SRK/KW/14/6916

Faculty of Engineering & Technology
First Semester B.E. (CBS) Examination
ENGINEERING CHEMISTRY
Paper–3

Time—Two Hours] [Maximum Marks—40

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Answer **FOUR** questions as follows :
Que No. - 1 **OR** Que. No - 2
Que No. - 3 **OR** Que. No - 4
Que No. - 5 **OR** Que. No - 6
Que No. - 7 **OR** Que. No - 8
(3) Due credit will be given to neatness and adequate dimensions.
(4) Assume suitable data wherever necessary.
(5) Diagrams and Chemical equations should be given wherever necessary.
(6) Illustrate your answers wherever necessary with the help of neat sketches.
(7) Discuss the reaction, mechanism wherever necessary.
(8) Use of non-programmable calculator is permitted.

1. (a) Calculate the quantity of lime and soda required for softening of 80,000 lit of water, with the following

analysis using 10 ppm of Sodium Aluminate as a coagulant

$Ca(HCO_3)_2$=81 ppm, $Mg(HCO_3)_2$ = 146ppm, $CaCl_2$=33·3ppm, $MgCl_2$=38ppm, $CaSO_4$=68ppm. 8

(b) How corrosion in boiler is caused due to dissolved gases ? How it can be removed chemically ? 4

OR

2. (a) Define the process 'de-salination'? How the de-salination of water is carried out by electro-dialysis process ? 4

(b) An exhausted zeolite softener was regenerated by passing 200 litres of NaCl-solution having the strength of 10 g/l of NaCl. Find the total volume of water, that can be softened by this softener, if the hardness of water is 300 ppm. 4

(c) Explain briefly tertiary treatment methods used in waste water treatment. 4

3. (a) Justify "corrosion can be controlled by proper design and material selection". 5

(b) Write notes on : (any **two**)

(i) Atmospheric corrosion

(ii) Waterline corrosion

(iii) Electroplating 5

OR

4. (a) Explain the mechanism of elerochemical corrosion with respect to absorption of Oxygen and H_2 liberation. 4

(b) Attempt any **two** :

(i) Cathodic protection by impressed current.

(ii) Compare EMF series and Galvanic series

(iii) Galvanizing and Tinning as protective coatings. 6

5. (a) Discuss the Setting and Hardening of portland cement. 5

(b) Explain the following (any **two**) :

(i) Heat of Hydration and Soundness of Cement.

(ii) Cement additives

(iii) Ready mix concrete 5

OR

6. (a) Draw a well labelled diagram of rotary kiln and explain the manufacturing of portland cement by wet process. 6

(b) Explain the microscopic constituents of portland cement and its charecteristics. 4

7. (a) Define the terms - Energy Density and Power Density of battery. 2

(b) Discuss in brief the H_2-O_2 alkaline Fuel Cell with respect to its working, advantages and disadvantages. 4

(c) Explain the concept of carbon credit. 2

OR

8. (a) What are the principles of green-chemistry ? Explain any two. 4

(b) Write a note on CO_2 as a super-critical fluid with the help of its phase diagram. 4