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CHEM136

[ST] Enrol. No. .....

END SEMESTER EXAMINATION : JAN. 2022

ENGINEERING CHEMISTRY

Time : 3 Hrs. *Maximum Marks : 60*

Note: ***Attempt questions from all sections as directed. Use of Simple calculator is allowed.***

SECTION – A (24 Marks)

Attempt any **four** *questions out of* **five.**
Each question carries **06** *marks.*

1. What is Dulong's formula? Calculate HCV and LCV of a coal sample containing 84% C, 1.5% S, 0.6% N, 5.5% H and 8.4% O.

2. Give reasons : (i) Most absorption bands in the visible UV spectrum are very broad, (ii) Aniline shows a hypsochromic shift in acidic solution.

3. Explain with diagram the process of softening of water through cation exchange and anion exchange method.

P.T.O.

4. Give the instrumentation of UV spectrophotometer and explain the components in it. Comment on the role of conjugation in the wavelength of absorption with the help of examples.

5. (i) Discuss the preparation and properties of Nylon 6,6. (6)

(ii) Draw the structure of the monomer each of the following polymers :

(a) Nylon-6

(b) Bakelite

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.

Each question carries **10** *marks.*

6. (a) What is boiler feed water? Explain the scale and sludge formation in boiler. (4)

(b) Write structure of EDTA and its reaction with calcium and magnesium? One liter of water sample has shown the following analysis: $Ca(HCO_3)_2$ = 4.86 mg/l, $Mg(HC0_3)_2$ = 5.84 mg/l, $CaSO_4$ = 6.86 mg/l and $MgSO_4$ = 8.4 mg/l Calculate temporary and permanent hardness in $CaCO_3$ equivalents. (6)

7. (a) What is knocking and how can it be measured in terms of octane number? How can knocking be prevented? What is the antiknock value of iso-octane? (4)

(b) What is the volume of air required for the complete combustion of 1 m^3 of mixture containing 60 % of CH_4 and 40% of C_2H_6? (3)

(c) How is PMMA synthesized by free radical polymerization? (3)

8. (a) What are solid lubricants? Under what operating conditions are solid lubricants preferred? (2)

(b) (i) What is meant by wet corrosion?

(ii) What is a sacrificial anode and how does it function?

(iii) Welded joints are better than riveted joints. Why? (5)

(c) Define viscosity and viscosity index. How the viscosity of a lubricating oil improved? (3)

P.T.O.

SECTION – C (16 Marks)

(Compulsory)

9. (a) Explain the effects of the following factors on the rate of corrosion :

(i) The ration of anodic and cathodic areas

(ii) Nature of corrosion product (4)

(b) (i) What is meant by carbonate and non-carbonate hardness of water?

(ii) Explain Break point chlorination. (4)

(c) Describe proximate analysis. Signify its importance. (4)

(d) Differentiate between thick film and thin film lubrication. (4)