



Q.P. Code :13126

[Time: Three Hours]

[Marks:80]

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. Attempt any three questions from Q.no.2. to Q. no.6.
 4. Figures to the right indicate full marks.
 5. Atomic weights : H=1, C=12, O=16, S=32, N=14, Cl=35.5

- Q.1. Answer any five of the following: 15
- a. Gold does not get corroded due to oxidation. Why?
 - b. Give the composition, properties and uses of Duralumin.
 - c. Define octane number and cetane number.
 - d. Give classification of composite materials.
 - e. List any six principles of green chemistry.
 - f. Explain the advantages of galvanizing over tinning.
 - g. A coal sample contains C=70%, O=23% H=5%, N = 0.4% Ash = 0.1% Calculate GCV and NC V of the fuel.
- Q.2. a. Explain the following factors affecting the rate of corrosion. 6
- i) Relative areas of anode and cathode
 - ii) pH of medium
 - iii) Purity of metal
- b. i) 0.5 gm of coal sample was burnt in Bomb Calorimeter experiment produced 0.06 gm of BaSO₄. 3
Calculate percentage of sulphur.
- ii) What is supercritical CO₂? Give one application of it. 2
- c. Write a note on sandwich panel type layered composites. 4
- Q.3. a. With neat and labelled diagram explain fixed bed catalytic cracking. 6
- b. i) Write a note on atomization. 3
- ii) What is pigment? Give its two functions. 2
- c. Calculate the percentage atom economy for the following reaction. 4

$$\text{CH}_3\text{NH}_2 + \text{COCl}_2 \rightarrow \text{CH}_3\text{N} = \text{C} = \text{O} + 2\text{HCl}$$
- Q.4. a. Explain with the help of diagram wet corrosion in neutral medium. 6
- b. i) Explain the green chemistry principle 'prevention of waste'. 3
- ii) Write a note on 'Matrix phase' of composite material 2
- c. Mention four drawbacks of plain carbon steel 4
- Q.5. a. Calculate weight of air needed for complete combustion of 2kg of coal containing C=70%, H=10%, O=10%, N=5% and remaining ash. 6

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- b. i) Explain the method of impressed current cathodic protection. 3
- ii) Give two purposes of alloying. 2
- c. Explain conventional and green route of manufacturing of Adipic acid. 4

Q.6. a. What is compaction in powder metallurgy? 6

Explain powder injection moulding method with suitable diagram.

- b. i) Mention the characteristic properties of composite materials. 3
- ii) Distinguish between anodic protection and cathodic protection. 2
- c. Define fuel. Give the characteristics of good fuel. 4
