Reg. No. : | | | | | | | | | | |

Question Paper Code: 51105

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

First Semester

Computer Science and Engineering

15UCY105 - APPLIED CHEMISTRY

(Common to Electrical and Electronics Engineering, Electronics and Communication Engineering, Information Technology and Bio-medical Engineering)

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. During the formation of a chemical bond

   (a) Energy decreases
   (b) Energy increases
   (c) Energy of the system does not change
   (d) Electron-electron repulsion becomes more than the nucleus-electron attraction

2. The maximum number of hydrogen bonds that a molecule of water can have is

   (a) 1 (b) 2 (c) 3 (d) 4

3. Saturated solution of KNO_3 is used to make salt bridge because

   (a) Velocity of K^+ is greater than that of NO_3^-
   (b) Velocity of NO_3^- is greater than that of K^+
   (c) Velocity of both K^+ and NO_3^- are nearly the same
   (d) KNO_3 is highly soluble in water

4. In electrochemical corrosion

   (a) anode undergoes oxidation (b) cathode undergoes oxidation
   (c) both undergo oxidation (d) none of these

5. In H_2-O_2 fuel cell, the electrolytes used is

(a) 25% NaOH (b) 25% KOH
(c) 85% KOH (d) 85% NaOH

6. Cells are connected in series in order to

(a) increase the voltage rating (b) increase the current rating
(c) increase the life of the cell (d) none of these

7. Name the thermal method of analysis in which no reference material is employed

(a) Thermogravimetry (b) Differential thermal analysis
(c) Differential scanning calorimetry (d) All the above

8. An example of green chemistry is

(a) recycled carpet (b) a product made on earth day
(c) a sublimation reaction (d) bio-plastics

9. Liquid crystals are usually composed of

(a) circular molecules (b) rod like molecules
(c) oval molecules (d) none of these

10. Conducting polymers can be obtained from the following reactions

(a) doping (b) chlorination
(c) polymerization (d) bromination

PART - B (5 x 2 = 10 Marks)

11. State Octet rule.

12. Define single electrode potential.

13. Distinguish between primary and secondary cells.

14. State Beer-Lambert's law.

15. What is meant by the term smart material?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Discuss briefly the molecular orbital theory. Discuss the formation of O_2 molecule on the basis of this theory. (10)

(ii) List out the postulates of valence bond theory. (6)

Or

(b) (i) Write short notes on (1) Pauli exclusion principle (2) Hydrogen bonding (3) Fajan's rule. (12)

(ii) What do you mean by bonding molecular orbital and anti bonding molecular orbital? Give suitable example. (4)

17. (a) (i) Discuss the mechanism of electrochemical corrosion. (8)

(ii) What are the main objectives of electroplating? Give an account of the method used in electroplating of nickel. (8)

Or

(b) (i) Discuss any three factors influencing the rate corrosion. (8)

(ii) How is steel protected cathodically? Discuss in detail. (8)

18. (a) What is fuel cell? Explain the construction and working of H_2-O_2 fuel cell. What are the advantages of fuel cell over batteries? Why is water formed in this cell is removed continuously? (16)

Or

(b) (i) Discuss the types of ion selective electrode in detail. (10)

(ii) Write short notes on electrochemical sensors and its applications. (6)

19. (a) (i) Summarize the working principle of Thermogravimetric analysis. (8)

(ii) What is green chemistry? Explain its basic component and importance. (8)

Or

(b) (i) Describe the principle and instrumentation of UV visible spectroscopy. (10)

(ii) Explain the concept of e-waste disposal and state its importance. (6)

20. (a) Why polymers show liquid crystalline behavior? What are the important properties and applications of LCPs? Give two examples and two applications of Thermotropic and Lyotropic LCPs (16)

Or

(b) (i) Write short note on use of conducting polymers in organic light emitting diodes. (10)

(ii) Write short note on doping process used in conducting polymers. (6)