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**A Reg. No. :**

**Question Paper Code: 51005**

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

First Semester

Computer Science and Engineering

15UCY105 - APPLIED CHEMISTRY

 (Common to EEE, ECE , IT,EIE and Biomedical Engineering)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

|  |  |  |
| --- | --- | --- |
| 1. | Electronic configuration of nitrogen atom is | CO1- R |
|  | (a) 1s2,2s2, 2p3  | (b) 1s2,2s2, 2p2 | (c) 1s2,2s2, 2p1 | (d) 1s2,2s2, 2p4 |
| 2. | The b0nd order in oxygen O2 molecule is |  CO1- R |
|  | (a) 2.5 | (b) 2.0 | (c) 1.5 | (d) 3.0 |
| 3. | The following compound is used for anodic inhibitors |  CO2- R |
|  | (a) Amine  | (b) Urea |
|  | (c) Chromates | (d) NaoH |
| 4. | Pitting corrosion is an example for |  CO2- R |
|  | (a) Dry corrosion | (b) Corrosion by oxygen |
|  | (c) Differential aeration corrosion | (d) Corrosion by hydrogen |
| 5. | All secondary batteries are  | CO3- R |
|  | (a) Irreversible cells | (b) Reversible cells | (c) Dry battery | (d) Flow battery |
| 6. | Ion selective membrane can be used in solution of PH upto  | CO3- R |
|  | (a) 3 | (b) 10 | (c) 14 | (d) 7 |
| 7. | Beer-Lambert’s law is applicable only for | CO4- R |
|  | (a) Concentrated solutions | (b)Dilute solutions |
|  | (c) Dark coloured suspensions | (d) Impurity solutions |
| 8. | Light source used in UV-Visible Spectrophotometer is |  CO4- R |
|  | (a) Na lamp | (b) Deuterium lamp |
|  | (c) Nichrome wire | (d) Hollow cathode lamp |
| 9. | An example of conducting polymer is |  CO5- R |
|  | (a) Fullerene | (b) Pentacene | (c) PVC | (d) Polyaniline |
| 10. | Generally conducting polymers are used in | CO5- R |
|  | (a) Solar cells | (b) Ion exchangers  |
|  | (c) Rechargeable battery | (d) All of the above |
|  | PART – B (5 x 2= 10 Marks) |
| 11. | Write Pauli’s exclusion principle. CO1-R |
| 12. | Define single electrode potential. CO2 -R  |
| 13. | How does a cell differ from a battery? CO3 -R |
| 14. | Differentiate TGA from DTA. CO4 -Ana |
| 15. | What are conducting polymers? CO5 -U |
|  | PART – C (5 x 16= 80 Marks) |
| 16. | (a) | (i) Explain valence bond theory and its limitations. | CO1-U |  (8) |
|  |  | (ii) Take any one diatomic molecule as an example,to explain  molecular orbital theory with a neat diagram. | CO1-App |  (8) |
|  |  | Or |  |  |
|  | (b) | (i) What is Fajan's rule? Explain the factors affecting it. | CO1 -App |  (8)  |
|  |  | (ii) Explain the Born-Haber cycle with suitable examples and its  importance in chemical bonding. | CO1 -U |  (8)  |
|  |  |  |  |   |
| 17. | (a) | (i) Derive Nernst equation and mention its significances  | CO2 -C- |  (8) |
|  |  |  (ii) Compare the mechanism of wet corrosion of iron metal with  acidic and aqueous environment with a neat diagram. | CO2-Ana |  (8) |
|  |  | Or |  |  |
|  | (b) |  (i) Describe the mechanism of differential aeration corrosion  taking pitting corrosion as an example. .  | CO2-U |  (8) |
|  |  |  (ii) Discuss the principle and process of electro plating of gold  and mention its applications in day to day life. | CO2-Ana |  (8) |
|  |  |  |  |  |
| 18. | (a) | (i) Explain H2-O2 fuel cell. Give its merits and demerits. | CO3 -U |  (10) |
|  |  | (ii) What are chemically modified electrodes? Explain their  types.  | CO3 -U |  (6) |
|  |  | Or |  |  |
|  | (b) |  Describe the construction and working principle of lead acid  battery  | CO3- U |  (16) |
|  |  |  |  |  |
| 19. | (a) |  (i) Describe the instrumentation and its working principle of UV  spectrophotometer with a neat block diagram.  | CO4- U |  (8) |
|  |  |  (ii) Discuss the concept, significance and some important  principles of green chemistry. | CO4- U |  (8) |
|  |  | Or |  |  |
|  | (b) | (i) Explain the thermo gravimetric analysis of any one chemical  compound with neat block diagram.  | CO4- U |  (8) |
|  |  | (ii) Describe the necessity of e-waste disposal and recommend  some eco- friendly methods for it. .  | CO4- U |  (8) |
|  |  |  |  |  |
| 20. | (a) | (i) Discuss the methods available in chemical and  electrochemical doping of conducting polymer in detail.   | CO5- U |  (8) |
|  |  | (ii) What is OLED? Explain its structure, advantages and  disadvantages of OLED. | CO5- U |  (8) |
|  |  | Or |  |  |
|  | (b) | What is Liquid crystal (LC)? explain their structure and applications of liquid crystal.  | CO5- U |  (16) |