

(216)

F.E (Sem II) All branch (CR)

(2 Hours)

[ Total Marks : 75

16/12/09

Applied Chemistry - II

- N.B.** (1) Question No. 1 is compulsory.  
 (2) Attempt any four questions from Q. Nos. 2 to 7.  
 (3) All the subquestions pertaining to main questions should be attempted together.  
 (4) Start the answer to main question on new page.  
 (5) Figures to the right indicate full marks.  
 (6) Assume any suitable data, if necessary.

1. Answer any five :-

- (a) Calculate the mass of hydrogen evolved by passing a current of 0.5 amperes for 40 minutes through acidified water. 3  
 (b) Explain the reaction of production of biodiesel and advantages of biodiesel as a fuel. 3  
 (c) 'Gold does not get corroded due to oxidation'. Explain. 3  
 (d) Give classification of composite materials. 3  
 (e) Give composition, properties and uses of 'Gun metal'. 3  
 (f) "Prevention of waste" is an important Principle of Green Chemistry. Explain. 3  
 (g) Define catalysis. List different types of catalysis with one example each. 3

2. (a) What is cracking ? Explain with example. Compare Fixed and Fluidised bed catalytic cracking. 3+2  
 (b) 2.5 gms of coal sample was taken in Silica Crucible and heated in oven maintained at 110°C for one hour. The weight after heating was 2.368 gms. The same sample was analysed for volatile matter, and weight obtained was 1.75 gms. The sample was further treated to get a fixed weight of 0.95 gms. Calculate percentage of moisture, V.M., ash and F.C. for this sample. 5  
 (c) With a neat labelled diagram, explain sacrificial anode method to Control corrosion. 5

3. (a) Define Catalyst. What are ideal characteristics of a Catalyst ? What is promotor ? 1+3+1  
 (b) By Kjeldahle's method, 2.3 gms of coal sample was analysed for nitrogen content. The liberated ammonia was neutralised by 12.5 ml. of 0.5 N  $H_2SO_4$  solution. The same weight of sample gave 0.64 gms of  $BaSO_4$  precipitate. Calculate percentage of nitrogen and sulphur in the sample. 3+2  
 (c) Explain Conventional and green route of production of Indigo dye. By this reaction which principle of green chemistry is shown ? 5

4. (a) What are metallic coatings ? Explain Galvanising

(b) Write notes on any **two** of following :-

(i) Atom Economy

5

(ii) Pillard clays

5

(iii) Compacting and Sintering.

5

5. (a) (i) Explain characteristics of composite materials.

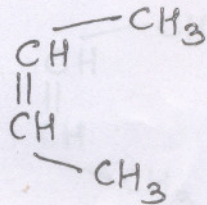
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(ii) List constituents of paints and give their functions.

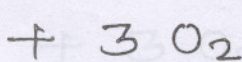
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(b) Calculate the atom economy for the following reaction, to prepare maleic anhydride.

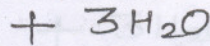
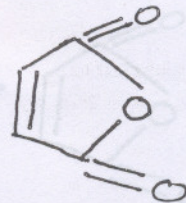
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2-Butene



oxidation



Maleic

Anhydride

[ TURN OVER

- (c) A sample of coal contains C = 75%, H = 12%, O = 6%, S = 4%, remaining being other impurities and ash. Calculate the minimum amount of air by volume and weight required for complete combustion of 5 kg. of fuel. 5
6. (a) Explain 'Wet Corrosion' in neutral medium with schematic diagram and mechanism. 5
- (b) Write note on (any one) 5
- (i) Magnesium and Commercial brass. [2.5 M. each]
- (ii) Glass Fibre reinforced composites
- (c) Write an informative note on Proper designing to control corrosion of metals. 5
7. Answer / Solve the following :-
- (a) A current of 3.5 amperes was passed through a solution of Nickel Nitrate for 15 minutes. Calculate the amount of metal deposited at cathode. 3
- (At wt. of Nickel = 58.71)
- (b) Calculate the volume of air required for complete combustion of  $1\text{m}^3$  of gaseous fuel which possesses by volume, 4
- $\text{CH}_4 = 40\%$ ,  $\text{C}_2\text{H}_4 = 10\%$ ,  $\text{CO} = 5\%$ ,  $\text{O}_2 = 2.5\%$ ,  $\text{H}_2 = 35\%$ ,  $\text{CO}_2 = 2\%$ ,  
 $\text{N}_2 = 2.5\%$ , Water Vapours = 3%
- (c) (i) Calculate Gross and Net calorific value for a coal sample which contains, 4
- C = 70%, H = 6%, O = 20%, S = 2.5%, N = 1.5%
- (ii) Write an informative note on 'Activation energy and catalysts'. 4