



Q.P. Code :16303

[Time: Two Hours]

[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 from remaining five questions.
 3. Figures to the right indicate full mark.
 4. All questions carry equal mark.
 5. Atomic weights :- H = 1, C = 12, N = 14, O = 16, S = 32, Cl = 35.5, Ba = 137.3 Ca = 40, Mg = 24, Na = 23

- Q.1 Answer **any five** from the following:- 15
- a) Why impure metal corrodes faster than pure metal under identical conditions?
 - b) What is HCV and LCV? Mention their units.
 - c) Give composition, properties and use of Wood's metal.
 - d) Define the terms: -
 - i. Composite materials
 - ii. Matrix phase
 - iii. Dispersed phase
 - e) Explain 'Use Catalyst, not stoichiometric reagents' principle in green chemistry.
 - f) State characteristics of good paints.
 - g) 2.2 gm coal was heated in Kjeldahl's flask and ammonia gas evolved was absorbed in 45ml of N/5 H₂SO₄. The excess acid required 35ml N/5 KOH for neutralization calculate % of Nitrogen.
- Q.2 06
- a) Explain the mechanism of following types of corrosion:-
 - i. Pitting corrosion
 - ii. Galvanic corrosion.
 - b) With neat labelled diagram, explain fractional distillation of crude oil. 05
 - c) Calculate % Atom Economy for the following reaction with respect to Allylchloride. 04

$$\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{Cl}_2 \rightarrow \text{Cl} - \text{CH}_2 - \text{CH} = \text{CH}_2 + \text{HCl}$$
- Q.3 06
- a) A fuel sample has the following composition: H₂ = 50%, C₂H₂ = 20%, CO = 8%, CO₂ = 1% and rest is nitrogen. Calculate the volume of oxygen and air required for complete combustion of 5m³ of fuel. 06
 - b) Explain conventional and Greener route for synthesis of Indigo dye. Mention the green Chemistry principle involved. 05
 - c) Discuss any four factors influencing rate of corrosion. 04
- Q.4 06
- a) What are alloy steels? Explain heat and corrosion resisting steels. 06
 - b) What is the principle of cathodic protection? Explain sacrificial anodic protection method. 05
 - c) Explain Sandwich panel composites with suitable diagram. 04
- Q.5 06
- a) Write informative note on Biodiesel. 06
 - b) What is powder metallurgy? Explain any two methods for production of Metal powders. 05
 - c) Mention important applications of composite materials? 04

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- Q.6
- a) What are metal coatings? Mention the names of various methods of application of metallic coatings. 05
 - b) A coal sample contains, C = 80%, O = 3%, H = 7%, S = 3.5%, N = 2.1% and Ash = 4.4%. Calculate the GCV and NCV of given coal sample. 05
 - c) Write a note on 05
 - i. Atomization
 - ii. Sintering