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**Reg. No. :**

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**Question Paper Code:91006**

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

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)

- Temporary hardness of water is caused by the presence of CO1- R
  - Chlorides of calcium and magnesium
  - Sulfates of calcium and magnesium
  - Bicarbonates of calcium and magnesium
  - Carbonates of sodium and potassium
- Zeolite softening process removes CO1- R
  - only temporary hardness of water
  - only permanent hardness of water
  - both temporary and permanent hardness of water
  - the dissolved gases in permanent hard water
- Permanent hardness of water may be softened by passing it through CO1- R
  - Sodium silicate
  - Sodium bicarbonate
  - Sodium hexametaphosphate
  - Sodium phosphate
- Which type of chemical reaction is observed at cathode, in electrochemical corrosion? CO3- U
  - Reduction reaction
  - Oxidation reaction
  - Pericyclic reaction
  - 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)  $L \text{ mol}^{-1} \text{ cm}^{-1}$  (b)  $L \text{ gm}^{-1} \text{ cm}^{-1}$  (c) cm (d) No unit
8. Which of the following wavelength ranges is associated with UV spectroscopy? CO2- R
- (a) 0.8 - 500 $\mu\text{m}$  (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  
 $\text{Mg}(\text{HCO}_3)_2 = 7.3$ ,  $\text{Ca}(\text{HCO}_3)_2 = 40.5$ ,  $\text{CaSO}_4 = 13.6$ ,  
 $\text{MgCl}_2 = 21.75$  and  $\text{NaCl} = 50$ . 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)

