

1E3103

Roll No. _____

Total No. of Pages: **2****1E3103****B.Tech. I - sem. (Main/Back/Re-back) Exam Jan. - 2026**
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 questions 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. NIL2. NIL**PART - A****[10×2=20]****(Answer should be given up to 25 words only)****All questions are compulsory**

- Q.1✓ What is the importance of sterilization of water by chlorination method?
Q.2✓ Merits of zeolite water softening process.
Q.3✓ What is gross and net calorific value of fuel?
Q.4✓ Properties and uses of gaseous fuel.
Q.5✓ Importance of lime saturation factor in cement manufacturing.
Q.6✓ Differentiate flash and fire points.
Q.7✓ Composition and uses of borosilicate glass.
Q.8 Significance of "Pilling Bedworth Rule".
Q.9 Why halogenation of alkanes is a substitution reaction?
Q.10 What is galvanization?

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 Analysis report of water is as follows -
 $\text{Mg}(\text{HCO}_3)_2 = 146 \text{ mg/litre}$; $\text{MgSO}_4 = 60 \text{ mg/litre}$
 $\text{CaCO}_3 = 55 \text{ mg/litre}$; $\text{Ca}(\text{HCO}_3)_2 = 81 \text{ mg/litre}$
Calculate temporary, permanent and total hardness in degree Clark.
- Q.2 Calculate Gross Calorific Value (GCV) of a coal sample having following composition -
 $\text{C} = 84\%$; $\text{H} = 6\%$; $\text{O} = 4\%$; $\text{N} = 3\%$; $\text{Ash} = 3\%$
- Q.3 What are the various factors responsible for the corrosion of metal?
- Q.4 Explain the role of gypsum in the setting of cement.
- Q.5 What is Calgon conditioning used for the prevention of scale formation in boiler?
- Q.6 Importance of proximate analysis of coal.
- Q.7 Explain the mechanism of nucleophilic addition reaction in aldehyde.

PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

- Q.1 (a) Differentiate between lime soda, zeolite and demineralization softening methods. [5]
(b) The exhausted zeolite was regenerated by 450 litres of brine solution (NaCl) having concentration of 95 gm/litre. Calculate the hardness of water as 20,000 litres of hard water was processed in zeolite softener. [5]
- Q.2 What is carbonization of coal? Describe coke formation by Otto-Hoffmann by product oven method with all the reactions and diagram. [2+8=10]
- Q.3 What is corrosion? Explain galvanic corrosion with suitable example. [4+6=10]
- Q.4 What is Portland cement? Describe manufacturing of cement with diagram. [2+8=10]
- Q.5 Describe synthesis, properties and uses of paracetamol drug. [4+3+3=10]