A **Reg. No. :** | | | | | | | | | | |

Question Paper Code:91006

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

First Semester

Civil Engineering

19UCY106 - CHEMISTRY FOR CIVIL ENGINEERING

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Temporary hardness of water is caused by the presence of CO1- R

   (a) Chlorides of calcium and magnesium (b) Sulfates of calcium and magnesium

   (d) Bicarbonates of calcium and magnesium (c) Carbonates of sodium and potassium

2. Zeolite softening process removes CO1- R

   (a) only temporary hardness of water

   (b) only permanent hardness of water

   (c) both temporary and permanent hardness of water

   (d) the dissolved gases in permanent hard water

3. Permanent hardness of water may be softened by passing it through CO1- R

   (a) Sodium silicate (b) Sodium bicarbonate

   (c) Sodium hexametaphosphate (d) Sodium phosphate

4. Which type of chemical reaction is observed at cathode, in electrochemical corrosion? CO3- U

   (a) Reduction reaction (b) Oxidation reaction

   (c) Pericyclic reaction (d) None of the above

5. Which of the following is an example of corrosion? CO3- U

(a) Rusting of iron (b) Tarnishing of silver

(c)Liquefaction of ammonia (d) Rusting of iron and tarnishing of silver

6. Select the incorrect statement from the following option CO3 Ann

(a) Replacement of corroded equipment is time-consuming

(b) Corrosion increases the electrical conductivity of metals

(c) Corrosion causes contamination of product

(d) Corrosion causes leakage of toxic liquid or gases

7. What is the unit of absorbance which can be derived from Beer Lambert's law CO2- R

(a) L mol^{-1} cm^{-1} (b) L gm^{-1} cm^{-1} (c) cm (d) No unit

8. Which of the following wavelength ranges is associated with UV spectroscopy? CO2- R

(a) 0.8 - 500μm (b) 400 - 100nm (c) 380 - 750nm (d) 0.01 - 10nm

9. What is the average particle size of cement? CO4- R

(a) 15 microns (b) 45 microns (c) 75 microns (d) 100 microns

10. Firing temperature of magnesite bricks is about _____ °C. CO4- R

(a) 800-1000 (b) 1000-1200 (c) 1600-1800 (d) 2400-2600

PART – B (5 x 2= 10 Marks)

11. Differentiate scale and sludge. CO1- Ana

12. Write the reactions involved in the zeolite process CO1- R

13. Analyze the type of corrosion occurs in wire fence. CO2- Ana

14. Define Beer-Lamberts law CO3- R

15. Write the composition of portland cement. CO4- R

PART – C (5 x 16= 80 Marks)

16. (a) Describe the internal conditioning of water. Explain the different types with the reaction involved in it. CO1- U (16)

Or

(b) What is the principle of EDTA? Describe the estimation of hardness of water by EDTA method. CO1- U (16)

17. (a) What are ion exchange resins? Discuss their applications in water-softening. How spent resins are regenerated? CO1- U (16)

Or

(b) (i) Explain reverse osmosis method of desalination of brackish water with advantages. CO1- U (8)

(ii) Calculate the carbonate and non carbonate hardness of a sample of water containing the dissolved salts as given below in mgs/ lit Mg $(HCO_3)_2$ = 7.3, Ca $(HCO_3)_2$ = 40.5, $CaSo_4$ = 13.6 , $Mgcl_2$ = 21.75 and Nacl = 50. CO1- U (8)

18. (a) What are paints? Explain its constituents with its functions. CO2- U (16)

Or

(b) Define electroplating. Explain the process involved in the electroplating of gold on other surfaces. CO2- U (16)

19. (a) Explain the principle and working of UV-Visible spectroscopy and discuss any four applications. CO3- U (16)

Or

(b) What is gas chromatography? Explain how this technique is used in the separation of constituents in compounds. CO3- U (16)

20. (a) Explain the process involved in the manufacturing of magnesite and zirconia brick CO4- U (16)

Or

(b) Explain the different steps involved in the manufacturing of portland cement. CO4- U (16)