

B.TECH DEGREE EXAMINATIONS: DEC 2014

(Regulation 2012)

Second Semester

BIOTECHNOLOGY

CHY106: Chemistry for Biotechnology

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

- An electropositive element will combine with electronegative element to form
 - Ionic bond
 - Metallic bond
 - Covalent bond
 - Hydrogen bond
- Which of the following does not exhibit intermolecular hydrogen bonding?
 - HI
 - NH₄OH
 - C₆H₅OH
 - HF
- How many carbon atoms in the molecule in the molecule HOOC-(CHOH)₂-COOH are asymmetric?
 - 1
 - 2
 - 4
 - 3
- In many number of cases the notation 'E' is given to
 - Cis isomer
 - Trans isomer
 - Racemic mixture
 - Optical isomer
- Soft water is not a demineralized water whereas a demineralized water is soft water because
 - Soft water does not contain sodium, potassium, sulfate, chloride ions
 - Soft water contains sodium, potassium, sulfate, chloride ions
 - Calcium and magnesium ions present in demineralized water
 - Soft water is does not give lather
- Tri-sodium phosphate is highly suitable for the treatment of
 - Low alkaline water
 - Highly alkaline water sample
 - Acidic water
 - Neutral water

7. Stereospecific polymers can be obtained using
 - a) Free radical mechanism
 - b) Ziegler- Natta mechanism
 - c) Cationic mechanism
 - d) Anionic mechanism
8. Monomer of PET are
 - a) Terephthalic + Ethylene glycol
 - b) Terphthalic acid + Phenol
 - c) Terephthalic acid +Acetone
 - d) Terphthalic acid + Acetaldehyde
9. The phosphoric acid in coca cola can be analyzed using
 - a) Complexometry method
 - b) Chelation method
 - c) Molybdenum blue method
 - d) Iodometry method
10. Lack of iodine in human body produce
 - a) Goiter
 - b) Itai-Itai
 - c) Leukemia
 - d) Blue baby syndrome

PART B (10 x 2 = 20 Marks)

11. Boiling point of H₂O is higher than that of HF molecule - Reason out.
12. Define the term dipole moment.
13. Recall the term racemic mixture.
14. Differentiate between configurational and conformational analysis.
15. List out the methods adopted for the removal of microorganism from water
16. Calgon conditioning is superior than carbonate conditioning for high pressure boilers –Justify
17. Distinguish between thermoplastic and thermosetting polymers.
18. Teflon is an addition polymer, but it behaves somewhat like a thermosetting plastic- Give reason.
19. List any four application of superabsorbent polymer.
20. How DNA is extracted from onion?

PART C (5 x 14 = 70 Marks)

21. a) (i) List the significance of Vander Waal's force and infer how its influence the physical properties of materials? (7)
 - (ii) Differentiate between ionic and covalent bonds and explain its characteristics. (7)
- (OR)**
- b) (i) Define the term hybridization. Explain the SP² hybridization with suitable example. (7)
 - (ii) Debate two types of hydrogen bonding with appropriate examples. (7)

22. a) (i) Explain the term chirality. Discuss the optical isomerism of chiral organic compounds taking tartaric acid as an example. (7)
- (ii) Write all the possible isomeric forms of 1, 3-dichloro-2-methylbutane and specify which of the isomers will be optically active. (7)

(OR)

- b) (i) Discuss the *E-Z* system of nomenclature. How is it better than *cis, trans* nomenclature? (7)
- (ii) Describe the various elements of symmetry and their role in optical activity. (7)

23. a) (i) Discuss the principle and salient features of desalination of water by reverse osmosis. (7)
- (ii) Describe the electrodialysis method with a neat diagram. (7)

(OR)

- b) (i) Explain the demineralization of water by ion-exchange process. How are exhausted cation and anion exchange resins regenerated? (7)
- (ii) Discuss the various problems involved in boilers if hard water is used for steam production. (7)

24. a) (i) Explain the mechanisms involved in free radical addition polymerization in detail. (7)
- (ii) Differentiate between addition and condensation polymerization. (7)

(OR)

- b) (i) Give the preparation, properties and application of nylon 6, 6. (7)
- (ii) What is vulcanization and explain how does it improve the properties of rubber? (7)

25. a) (i) Determine the amount of calcium in milk powder by complexometric method. (7)
- (ii) Elucidate the permanganometric method to analyze kidney stones. (7)

(OR)

- b) (i) Give the preparation of poly (acrylic acid) superabsorbent polymer using free radical mechanism. (7)
- (ii) How is fluorescein synthesized? Give its application in angiogram technique. (7)
