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FE (AM, Br) Sem. II (R)  
Applied Chemistry-II27/05/09  
11-1 p.m.

VR-1026

Con. 2438-09.

(2 Hours)

[Total Marks : 75]

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Answer any **four** from remaining **six** questions.  
 (3) **Figures** to the **right** indicate **full** marks.  
 (4) **All** questions carry **equal** marks.

1. Attempt any **five** from the following :—

15

- Define H.C.V. and L.C.V.
- Give the composition, properties and uses of Gun metal.
- Name the constituents of paints.
- Explain why zinc coating gives a better protection for iron than tin.
- Define Octane number and Cetane number.
- What are the applications of powder metallurgy?
- What are the functions of matrix phase in a composite material?

2. (a) Define cracking of petroleum. Explain fixed bed catalytic cracking with a neat diagram.

5

(b) List the 12 principles of Green chemistry.

5

(c) What are metal ceramic powders? Give the methods of ceramic powder formation.

5

3. (a) Write notes on any **two** :—

4

- Green fuels.
- Metal cladding.
- Activation energy.

(b) The composition of a gas was found to be  $H_2 = 10\%$ ,  $CH_4 = 16\%$ ,  $C_2H_6 = 20\%$ ,  $N_2 = 6\%$ ,  $CO = 22\%$ ,  $CO_2 = 18\%$ ,  $O_2 = \text{rest}$ . Calculate the volume of air required for complete combustion of 1 m<sup>3</sup> of this gas.

6

(c) Give the various methods of Compacting. Explain cold powder extrusion method.

5

4. (a) Describe the adsorption and catalytic properties of zeolites.

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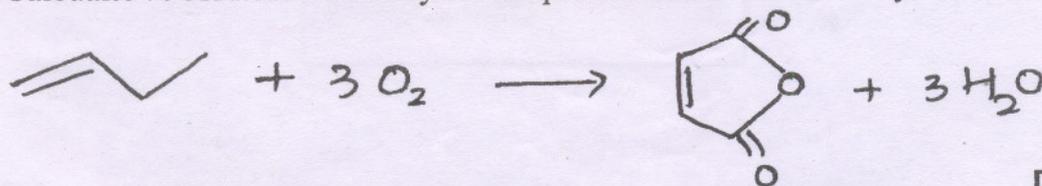
(b) How the following factors affect the rate of corrosion :

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- Position of metal in galvanic series.
- Temperature of the medium.
- Passivity of the metal.

(c) Calculate % of Atom Economy for the production of maleic anhydride.

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[TURN OVER

5. (a) Explain the production of ethanol from molasses. 5
- (b) What current strength in amperes will be required to liberate 20 g of iodine from potassium iodide solution in one hour. (electrochemical equivalent of iodine = 0.00131 g) 5
- (c) Define a catalyst. What are the characteristics of a catalyst? 5
6. (a) 3 g of coal was heated in Kjeldahl's flask and  $\text{NH}_3$  gas evolved was absorbed in 40 ml of 0.5 N  $\text{H}_2\text{SO}_4$ . After absorption, the excess acid required 18.5 ml of 0.5 N KOH for exact neutralisation. 2.3 g of coal sample in quantitative analysis gave 0.35 g  $\text{BaSO}_4$ . Calculate the % of N and S in the sample. 5
- (b) Write a note on structural composition. 5
- (c) What is the principle of cathodic protection method? Explain sacrificial anode cathodic protection. 5
7. (a) State Faraday's laws of electrolysis. 5
- (b) What is knocking? Explain the role of antiknocking agents. 5
- (c) With the help of Synthesis of adipic acid, explain the basic ideas in the field of green chemistry research. 5

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