

11503

Roll No. ~~1110110061~~

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B. Tech. I - Sem. (Main) Exam., Dec. - 2018

BSC

1FY2 – 03 Engineering Chemistry

Time: 3 Hours

Maximum Marks: 160

*Instructions to Candidates:*

*Part – A: Short answer questions (up to 25 words) 10 × 3 marks = 30 marks. All ten questions are compulsory.*

*Part – B: Analytical/Problem solving questions 5 × 10 marks = 50 marks. Candidates have to answer five questions out of seven.*

*Part – C: Descriptive/Analytical/Problem Solving questions 4 × 20 marks = 80 marks. Candidates have to answer four questions out of five.*

*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

Q.1 What is hardness of water? How many types of hardness in water define with reaction? [3]

Q.2 Define Calorific Value? Distinguish between gross and net calorific value. [3]

Q.3 Write short note on Octane number. [3]

Q.4 What do you mean by degree of hardness? [3]

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- Q.5 Explain the method of sedimentation in water purifying. [3]
- Q.6 What is the role of gypsum in cement? [3]
- Q.7 Explain the importance of annealing process in glass manufacturing. [3]
- Q.8 Write the properties and uses of Aspirin? [3]
- Q.9 Write the steps of Elimination reaction mechanism with examples? [3]
- Q.10 Write short note on Extreme pressure Lubrication? [3]

### PART - B

- Q.1 Explain the Zeolite method of water softening in detail with regeneration process. [10]
- Q.2 Explain the Otto-Hoffmann by product oven method in brief with diagram. [10]
- Q.3 Explain the meaning of Tinning in corrosion control. [10]
- Q.4 Write short note on-
- (a) Flash and fire point [5]
  - (b) Safety glass [5]
- Q.5 Explain SN1 reaction with examples. [10]
- Q.6 Write short note on Break Point Chlorination. [10]
- Q.7 Explain the manufacturing of glass with diagram. [10]

## PART - C

Q.1 (a) What is the unit of hardness? How is it determined by EDTA method with reaction? [2+8=10]

(b) A water sample was analyzed. The following data was obtained. [10]

Ca (HCO<sub>3</sub>)<sub>2</sub> = 40.5 ppm, Mg (HCO<sub>3</sub>)<sub>2</sub> = 36.5 ppm, CaSO<sub>4</sub> = 34.0 ppm, Mg SO<sub>4</sub> = 30.0 ppm, CaCl<sub>2</sub> = 27.75 ppm, KCl = 10.0 ppm. Calculate the amount of lime (90% Pure) and soda (95% Pure) required for treatment of 30,000 litres of water.

Q.2 (a) Explain the determination of calorific value of solid fuel using Bomb Calorimeter. [8]

(b) A sample of Coal was found to have the following percentage composition by weight: C = 90%, O = 3.0%, S = 0.5% N = 0.5% and ash = 2.5% [12]

Calculate:

- (i) The minimum amount of O<sub>2</sub> and air by weight necessary for complete combustion of 1 kg of Coal.
- (ii) Weight of air required if 40% excess of air is supplied.
- (iii) Gross and net calorific value of coal sample using Dulong's formula.

Q.3 (a) What are the functions of Lubricant? How are they classified? [12]

(b) Write note on Cloud and Pour point. [8]

Q.4 (a) What are the different type of organic reactions? Explain them with examples. [10]

(b) What do you mean by Markovnikov's Rule? Discuss addition electrophilic and free radical addition reaction in alkenes. [2+8=10]

Q.5 Write short note on following-

(a) Caustic Embrittlement [5]

(b) Synthetic petrol [5]

(c) Refining of gasoline [5]

(d) Emulsification [5]

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