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JAU-003-2011022 Seat No. _____

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

December - 2019

BC - 101 : Physical & Chemical Aspects of Biochemistry

(New Course)

Faculty Code : 003

Subject Code : 2011022

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

Instructions : (1) Objective types of questions are compulsory.
(2) Figures on the right indicate the marks of individual question.

1 (A) Objective type questions : **4**

(1) What is Molecule ?

(2) The region around the nucleus (proton + neutron) of an atom, in which there is high probability of finding electron is called _____

(3) Name the most electronegative atom.

(4) Which bond is present within the water molecule ?

(B) Write the answer in brief : (Any **One** out of Two) **2**

(1) What is Electrophiles and Nucleophiles ?

(2) Explain : Properties of Covalent bond.

(C) Write the answer in detail : (Any **One** out of Two) **3**

(1) Explain : Biological importance of water.

(2) Describe : van der Waals' forces with example.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Describe in detail : Chemical bonds and their importance in structure of Biomolecules.

(2) Explain : Water as a biological solvent, and its physical and chemical properties of water.

2 (A) Objective type questions : **4**

(1) What is thermodynamics ?

(2) State the formula of Gibbs' free energy.

(3) What is it, in thermodynamics that can be used to calculate the maximum of reversible work that may be performed by a thermodynamic system at a constant temperature and pressure?

(4) It measures the amount of energy lost when doing useful work is known as _____

(B) Write the answer in brief : (Any **One** out of Two) **2**

(1) Define : Reduction and Oxidation with example.

(2) Justify : ATP is a high energy compound.

(C) Write the answer in detail : (Any **One** out of Two) **3**

(1) Explain : First law of thermodynamics.

(2) Explain the role of Redox potential in biological reaction.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Give the introduction to, Electrochemistry and explain Electrochemical cells and Galvanic cells.

(2) Explain in detail : Derivation of Nerst equation and write its application.

3 (A) Objective type questions : **4**

(1) Which pH is most acidic pH 3 or pH 6 ?

(2) Name the method that can determined pH accurately ?

(3) Who gave the term pH ?

(4) The magnitude of its resistance against pH change is called as _____

(B) Write the answer in brief : (Any **One** out of Two) **2**

(1) Define acid and base with example.

(2) If $[H^+]$ of the solution is 0.0634 mol/lit. Calculate the pH of the solution and state whether the solution is acidic, basic or neutral ?

(C) Write the answer in detail : (Any **One** out of Two) **3**

(1) Explain Henderson – Hesselbalch equation.

(2) Explain S.H.E. (electrode)

(D) Write a note on : (Any **One** out of Two) **5**

(1) Explain in detail : physiological buffers with it's types and importance.

(2) Explain pH meter with principle, working and glass electrode and the factors affecting pH.

4 (A) Objective type questions : **4**

(1) Osmole is non-SI unit of measurement that defines the number of moles of solute that contributes to the osmotic pressure of a solution. State it is true or false.

(2) If Red Blood Cell are suspended in hypertonic solution of NaCl, water flows out of RBC and the cytoplasm shrinks, this phenomenon referred to as _____

(3) In simple diffusion, which type of molecules can travel across the cell membrane?

(4) What is the unit of Viscosity?

(B) Write the answer in brief : (Any **One** out of Two) **2**

(1) Define : Osmosis and Diffusion.

(2) justify : Isotonic solution is used to treat dehydration and burn.

(C) Write the answer in detail : (Any **One** out of Two) **3**

(1) Describe the factors that affect viscosity.

(2) Explain Adsorption and write its characteristics with applications.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Explain viscosity in detail and application of viscometry.

(2) Describe in detail : Diffusion.

5 (A) Objective type questions : **4**

(1) Define stock solution.

(2) Which compound is made from mixing solute and solvent?

(3) The density of pure water is _____

(4) Write the formula for Normality of solution.

(B) Write the answer in brief : (Any **One** out of Two) **2**

(1) What is mole concept ?

(2) How do you prepare 10% w/v NaCl solution? (M.W. 58.44 gm/mol).

(C) Write the answer in detail : (Any **One** out of Two) **3**

(1) Explain : Percent solution and its preparation with example.

(2) How do you prepare 200 ml of 5 Molar working solution from 36 Molar H_2OS_4 stock solution?

(D) Write a note on : (Any **One** out of Two) **5**

(1) Explain : Normal, Molar, and Molal solution with its equation and prepare 1 Molar, 1 Normal and 1 Molal solution of NaOH (M. W. 40).

(2) Explain concept of density and specific gravity. Solve the below problems.

(i) If 5 ml of ethanol has a mass of 3.9 gm, What is the density ?

(ii) If the density of mercury is 13600 kg/m^3, find the specific gravity of mercury.
