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Question Paper Code: 51006

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

First Semester

Civil Engineering

15UCY106 - CHEMISTRY FOR CIVIL ENGINEERING

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

Answer All Questions

1. Covalent bond is formed by CO1- R
 - (a) Complete transfer of valence electrons
 - (b) Removal of electron from one atom
 - (c) Both the electron are donated by same atom
 - (d) Sharing of electrons
2. Electronic configuration of oxygen atom is CO1- R
 - (a) $1s^2 2s^2 2p^2$
 - (b) $1s^2 2s^2 p^5$
 - (c) $1s^2 2s^2 2p^6$
 - (d) $1s^2 2s^2 2p^4$
3. Hardness in water is expressed in terms of equivalent of CO2- R
 - (a) $CaCl_2$
 - (b) $MgCl_2$
 - (c) $CaCO_3$
 - (d) $MgCO_3$
4. What is the unit for hardness? CO2- R
 - (a) ppm
 - (b) ppt
 - (c) nm
 - (d) Kg

5. During rusting of iron metal CO3- R
- (a) Corrosion occurs at cathode
- (b) Corrosion product is deposited at anode
- (c) Corrosion occurs at anode and rust is deposited at cathode
- (d) Corrosion occurs at anode and rust is deposited at anode
6. Which of the following factors does not influence throwing power of electroplating bath CO3- R
- (a) Current density (b) Conductance of solution
- (c) Complexing agent (d) Competing electrode reaction
7. Soil acidity is dominated by CO4- R
- (a) Sodium ions (b) Bicarbonate & Carbonate ions
- (c) Hydroxide & Carbonate ions (d) Hydrogen & Aluminum ions
8. For soils at the optimum pH, the most common ion on the exchange sites would be _____. CO4- R
- (a) Aluminium (b) Hydrogen (c) Calcium (d) Potassium
9. Function of gypsum is to CO5- R
- (a) Start the setting of cement (b) Stop the hydration of cement
- (c) Retard the easily initial setting of cement (d) None of the above
10. ____ is the property of breaking, cracking or peeling off a refractory material under high temperature. CO5- R
- (a) Porosity (b) Thermal spalling (c) Thermal Conductivity (d) Chemical inertness

PART – B (5 x 2= 10Marks)

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| 11. | With your own examples explain Inter molecular and Intramolecular hydrogen bonding. | CO1- U |
| 12. | What is meant by hardness in water? How is it expressed? | CO2- U |
| 13. | Bolt and nut made up of same metal is preferred in practice. why? | CO3- Ana |
| 14. | Define sodic soil. | CO4- U |
| 15. | What is meant by thermal spalling? | CO5- U |

PART – C (5 x 16= 80Marks)

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| 16. | (a) Explain the term hybridization. Give an account of the different types of hybridization with suitable examples. | CO1-U | (16) |
| | Or | | |
| | (b) (i) Draw the molecular orbital diagram for O ₂ molecule. Write the electronic configuration, calculate the bond order and predict the magnetic behavior of O ₂ . | CO1 -U | (10) |
| | (ii) What is Pauli's exclusion principle? explain its uses. | CO2 -U | (6) |
| 17. | (a) Discuss the estimation of hardness using EDTA method. | CO2 -U | (16) |
| | Or | | |
| | (b) (i) What is desalination? Discuss any one process in detail with suitable diagram. | CO2 -Ana | (6) |
| | (ii) Describe the demineralization process for softening of hard water. Mention the advantages and disadvantages of this method. | CO2 -U | (10) |
| 18. | (a) (i) Explain how the corrosion can be controlled by sacrificial anode and impressed current method. | CO3- U | (8) |
| | (ii) Define electromotive force. How is it measured by potentiometric method? | CO3- U | (8) |

Or

- (b) (i) List and explain the various factors that influence corrosion. CO3-App (8)
- (ii) What is paint? Give its constituents and functions with suitable example. CO3-Ana (8)
19. (a) Explain briefly about the cation exchange capacity occurring in the soil. Discuss the various factors influencing CEC. CO4-Ana (16)
- Or
- (b) (i) Explain the oxidation and reduction reaction occurring in the soil. CO4 -U (8)
- (ii) Discuss the various organic matters present in the soil and give its significance. CO4-U (8)
20. (a) What are refractories? How are they classified? Explain any four important refractories. CO5- Ana (16)
- Or
- (b) (i) Describe the various methods available for fabrication of ceramic ware. CO5-U (8)
- (ii) Discuss the various chemical reactions involved in the setting and hardening properties of cement. CO5-U (8)