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**Question Paper Code: 91004**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

First Semester

Mechanical Engineering

19UCY104 - ENGINEERING CHEMISTRY

(Common to Chemical Engineering)

(Regulation 2019)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

- Which one of the following pair of atoms most likely to form an ionic bond? CO1-R  
(a) Na & F      (b) C & C      (c) N & F      (d) F & F
- Which among the following is weakest bond? CO1-R  
(a) Covalent bond      (b) Ionic bond      (c) Metallic bond      (d) Hydrogen bond
- The electronic configuration of an atom with atomic number 8 is CO1-R  
(a)  $1s^2 2s^2 2p^3 3s^1$       (b)  $1s^2 2s^2 2p^1 3s^2 3p^1$       (c)  $1s^2 2s^1 2p^6 3s^1$       (d)  $1s^2 2s^2 2p^4$
- The unit of rate constant for a second order reaction is CO2-R  
(a) mol / S      (b) mol / l<sup>2</sup> / S      (c) mol / l / S      (d) lit / mole / S
- What type of reaction takes place when an acid dissolves in water? CO2-R  
(a) Exothermic      (b) Endothermic      (c) Substitution      (d) Displacement Reaction
- Temporary Hardness of water can be removed by CO3-R  
(a) Boiling      (b) Sedimentation      (c) Solvent Extraction      (d) Filtration
- Hardness in water expressed in terms of equivalent of CO3-R  
(a) CaCl<sub>2</sub>      (b) MgCl<sub>2</sub>      (c) CaCO<sub>3</sub>      (d) MgCO<sub>3</sub>
- During the galvanic corrosion the noble metal act as CO4-R  
(a) Anode      (b) Cathode      (c) Catalyst      (d) Corroding metal

9. Iron corrodes faster in CO4- R  
(a) Hard water      (b) Soft water      (c) Demineralized water      (d) Distilled water
10. In electro plating the article to be plated is subjected to pickling, this is to CO4- R  
(a) Remove grease      (b) Increase the rate of plating  
(c) Remove the oxide scale      (d) Get a bright deposit

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. Describe the characteristic properties of covalent compounds. CO1- U      (8)
12. Derive the integrated rate equation for a second order reaction where the reactants are same concentration. CO2- U      (8)
13. How is hardness of water determined by the complexometric method? Write the necessary calculation CO3- U      (16)
14. Calculate the temporary, permanent and total hardness of a sample water containing  $\text{Mg}(\text{HCO}_3)_2 = 73 \text{ mg/lit}$ ,  $\text{Ca}(\text{HCO}_3)_2 = 162 \text{ mg/lit}$ ,  $\text{MgCl}_2 = 95 \text{ mg/lit}$ ,  $\text{CaSO}_4 = 136 \text{ mg/lit}$ , Atomic weight: Ca = 40, Mg = 24, C = 12, S = 32, O = 16, H = 1, Cl = 35.5. CO3- U      (8)
15. Explain the rusting of iron on the basis of electrochemical theory of corrosion CO4- U      (8)

