Roll No. _____

Total No of Pages: 3

21503/11503

21503/11503
B. Tech. I/II Sem. (Main/Back) Exam., Dec. - 2019
BSC
2FY2-03 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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. NIL _____ 2. NIL _____

PART - A

Q.1 What is softening of Water? [3]

Q.2 Importance of anti-knocking agents. [3]

Q.3 What is cracking in petroleum? [3]

Q.4 Pilling Bedworth's rule in dry corrosion. [3]

Q.5 Sacrificial anode method of corrosion protection. [3]

Q.6 What is false setting in cement? [3]

Q.7 Properties and uses of Borosilicate glass. [3]

Q.8 Importance of flash and fire point in lubricants. [3]

Q.9 Calgon conditioning in boilers. [3]

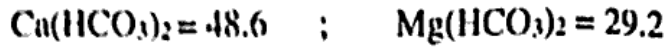Q.10 Elimination reaction in alkyl halide with example. [3]

PART – B

Q.1 Discuss the formation, troubles and preventions of Scales in boilers. [3+3+4=10]

Q.2 What is calorific value of fuel? Describe the determination calorific value of gaseous

fuel with Junkers Calorimeter. [3+7=10]

Q.3 Explain the property of setting and hardening of cement with reactions. [10]

Q.4 What are lubricants? Explain the thin layer mechanism of lubrication. [4+6=10]

Q.5 Explain SN2 substitution reactions with example. [10]

Q.6 What is potable water? What are the properties for a good quality potable water? Explain

sterilization of water through chlorinator. http://www.mgsuonline.com [2+4+4=10]

Q.7 Describe synthesis, properties and uses of Asprin. [5+3+2=10]

PART – C

Q.1 (a) Explain water softening by Zeolite method with diagram. [15]

(b) Zeolite softener was used to remove the hardness of 90,000 liters of hard water.

The softener required 450 liters of NaCl solution having concentration of 16 grams

/ liter. Calculate the hardness of hard water. [5]

Q.2 (a) What is metallurgical coke? Describe Otto – Hoffmann by-product oven method

of coke preparation. [4+8=12]

(b) A sample of water on analysis has been found to contain the following impurities in mg/liter – [8]

$$Ca(HCO_3)_2 = 48.6 \quad ; \quad Mg(HCO_3)_2 = 29.2$$

$$MgCl_2 = 3.8 \quad ; \quad MgSO_4 = 4.8$$

$$CaCl_2 = 33.3 \quad ; \quad CaSO_4 = 54.4$$

Calculate the quantity of Lime and Soda for softening 10^6 litres of water.

Q.3 (a) Explain the stress corrosion with Suitable example. [6]

(b) Break point chlorination method. [7]

(c) Explain proximate analysis of coal. [7]

Q.4 What is Portland cement? Describe manufacturing of Cement by Rotatory Kiln Technology with diagram and reactions involved in the process. [4+8+8=20]

Q.5 (a) Describe measurement of Viscosity of Oil with redwood Viscometer No. 1. [8]

(b) Explain determination of hardness of water by a complexometric titration method. [8]

(c) A Coal Sample on an analysis have a following composition by weight – [4]

$$C = 85\% \quad ; \quad O = 2.5\%$$

$$N = 1.0\% \quad ; \quad ash = 3.0\%$$
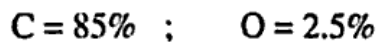
Calculate minimum amount air by weight required for completer combustion of 2.5 kg of Coal.

[21503/11503]