|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |

**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) |