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

December - 2019

Biochemistry : Paper - 101

(Physical and Chemical Aspects of Biochemistry)

(Old Course)

Faculty Code : 003
Subject Code : 001114

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

1   Answer the following questions in just one or two lines : **20**

(1)   Define covalent bonds.

(2)   What is the importance of Van der Waals forces in living systems?

(3)   Name the bonds by which hydrogen and oxygen atoms are held together in a water molecule.

(4)   Calculate the number of carbon and hydrogen atoms in ethylene.

(5)   Write equation for dissociation of water.

(6)   When Coenzyme Q receives electrons and protons during process of electron transport in mitochondria, the process is called oxidation, reduction, both or none of the two?

(7)   In a reaction, if a substance X is donating H^+ ions to substance Y, then which of the two substances is getting oxidized and which one is getting reduced?

(8)   Describe redox potential.

(9)   What is pH? If hydrogen concentration in a solution increases continuously, then pH of the solution would increase or decrease?

(10) Write the names of electrodes used in pH meter.

(11) Define buffer solution giving suitable example.

(12) Write the use of pH paper strips.

(13) Explain giving examples the process of simple diffusion.

(14) If two solutions having glucose concentrations of 1 M and 0.1 M are separated by a semi permeable membrane, by osmosis process water will move in which direction? Explain using simple diagram.

(15) Write two important applications of activated charcoal powder as an adsorbent.

(16) Two 10 ml pipettes of same brand having same volume and diameter are taken. If, one was filled with 0.9 % NaCl and other was filled with 40% Glycerol till zero mark, and then the solutions were allowed to flow through it freely. Which pipette would get emptied first and why?

(17) Define molar solutions.

(18) Calculate the normality of 1 M NaOH solution at 25°C temperature and 1 atmospheric pressure.

(19) How can you convert saturated solution into non-saturated solution?

(20) You are given a glass of water, a pipette and empty test tube. No weighing balance is available in the laboratory. How will you take exactly 10 grams of water in to the test tube? Justify your answer.

2 (A) Answer any **three** of the following questions briefly : 6

    (1) What is bond energy? Write its unit.

    (2) Define Electrophiles.

    (3) Describe water as a universal biological solvent

    (4) Write the role of an indicator dye in acid base titrations.

    (5) What is buffering capacity?

    (6) Define adsorption phenomenon. How is it different from absorption?

(B) Answer any **three** of the following questions briefly : **9**
  (1) Describe occurrences of hydrogen bonds in biomolecules giving suitable examples.
  (2) Write the significance of ionic bonds.
  (3) Discuss important physical and chemical properties of water.
  (4) Draw the diagram of pH scale according to acidity and alkalinity.
  (5) Describe strong-acids and weak acids with suitable examples.
  (6) Normal range for Blood glucose concentration is 100 mg/dl. Calculate the normal glucose concentration in the blood in terms of milimoles per litre. (Mol. Wt. Of glucose =180)

(C) Write answers of any **two** of the following questions in detail : **10**
  (1) Discuss in detail structure of an atom using suitable examples.
  (2) Explain hydrophobic interactions and their role in macromolecular structure.
  (3) Write different definitions of acids and bases with suitable examples.
  (4) Discuss physiological buffers in detail.
  (5) Write a short note on importance of diffusion phenomenon in living organisms.

3 (A) Answer any **three** of the following questions briefly : **6**
  (1) Write examples of non covalent bonds.
  (2) Define Nucleophiles.
  (3) Describe the terms Ka and pKa.
  (4) Write the principle of working of a pH meter.
  (5) Write examples of adsorbents. List at least three applications of adsorbents.
  (6) Define molality and explain how it is different from molarity.

(B) Answer any **three** of the following questions briefly : 9

    (1) Describe resonance bond

    (2) What will happen if the dilute acid or base is added to Buffer solution?

    (3) Calculate the pH of 0.001 M HCl solution.

    (4) What is the effect of temperature on pH of the solution? Describe using suitable example.

    (5) Define viscosity and discuss factors affecting viscosity of a solution.

    (6) Calculate how you will prepare 100 ml of 1M NaOH working solution from 5M stock solution of NaOH.

(C) Write answers of any **two** of the following   10
questions in detail :

    (1) Describe hydrogen bonds, their occurrence and its importance in molecular structure.

    (2) Explain role of different types of bonds in protein structure.

    (3) Derive Handerson-Hesselbach equation and write its significance.

    (4) Explain in detail: Haemoglobin as buffer.

    (5) Discuss importance of osmosis in living organisms.

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