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F315

CHEM136

Enrol. No. A2305222304

[ST]

END SEMESTER EXAMINATION : DECEMBER, 2023

ENGINEERING CHEMISTRY

Time : 3 Hrs. *Maximum Marks : 60*

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

SECTION – A (24 Marks)

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

1. A sample of water was alkaline both to phenolphthalein and methyl orange. 100 ml of the water sample required 25.8 ml of N/50 HCl for Phenolphthalein end point and another 20.4 ml for complete neutralization. Calculate the type and extent of alkalinity in ppm.

2. State and explain Lambert Beer's law. Give its two applications.

3. In an experiment in a Bomb calorimeter, a solid fuel of 0.90g is burnt. It is observed that the temperature increases to 3.8 degree Celsius of 4000g of water. The fuel contains 1% H. Calculate the HCV and LCV value (water equivalent of calorimeter = 385g and latent heat of steam = 587 cal/g).

4. Give preparation, property, and uses of polyester and PMMA.

5. Describe flash point and fire point of lubricants.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three.**
Each question carries **10** *marks.*

6. (a) Differentiate between octane and cetane numbers. (5)

(b) How is moisture, volatile matter, ash and fixed carbon in the fuel determined? (5)

7. (a) Explain mechanism of electrochemical corrosion of iron. (5)

(b) What is dry corrosion? Explain Pilling-Bedworth rule. (5)

8. (a) Discuss mechanism of free radical polymerization for polythene. (5)

(b) (i) Explain using suitable equations whether lime or soda or both is (are) needed for softening of water containing magnesium sulphate. (5)

(ii) Calculate the temporary and permanent hardness of a sample of water containing : $Mg(HCO_3)_2$ = 7.3mg/L, $Ca(HCO_3)2$ = 16.2mg/L, $MgCl_2$ = 9.5mg/L, $CaSO_4$ = 13.6mg/L.

SECTION – C (16 Marks)

(Compulsory)

9. (a) Discuss advantages and limitations of zeolite method of water softening. (5)

(b) How is boiler feed water prepared using cation and anion exchange resins? (5)

(c) (i) How many NMR signals will be obtained in the NMR spectrum of tetramethyl silane, methyl alcohol, and acetone.

(ii) Discuss the range and importance of finger print region. (6)