

App. Chemistry — II

Q.P. Code : 5816

(2 Hours)

[Total Marks : 60]

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

(2) Attempt any three questions out of the remaining five questions.

(3) All questions carry equal marks.

(4) Figures to the right indicate full marks.

(5) Atomic weights : H = 1, C = 12, N = 14, O = 16, S = 32, Cl = 35.5

1. Answer any five of the following :-

15

- What is 'Oxidation corrosion' ? Why do gold and platinum metal not get corroded in atmospheric oxygen ?
- Give composition, properties and uses of German silver.
- What is 'cracking' of heavy oil ? Mention any four advantages of catalytic cracking over thermal cracking.
- Explain 'prevention of waste' principle in Green Chemistry.
- What are composite materials ? Mention any four characteristics of composite materials.
- What is metal cladding ? How is 'alclad' obtained ?
- 1.5g of a coal sample was burnt in a combustion apparatus and the products of combustion were collected in previously weighed KOH bulb and CaCl_2 tube. The increase in weights of KOH bulb and CaCl_2 tube were found to be 3.92g and 1.25g respectively. Calculate percentage carbon and hydrogen in the sample.

2. (a) How do the following factors affect the rate of corrosion ?

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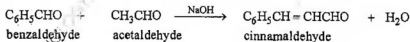
- Relative areas of anodic and cathodic parts
- Purity of metal
- pH of medium

(b) What is meant by 'Knocking' in internal combustion engine ? Define Octane number. Name any two anti-knock agents.

5

(c) Calculate percentage atom economy for the following reaction with respect to cinnamaldehyde.

4



3. (a) A gaseous fuel has the following composition by volume.

6

$\text{CO} = 46\%$	$\text{H}_2 = 30\%$	$\text{CH}_4 = 10\%$
$\text{C}_2\text{H}_4 = 4\%$	$\text{N}_2 = 1\%$	$\text{CO}_2 = 2\%$ and $\text{O}_2 = 7\%$

Calculate volume and weight of air required for complete combustion of 1m^3 of fuel (Mol. wt. of air = 28.949)

- (b) Explain conventional and greener route of production of Indigo dye. Highlight the green chemistry principle involved. 5
- (c) Explain Galvanic corrosion with the help of a suitable example and diagram. 4
4. (a) What is power metallurgy? List various steps involved in powder metallurgy. Mention the aim of each step. 6
- (b) With the help of a diagram and electrode reactions, explain mechanism of electrochemical corrosion of iron by hydrogen evolution, in acidic medium. 5
- (c) Explain 'sandwich panel' type layered structural composites, with a suitable diagram. Mention their application. 4
5. (a) With a suitable diagram, explain process of refining of petroleum. Name any two fractions obtained. 6
- (b) How are plain carbon steels classified based on carbon content? What are the drawbacks of plain carbon steels? 5
- (c) Discuss influence of any two chemical factors on adhesive action. 4
6. (a) Define 'Paint'. Mention any four constituents of paint with their functions. 5
- (b) A sample of coal has the following composition by mass : 5
- C = 70%, H = 10%, O = 4%
- S = 2% N = 2% and Ash = 12%
- Calculate Gross and Net calorific value using Dulong's formula.
- (c) Distinguish between Brass and Bronze. 5