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FE (AII, BII) 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

(a) Define H.C.V. and L.C.V.

(b) Give the composition, properties and uses of Gun metal.

(c) Name the constituents of paints.

(d) Explain why zinc coating gives a better protection for iron than tin.

(e) Define Octane number and Cetane number.

(f) What are the applications of powder metallurgy ?

(g) 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** :—

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(i) Green fuels.

(ii) Metal cladding.

(iii) 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^3 of this gas.

6

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

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

5

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

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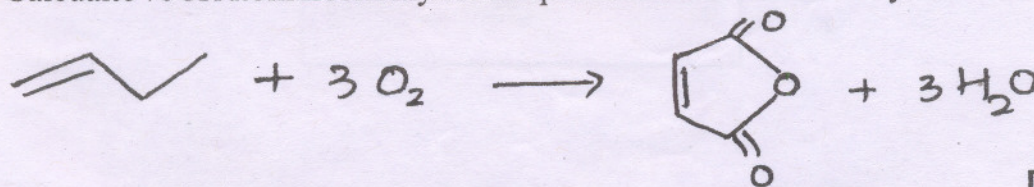
(i) Position of metal in galvanic series.

(ii) Temperature of the medium.

(iii) Passivity of the metal.

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

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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 NH_3 gas evolved was absorbed in 40 ml of 0.5 N H_2SO_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 BaSO_4 . Calculate the % of N and S in the sample. 5
- (b) Write a note on structural composites. 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 reserach. 5