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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]

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]

$Ca(HCO_3)_2$ = 40.5 ppm, $Mg(HCO_3)_2$ = 36.5 ppm, $CaSO_4$ = 34.0 ppm, $MgSO_4$ = 30.0 ppm, $CaCl_2$ = 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_2 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]
