

<b>1E2403</b>	Roll No. _____	Total No of Pages: <span style="border: 1px solid black; padding: 2px;">3</span>
<b>1E2403</b>		
<b>B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019</b>		
<b>1FY2-03 Engineering Chemistry</b>		

**Time: 3 Hours**

**Maximum Marks: 160**  
**Min. Passing Marks: 56**

*Instructions to Candidates:*

*Attempt all ten questions from Part A, five questions out of seven questions from Part B and four 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**

**(Answer should be given up to 25 words only)**

**[10×3=30]**

**All questions are compulsory**

- Q.1 Define Caustic Embrittlement. [3]
- Q.2 What is break point chlorination? [3]
- Q.3 Give 2-2 examples of secondary solid fuel, secondary liquid fuel and secondary gaseous fuel. [3]
- Q.4 What is Cetane number? [3]
- Q.5 State Pilling-Bedworth rule. [3]

- Q.6 Why does corrosion occur in steel pipe connected to copper plumbing? [3]
- Q.7 Why Gypsum is added in the cement? [3]
- Q.8 What do you understand by steam emulsion number? [3]
- Q.9 How Aspirin is useful in prevention of heart attacks? [3]
- Q.10 State Markovnikov's rule. [3]

**PART - B**

**(Analytical/Problem solving questions)**

**[5×10=50]**

**Attempt any five questions**

- Q.1 Explain zeolite method of water softening. [10]
- Q.2 Discuss the flue gas analysis by Orsat's apparatus. [10]
- Q.3 What do you understand by calorific value? Distinguish between gross and net calorific value. [10]
- Q.4 Explain sacrificial anodic protection method to minimize corrosion. [10]
- Q.5 Define flash and fire point and its determination using PENSKY MARTIN apparatus. [10]
- Q.6 Explain Fischer Tropsch process with neat and labelled diagram. [10]
- Q.7 Explain electrophilic substitution reactions of benzene with the help of suitable example. [10]

**PART - C**

**(Descriptive/Analytical/Problem Solving/Design Questions)** [4×20=80]

**Attempt any four questions**

Q.1 Calculate the quantity of hydrated lime and sodium carbonate required to soften 20,000 litres of water containing following salts – [20]

$\text{CaCO}_3 = 10.0 \text{ mg/litre}$ ,  $\text{MgCO}_3 = 8.4 \text{ mg/litre}$ ,  $\text{CaCl}_2 = 11.1 \text{ mg/litre}$ ,  $\text{MgSO}_4 = 6.0 \text{ mg/litre}$  assuming the purity of lime as 90% and that of sodium carbonate 95%.

Q.2 (a) 0.26 gm coal sample gave on combustion 0.039 gm of water and 0.245 gm of  $\text{CO}_2$ . Calculate the percentage of carbon and hydrogen in it. [10]

(b) Calculate the volume of air required for complete combustion of  $1\text{m}^3$  of gaseous fuel having the composition:  $\text{CO} = 48\%$ ,  $\text{CH}_4 = 8\%$ ,  $\text{H}_2 = 40\%$ ,  $\text{C}_2\text{H}_2 = 2\%$ ,  $\text{N}_2 = 1\%$  and remaining being ash. [10]

Q.3 Write short notes –

(a) Pitting corrosion [10]

(b) Dry theory of corrosion [10]

Q.4 Write short notes –

(a) Borosilicate glass [5]

(b) Significance of annealing [5]

(c) Extreme pressure lubrication [5]

(d) Setting and Hardening of Portland cement [5]

Q.5 (a) Explain free radical halogenation of alkane. [10]

(b) Describe the synthesis, properties and uses of Aspirin. [6+2+2=10]