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

# Question Paper Code: R1Y04

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

First Semester

Civil Engineering

R21UCY106 - GEO CHEMISTRY

(Common to Agricultural branch)

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Bond formed by transference of electrons is _____ CO1-U

   (a) Ionic bond (b) Dative bond (c) Hydrogen bond (d) Metallic bond

2. Lateral overlapping of atomic orbitals results in _____ bond formation CO1-U

   (a) Π (b) ionic (c) σ (d) none

3. Calgon is a trade name given to CO1- U

   (a) Sodium silicate (b)Calcium phosphate

   (c) Sodium hexa meta phosphate (d) Sodium zeolite

4. Bicarbonates of Ca and Mg causes CO1- U

   (a) softness (b) permanent hardnes

   (c) temporary hardness (d) none of the above

5. Iron corrodes faster in CO1- U

   (a) air (b) electrolytic solution (c) water (d) all the above

6. During the galvanic corrosion the noble metal act as CO1- U

(a) Anode (b) Cathode (c) Catalyst (d) Corroding metal

7. Transported soil deposited by -------- CO1- U

(a) water (b) gravity (c) winds (d) all the above

8. The Illite mineral is not present CO1- U

(a) Gibbsite sheet (b) Silicon Sheet (c) Potassium (d) Zn

9. X-ray diffractometers provide _____ information about the compounds present in a solid sample CO2- U

(a) quantitative (b) qualitative (c) both a and b (d) none of these

10. In AAS, which of the following is the generally used radiation source? CO2- U

(a) Tungsten lamp (b) Xenon mercury arc lamp

(c) Hydrogen lamp (d) Hollow cathode lamp

PART – B (5 x 2= 10 Marks)

11. What are the types of hydrogen bonding with suitableexample? CO1- U

12. Distinguish between temporary and permanent hardness of water. CO1- U

13. Analyze the reason why bolt and prepare same metal? CO4- Ana

14. Write a three types of rock? CO1- U

15. Write the types of Gas Chromatography. CO2- U

PART – C (5 x 16= 80 Marks)

16. (a) Differentiate weak bond from strong bond? What is meant by weak bond? Explain the various Van der Waals interaction forces with suitable diagram. CO3-AP (16)

Or

(b) Based on Aufbau principle write the electronic configuration of the following elements (i) F (ii) Mg (iii) Cl (iv) Fe (v) C (vi) Ca (vii) Ne (viii) S CO3-AP (16)

17. (a) Due to water crisis, salt water is converted to drinking water in both rural and coastal area. Analyze the suitable method for this process with proper reason. CO5- Ana (16)

Or

| | | | | |
|---|---|---|---|---|
| | (b) | (i) A sample of water is found to contain 16.8 mg/L of $Mg(HCO_3)_2$, 12 mg/L of $MgCl_2$, 29.6 mg/L of $MgSO_4$ and 5.0 mg/L of NaCl. Calculate the temporary and permanent hardness.<br>(ii) Calculate the carbonate and non-carbonate hardness of a sample water containing the dissolved salts given (in mg/L) $Mg(HCO_3)_2$, = 14.6, $MgCl_2$ = 9.5, $Ca(HCO_3)_2$, = 16.2, $MgSO_4$, = 6.0, and NaCl =50.<br>(At. wt of Ca, Mg, O, C, Cl, S, H are 40,24,16,12,35.5,32 and 1)<br>(iii) Analyze the both problem which hardness you recommend to drinking purpose? | CO5- Ana | (8+8) |
| 18. | (a) | Ms.Joy bought an Iron bucket for his household uses, the iron bucket was exposed to open oxygen environment, after few months iron bucket damage and analyze the damage. | CO4-Ana | (16) |
| | | Or | | |
| | (b) | The gas supply from kerala to Mumbai through the sea water, the gas pipe constructed on iron body. Analyze the suitable methods for prevent corrosion on iron pipe. | CO4-Ana | (16) |
| 19. | (a) | Explain interparticle attractive and repulsive forces. | CO1- U | (16) |
| | | Or | | |
| | (b) | What do you understand by Atterberg's limits? Explain the soil component? | CO1- U | (16) |
| 20. | (a) | Selva prepare sugar solution on various concentration A To E but Deva's don't know this solution concentration. Then how to Deva analyze the sugar solution from beer lamberts law. | CO2-U | (16) |
| | | Or | | |
| | (b) | Vijay has a material in the form of sodium chloride crystal. So, how to verify the XRD spectroscopic techniques and explain with diagram? | CO2-U | (16) |