Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **19CH1006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **APPLIED CHEMISTRY FOR CIVIL ENGINEERING** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (10 X 1 = 10 MARKS)** | | | |
| 1. | Which of the following is not a unit of hardness?  i) Parts per million ii) Degree centigrade iii) Degree Clarke  iv) Degree French | CO1 | 1 |
| 2. | 1 ppm =  i) 0.07 0Fr ii) 0.70Fr iii) 0.10Fr iv) 0.010Fr | CO1 | 1 |
| 3. | Which of the following is correct for ion exchange process?  i) It is used to remove both cations and anions in hard water  ii) It can remove only cations in hard water  iii) It can remove only anions in hard water | CO2 | 1 |
| 4. | The Exhausted zeolite exchanger can be regenerated by  i) Calculated amount of NaCl solution  ii) Calculated amount of HCl solution  iii) Calculated amount of NaOH solution | CO2 | 1 |
| 5. | Dry corrosion is also called as \_\_\_\_\_\_\_\_\_.  i) Chemical corrosion ii) Electrochemical corrosion iii) Wet corrosion  iv) Oxidation corrosion | CO3 | 1 |
| 6. | Which type of chemical reaction is observed at cathode, in electrochemical corrosion?  i) Oxidation reaction ii) Peritectic reaction iii) Reduction reaction  iv) None of the above | CO3 | 1 |
| 7. | Rusting of iron can be prevented by  i) Coating of zinc on iron ii) Coating copper on iron  iii) Coating platinium on iron | CO4 | 1 |
| 8. | Tinning is the example of  i) Anodic coatings ii) Cathodic coatings  iii) Neither anode nor cathode iv) Both anode and cathode | CO4 | 1 |
| 9. | All \_\_\_\_\_\_\_ tend to accelerate the setting of cement and to improve the strength of concrete in early stages.  i) Chlorides ii) Sulphates iii) Sodium iv) Potassium | CO5 | 1 |
| 10. | Cement concrete has proved to be more economical than  i) Aluminium ii) Steel iii) Copper iv) Silica | CO5 | 1 |

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| **PART - B (6 X 3 = 18 MARKS)** | | | |
| 11. | What is the cause for alkanity of natural water and how to remove it? | CO1 | 3 |
| 12. | Mention the advantages and disadvantages of zelite process. | CO2 | 3 |
| 13. | Write a short note on rusting of iron process. | CO3 | 3 |
| 14. | Explain prevention of corrosion by deaeration method. | CO4 | 3 |
| 15. | Give account of Heat of hydration of cement. | CO5 | 3 |
| 16. | What are the applications of plasticizers? | CO6 | 3 |

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| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | |
| 17. | a. | Differentiate between scale and sludges. | CO1 | 4 |
| b. | A sample of water is found to contains following dissolving salts in milligrams per litre Mg(HCO3)2 = 73, CaCl2 = 111, Ca(HCO3)2 = 81. Calculate temporary and permanent hardness. | CO1 | 8 |
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| 18. | a. | Write a short note on ionexchange process. | CO2 | 4 |
| b. | Explain reverse osmosis process with diagram. Also explain the advantages of reverse osmosis process and ion exchange process. | CO2 | 8 |
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| 19. | a. | Explain the mechanism of Galvanic corrosion with example. | CO3 | 4 |
| b. | Explain factors influences corrosion. | CO3 | 8 |
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| 20. | a. | Write short notes on galvanization process. | CO4 | 4 |
| b. | Describe sacrificial anodic protection method and mention its application. | CO4 | 8 |
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| 21. | a. | Describe the constituents of Portland cement. | CO5 | 4 |
| b. | Write the chemistry of setting and hardening of cement. | CO5 | 8 |
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| 22. | a. | How to remove permanent hardness in water? | CO2 | 4 |
| b. | After treating 100 L of H2O in ion exchange resigns, cation exchange resin requires 100 L 0.1 N HClsolution to regenerate it. Calculate hardness of sample water. | CO2 | 8 |
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| 23. | a. | Write account of reinforced concrete construction (RCC). | CO5 | 4 |
| b. | Explain manufacturing process of Portland cement in details. | CO5 | 8 |
|  |  | **Compulsory:** | | |
| 24. | a. | Write a short note about vulcanization of rubber. | CO6 | 4 |
| b. | List the biomedical uses of the following.  i) Polyurethane ii) PVC iii). Polypropylene iv) Polyethylene  Question No.24 from Module 6 | CO6 | 8 |