PBP-003-0011014   Seat No. _____

B. Sc. (Sem. I) (CBCS) Examination

November / December - 2018

Biochemistry : Paper - 101

(Physical & Chemical Aspects of Biochemistry) (New Course)

Faculty Code : 003

Subject Code : 0011014

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

1   (a)   Write the correct answer for the question :   4
          (1)   Give the definition of Noble gases and example.
          (2)   What is Electrostatic interaction ?
          (3)   Define Polar Covalent bond.
          (4)   Define electronegativity of atom.
    (b)   Write the answers in brief : (any 1 out of 2)   2
          (1)   Write a difference between electrophiles and nucleophiles.
          (2)   Define Dipole Interaction.
    (c)   Write the answers in detail : (any 1 out of 2)   3
          (1)   Give the importance of hydrophobic interaction.
          (2)   Give the importance of covalent bond.
    (d)   Write the short notes in detail : (any 1 out of 2)   5
          (1)   How will you differentiate between Polar covalent bond and Non polar covalent bond ?
          (2)   Write a note on ionic bond.

2   (a)   Write the correct answers for the questions.   4
          (1) ΔG^o is defined as the
          (2)   What does first law of thermodynamics state ?
          (3)   Define Standard free energy.
          (4)   Define Second Law of thermodynamics.
    (b)   Write the answers in brief : (any 1 out of 2)   2
          (1)   Define High energy compound and its example.
          (2)   Why Entropy decreases with increase in temperature ?

(c) Write the answers in brief : (any 1 out of 2)   3
(1) Draw labelled structure of ATP.
(2) Explain following terms : Isolated system,
Open system, Closed system.

(d) Write short note in detail : (any 1 out of 2)   5
(1) Explain role of redox potential in biological
reaction.
(2) Explain relationship between equilibrium constant
and ΔG.

3 (a) Write the correct answers for the questions.   4
(1) Explain Strong Acid and Weak Base.
(2) Write Henderson–Hesselbalch equation.
(3) What is the pOH of a solution that has a hydroxide
ion concentration of 4.82×10^{-5} M ?
(4) Define respiratory Alkalosis.

(b) Write the answers in brief : (any 1 out of 2)   2
(1) Find the pH of a 0.0025M HCl solution. The HCl
is a strong acid and is 100% ionized in water.
The hydronium ion concentration is 0.0025 M.
(2) What is the pKa of acetic acid, if K_a for acetic acid
is 1.78×10^{-5} ?

(c) Write the answers in brief : (any 1 out of 2)   3
(1) Define Buffer capacity with example.
(2) A buffer contains 1.00 molar acetic acid and 0.800
molar sodium acetate. What is its pH ?

(d) Write short notes in detail : (any 1 out of 2)   5
(1) Derive the Henderson–Hesselbalch equation.
(2) Explain titration curve of Strong acid and Strong
base.

4 (a) Write the correct answers for the questions.   4
(1) Define Adsorption.
(2) Define Osmosis.
(3) Define Specific gravity.
(4) Define Reverse osmosis.

(b) Write the answers in brief : (any 1 out of 2)   2
(1) Write a factor affecting viscosity.
(2) Write a difference between adsorption and
absorption.

(c) Write the answers in brief : (any 1 out of 2) 3
   (1) Write a factor affecting diffusion.
   (2) How gases oxygen and carbon dioxide can transport a cross the biological membrane ?

(d) Write short notes in detail : (Any 1 out of 2) 5
   (1) Write a detailed note on osmosis and reverse osmosis with example.
   (2) Write a factor affecting and biological importance of adsorption.

5 (a) Write the correct answers for the questions. 4
   (1) Define Molality.
   (2) Homogeneous mixture of two or more than two compounds is called _____ ?
   (3) 10 ml of alcohol dissolved in 90 ml of water; unit of concentration used is _____ ?
   (4) Number of moles in 1 kg of solvent is called.......

(b) Write the answer in brief : (any 1 out of 2) 2
   (1) What is the difference between stock solution and working solution ?
   (2) Define Percent Solution.

(c) Write the answers in brief : (any 1 out of 2) 3
   (1) A solution of H_2SO_4 (density = 1.834 g/ml) contains 95 g of the acid per 100 grams of solution. Calculate the volume of the solution containing 38 grams of the acid.
   (2) How much water you have to add to 450 ml of a solution 0.3 M to obtain a concentration 0.25 M ?

(d) Write short notes in detail : (any 1 out of 2) 5
   (1) The molarity of iron sulfate solution (Molecular weight of $FeSO_4.6H_2O$ = 260 g/mole) is 0.10 M. It is dissolved in 500 ml of water, to make up a solution of 600 ml. Calculate its molality. (Density of water = 1.00 g/liter).
   (2) An aqueous solution of HCl is 38% by mass and its density is 1.19 gm/ml. Calculate the molality and molarity of solution.