



edumate

Con. 5731-13. *engg.com* (REVISED COURSE)

FE. (SEM-II) (CBGS) Nov-DEC 2017

Applied Chemistry-II

02/12/13

GX-10141

( 2 Hours )

[ Total Marks : 60

- N.B. :**
- (1) Question No. 1 is **compulsory**.
  - (2) Attempt any **three** questions from remaining **five** questions.
  - (3) **All** questions carry **equal** marks.
  - (4) **Atomic Weights** : H = 1, C = 12, N = 14, O = 16, S = 32, Cl = 35.5, Ba = 137.3.

1. Answer any **five** of the following :-

15

- (a) Define Octane number of gasoline, Name any two anti-knock agents.
- (b) Why is galvanization of iron articles preferred to tinning ?
- (c) Give composition, properties and uses of Wood's metal.
- (d) Explain 'prevention of waste' principle in Green Chemistry.
- (e) Define 'matrix phase' of composite material. State functions of matrix phase.
- (f) State characteristics of a good paint.
- (g) A coal sample was subjected to ultimate analysis. 1.5g of coal on combustion in a Bomb calorimeter gave 0.42g of BaSO<sub>4</sub>. Calculate percentage sulphur in the coal sample.

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

6

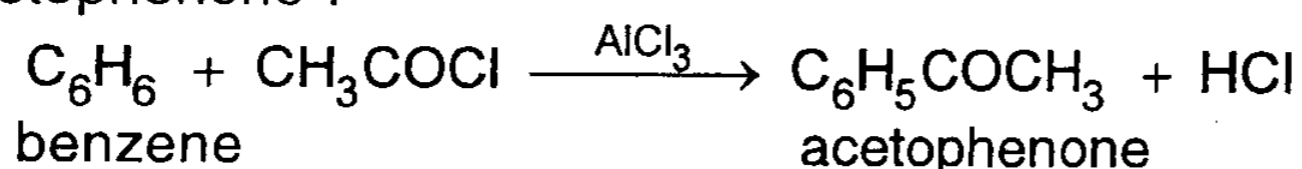
- (i) Relative areas of anodic and cathodic parts.
- (ii) Passive character of metal.
- (iii) pH of medium.

(b) What is Biodiesel ? Give 'Trans-esterification reaction in preparation of Biodiesel from vegetable oils. What are the advantages of Biodiesel ?

5

(c) Calculate percentage atom economy for the following reaction with respect to acetophenone :-

4



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

6

H<sub>2</sub> = 50%, CO = 10%, CH<sub>4</sub> = 30%, C<sub>2</sub>H<sub>4</sub> = 5%, N<sub>2</sub> = 1%, O<sub>2</sub> = 2% and CO<sub>2</sub> = 2%.

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

(b) Explain conventional and green chemistry route of production of adipic acid. Highlight the green chemistry principle involved.

5

(c) Discuss differential aeration corrosion with the help of a suitable example.

4

[ TURN OVER

**Con. 5731-GX-10141-13.****2**

4. (a) What are alloy steels ? Explain special effects of the following metals on properties of alloy steels :- **6**
- (i) Chromium
  - (ii) Nickel
  - (iii) Cobalt
  - (iv) Tungsten.
- (b) What is the principle of cathodic protection method of corrosion control ? Discuss any *one* method of corrosion control by cathodic protection. **5**
- (c) Write a note on 'sandwich panel' type layered composites. **4**
5. (a) What is cracking ? With a schematic diagram, explain any *one* method of catalytic cracking. **6**
- (b) What is powder metallurgy ? How are metal powders prepared ? **5**
- (c) Discuss the influence of *any two* physical factors on adhesive action. **4**
6. (a) What is 'oxidation corrosion' ? Discuss the role of nature of oxide formed in oxidation corrosion. **5**
- (b) A sample of coal has the following composition by weight :- **5**  
C = 82%, H = 6%, O = 8%, S = 0.5%, N = 3% and Ash = 0.5%. Calculate the Gross and Net Calorific value using Dulong's formula.
- (c) What is an alloy ? Explain any four purposes of alloying with suitable examples. **5**

\*\*\*\*\*