1E3103

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1E3103

B. Tech. I - Sem. (Main / Back) Exam., - 2025

1FY2-03 Engineering Chemistry

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

[10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1 Provide the various units of expressing Hardness of water and write the equation representing their inter-conversion.

Q.2 Explain about Break-point-chlorination.

Q.3 Provide the Dulong's formula for the calculation of calorific value of a fuel using GCV & NCV.

Q.4 What is meant by combustion of fuels? Mention also about the combustible and non-combustible constituents of fuels.

Q.5 What do you understand by Galvanic series? How it differs from Electro chemical series?

Q.6 Describe in brief about Tinning.

Q.7 Explain the role of Gypsum in Cement.

Q.8 What are Viscosity and Viscosity Index of Lubricant oils?

Q.9 Provide the Mechanism of Electrophilic aromatic substitution by an example.

Q.10 Draw the structural formula for Aspirin and Paracetamol & their uses.

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1 Calculate temporary, permanent and total hardness of one liter of water with following impurities -

$Mg(HCO_3)$ = 0.0246 gms; $Ca(HCO_3)_2$ = 0.0159 gms, $CaSO_4$ = 0.0168 gms, NaCL = 0.0069gm; and $MgSO_4$ = 0.0057 gms.

Q.2 Describe the process of Refining of Petroleum with labelled diagram of different fractions.

Q.3 Write a short note on -

(a) Anti-knocking agents

(b) Cetane number

Q.4 Explain the method to determine the calorific value of gaseous fuels by Junker's Calorimeter.

Q.5 Describe the types of Dry or Chemical corrosion.

Q.6 Provide the composition of Portland cement and it's manufacturing process.

Q.7 Write short notes on -

(a) Dehydration of Alcohols

(b) Free radical Rearrangements

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1 Explain following -

(a) Scale & Sludge formation [4]

(b) Boiler corrosion [3]

(c) Water softening by Zeolites [3]

Q.2 Describe the method to determine the calorific value of solid fuels by Bomb Calorimeter and compare the properties of solid fuels with liquid fuels.

Q.3 Write short notes on following - [4+3+3=10]

(a) Pitting corrosion & Concentration corrosion

(b) Galvanizing

(c) Sacrificial Anodic Protection

Q.4 Explain in details -

(a) Types & properties of Glass [5]

(b) Classification of Lubricants [5]

Q.5 Explain following - [5+5=10]

(a) Free radical Halogenation

(b) Nucleophilic addition in Aldehydes & Ketones
