanism of following types of corrosion:-

[06M]

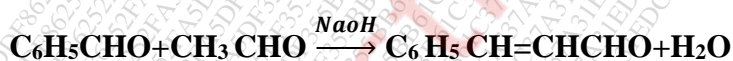
- i) Pitting corrosion
- ii) Galvanic cell corrosion

b) Write informative note on Fixed bed catalytic cracking.

[05M]

c) Calculate % Atom Economy for the following reaction

[04M]



Q.3] a) A fuel sample has the following composition: H₂=15%, CH₄=25%, C₂H₄=30%, CO=15%, CO₂=3%, and remaining nitrogen. Calculate the volume of oxygen and air required for complete combustion of 5 m³ of fuel.

[06M]

b) Explain Conventional and Greener route for synthesis of Indigo dye. Mention the green Chemistry principle involved.

[05M]

c) Discuss the following factors influencing the rate of corrosion:

- i) Nature of oxide film
- ii) Moisture

[04M]

Q.4] a) What are alloys? Explain the purpose of making alloys. [06M]

b) What is the principle of cathodic protection? Explain any one protection method. [05M]

c) Write note on 'Particle reinforced composites' [04M]

Q.5] Write informative note on Biodiesel. [06M]

b) What is powder metallurgy? Explain hot compaction method. [05M]

c) Write a note on dispersed phase of composite materials. [04M]

Q.6] a) Define corrosion. Explain the mechanism of electrochemical corrosion in acids. [05M]

b) A coal sample contains, C=70%, O=23%, H= 5%,N=0.4 and remaining Ash. Calculate the GCV and NCV of given coal sample. [05M]

c) Write a note on:- [05M]

i) powder injection moulding ii) Sintering
