

F. E. Sem II (CBAS)

1/12/15

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 :-

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- (a) What is 'Oxidation corrosion' ? Why do gold and platinum metal not get corroded in atmospheric oxygen ?
 (b) Give composition, properties and uses of German silver.
 (c) What is 'cracking' of heavy oil ? Mention any four advantages of catalytic cracking over thermal cracking.
 (d) Explain 'prevention of waste' principle in Green Chemistry.
 (e) What are composite materials ? Mention any four characteristics of composite materials.
 (f) What is metal cladding ? How is 'alclad' obtained ?
 (g) 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 CaCl₂ tube. The increase in weights of KOH bulb and CaCl₂ 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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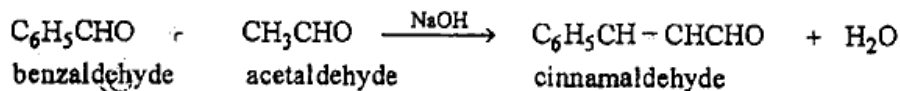
- (i) Relative areas of anodic and cathodic parts
 (ii) Purity of metal
 (iii) pH of medium

(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.

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CO = 46% H₂ = 30% CH₄ = 10%
 C₂H₄ = 4% N₂ = 1% CO₂ = 2% and O₂ = 7%

Calculate volume and weight of air required for complete combustion of 1m³ of fuel (Mol. wt. of air = 28.949)

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- (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 powder 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

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