B.Sc. BIOTECHNOLOGY
Third Semester
BIOPHYSICAL CHEMISTRY
(BBT - 14)

Duration: 3Hrs. **Full Marks: 70**

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

Answer any *five* of the following questions:

1. Explain the folding of Protein? What are the roles of different chaperones in protein folding? What is a native protein? (3+5+2=10)
2. What is the difference between A and B form of DNA? Explain the structure of a DNA molecule. (5+5=10)
3. (a) What is redox reaction? Give example of it. (2+3+5=10)
   (b) Write the Nernst equation.
   (c) What is electrochemical series? Write application of it.
4. (a) Write Schrödinger wave equation. (2+3+5=10)
   (b) Write Paulis exclusion principle and Hunds rule.
   (c) Write short notes on quantam numbers.
5. (a) Write Raults law. (2+3+5=10)
   (b) Calculate the normality and molarity of 4 g NaOH in 500 ml water.
   (c) What is osmotic pressure? How osmotic pressure can be measured?
6. (a) Write about glass membrane of ion selective electrode. (2+3+5=10)
   (b) Write three differences between natural and artificial radioactivity.

(c) Derive the following equation:

$\lambda = 2.303/t \log (N_o/N)$

7. (a) Illustrate the concept of acids and bases according to Bronsted and Lowry's concept.

(b) Write down conjugate bases for following acids: (5+5=10)

CH_3COOH, H_2SO_4

Write down conjugate acids for following bases:

NH_3, ^-OH

(c) (i) What do you mean by pK_a of an acid?

(ii) Find the P^H of following:

(a) 0.25 N HCl (b) 0.01 N NaOH

8. (a) On the basis of VSEPR theory explain shapes of following molecule and draw their structureNH_3,ClF_3 (5+3+2=10)

(b) (i) Ethyl alcohol is miscible with water however ether is not. Explain why?

(ii) Explain why H_2S is gas while H_2O is liquid?

(c) Explain in brief about the formation of H_2-molecule from H-atom using Valence Bond Theory.

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REV-00
BBT/84/90

2015/12

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Duration: 20 minutes **Marks – 20**

(PART A- Objective Type)

I. Choose the correct answer: **1×20= 20**

1. Which of the following is a basic amino acid?
   a. Alanine b. Glycine c. Lysine d. Methionine
2. Imino group is present in which amino acid?
   a. Asparagine b. Histidine c. Proline d. Serine
3. Which is an aromatic amino acid?
   a. Phenylalanine b. Cysteine c. Leucine d. Isoleucine
4. Out of the following which is a protein secondary structure?
   a. Amino acids b. Peptides c. Domains d. Alpha helix
5. The nitrogen base, sugar and phosphate group forms the
   a. Nucleoside b. TRNA c. DNA d. Nucleotide
6. The oxidation means
   a. loss of electron c. both a & b
   b. gain of electron d. none of the above
7. Which of the following metal will react with dil. H_2SO_4?
   a. Zn b. Cu c. Ag d. All of the above
8. Isotonic solution means
   a. solution having same osmotic pressure c. both a & b
   b. solution having different osmotic pressure d. none of the above
9. Half life period depends upon
   a. disintegration constant λ c. conc. of product
   b. initial conc. of reactant d. none of the above
10. The value of m_l for l=1
    a. -1, 0,+1 b. 0 c. 1 d. None of the above
11. The s-orbital have
    a. spherical shape c. square pyramidal shape
    b. dump-bell shape d. all of the above

12. An acid is
    a. proton acceptor
    b. proton donor
    c. electron donor
    d. none of the above

13. P^H of a solution is 2, its concentration of $[H^+]$ in moles/lit is
    a. 10^{-1} b. 10^{-2} c. 10^{2} d. 10^{12}

14. P^H of 0.1 (N) NaOH will be
    a. 13 b. 14 c. 12 d. 11

15. Which of the following molecule will have zero dipole moment?
    a. NH_3 b. H_2O c. $BeCl_2$ d. CH_3Cl

16. O-nitrophenol is more volatile than p-nitrophenol because of
    a. intermolecular H-bonding between o-nitrophenol.
    b. intramolecular H-bonding between o-nitrophenol.
    c. vander-waals force of attraction between o-nitrophenol.
    d. all of the above.

17. The type of hybridiazation involved in following molecule:
    SO_4^{-2}, BF_3, $XeOF_4$, $BeCl_2$ are respectively
    a. sp^3, sp^3d, sp and sp^2
    b. sp, sp^3d, sp^3 and sp^2
    c. sp^2, sp^3, sp^3d, sp
    d. sp^3, sp^2, sp^3d^2, sp

18. The value of half life period is
    a. $0.693/\lambda$ b. $\lambda/.693$ c. .693 d. None of the above

19. Weak electrolyte
    a. completely ionised
    b. feebly ionised
    c. not ionized
    d. all of the above

20. The flow of solvent through a semi permeable membrane towards the solution side is the phenomenon of
    a. adsorption
    b. diffusion
    c. osmosis
    d. transfusion

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