





# UNIVERSITY OF THE PUNJAB

Fifth Semester – 2019

Examination: B.S. 4 Years Program

Roll No. ....

PAPER: Applied Chemistry

Course Code: CHEM-309 Part – II

MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

### (Short Questions)

- Q No. 02** Give short answers of the following questions (2 x 10)
- Write down the name of three processes used for the manufacturing of 'CAUSTIC SODA' on industrial scale.
  - Draw a labelled diagram of 'NELSON CELL'.
  - You are provided with the following mixtures, which techniques you would use to separate the (i) Chalk powder and water (ii) Sodium chloride and water (iii) Ethyl alcohol and water.
  - Differentiate between the sludge and scale.
  - What are the water softeners?
  - Describe the softening of water by 'complexation method'.
  - Write down the principle of 'REVERSE OSMOSIS'.
  - Give the composition of 'PORTLAND CEMENT'.
  - State any three uses of 'SULFURIC ACID'.
  - Define the term 'CLINKER' in the manufacturing of Portland cement.

### (Long Questions)

- Q No. 03** (a) Write the balanced chemical equations processes that take place in the following chambers during the manufacturing of sulfuric acid. (i) Pyrite burner (ii) Contact tower (iii) Absorption tower (iv) Dilution tank. (7)
- (b) Write down the three conditions which are used in the converter reaction of the contact process to maximize the conversion of  $\text{SO}_2$  to  $\text{SO}_3$ . (3)
- Q No. 04** (a) Write down the role of the following water conditioning products and give two examples of each product (i) Phosphate dispersants (ii) Sequestering agents (iii) Oxygen scavenger (iv) Antifoaming or anti priming agents. (10)
- Q No. 05** (a) Differentiate between 'evaporation' and 'vaporization'. Briefly describe the working principle of the multiple effect evaporator. (5)
- (b) Describe the different methods of heat transfer with example. (5)