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**A Reg. No. :**

**Question Paper Code: 51006**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

First Semester

Civil Engineering

15UCY106 - CHEMISTRY FOR CIVIL ENGINEERING

 (Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

|  |  |  |
| --- | --- | --- |
| 1. | The bond order in N2 molecule is  | CO1- R |
|  | (a) 1.0  | (b) 2.5 | (c) 3.0 | (d) 0.0 |
| 2. | Electronic configuration of oxygen atom is |  CO1- R |
|  | (a) 1s22s22P2 | (b) 1s22s2 P5 | (c) 1s22s2 2P6 | (d) 1s22s2 2P4 |
| 3. | Under phosphate conditioning, which phosphate is used for too acidic nature of water |  CO2- R |
|  | (a) Na3PO4 | (b) NaHPO3 |
|  | (c) NaH2PO4 | (d) Na2HPO4 |
| 4. | What is the unit for hardness?  |  CO2- R |
|  | (a) ppm | (b) ppt |
|  | (c) nm | (d) Kg |
| 5. | If the corrosion product is soluble in the corroding medium the corrosion rate will be  | CO3- R |
|  | (a) Slower | (b) Faster | (c) Very slow | (d) Nil |
| 6. | The constituents present in the paint are |  CO3- R |
|  | (a) Thinner | (b)Pigments | (c) Fillers& Vehicle | (d) All the above |
| 7. | The buffering capacity of a soil is a function of the H+ concentration in the \_\_\_ pool | CO4- R |
|  | (a) Soil air | (b) Colloid | (c) Rain water | (d) Soil solution |
| 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. | Which material is consisting as acidic refractories?  | CO5-App |
|  | (a) Al2O3 | (b) Zro2 | (c) ZnO | (d) Carbon |
| 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= 10 Marks) |
| 11. | What is bond order? CO1-R |
| 12. | What are the requirements of boiler feed water? CO2 -R  |
| 13. | Define hydrolysis of salt. CO3 -U |
| 14. | How do we neutralize acidic soil? CO4 -U |
| 15. | What are refractories? How are they classified? CO5 -U |
|  | PART – C (5 x 16= 80 Marks) |
| 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 and explain the MO diagram of anyone diatomic  molecule. | CO1 -U |  (8)  |
|  |  | (ii) Explain the determination of lattice energy with the help of  Born-Haber cycle. | CO1 -U |  (8)  |
|  |  |  |  |   |
| 17. | (a) | (i) What is the principle of EDTA method? Describe the  estimation of hardness of water by EDTA method. | CO2 -App |  (8) |
|  |  | (ii) Discuss the principle and salient features of desalination of  water by reverse osmosis.  | CO2-App |  (8) |
|  |  | Or |  |  |
|  | (b) | (i) Explain the principle involved in Ion-exchange process.  | CO2-App |  (8) |
|  |  | (ii) Explain any three internal conditioning methods for water  treatment. | CO2-U |  (8) |
|  |  |  |  |  |
| 18. | (a) | (i) Derive Nernst’s equation for emf of a cell.  | CO3 -App |  (6) |
|  |  | (ii) Explain the mechanism of electrochemical corrosion with  neat diagram.  | CO3 -U |  (10) |
|  |  | Or |  |  |
|  | (b) |  (i) What are corrosion inhibitors? Explain with examples these  inhibitors provide protection against corrosion?  | CO3- U |  (6) |
|  |  | (ii) What is paint? What are the different constituents of paint  and explain their functions?  | CO3- R |  (10) |
|  |  |  |  |  |
| 19. | (a) | (i) Describe briefly the different types of clay minerals. | CO4- U |  (8) |
|  |  | (ii) Explain the various sources of oxidation and reduction in  soil. | CO4- U |  (8) |
|  |  | Or |  |  |
|  | (b) | (i) Write short notes on  a) Buffering Capacity, b) Soil acidity, c) Lime content in soil  | CO4- U |  (8) |
|  |  | (ii) Discuss the redox properties of soil   | CO4- U |  (8) |
|  |  |  |  |  |
| 20. | (a) | (i) Discuss the manufacture of Portland cement with a neat  diagram.  | CO5- Ana |  (8) |
|  |  | (ii) Discuss the preparation, properties and uses of the following. a) Alumina and b) Zirconia bricks | CO5- Ana |  (8) |
|  |  | Or |  |  |
|  | (b) | (i) Describe the various methods available for fabrication of  ceramic ware.  | CO5- Ana |  (8) |
|  |  | (ii) Discuss the various chemical reactions involved in the  setting and hardening properties of cement. | CO5- Ana |  (8) |