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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) |