DCZ-003-0011014 Seat No. _____

B. Sc. (Sem. I) (CBCS) (W.E.F. 2016) Examination

August - 2022

Biochemistry : BC-101

(Physical & Chemical Aspects of Biochemistry)

Faculty Code : 003

Subject Code : 0011014

Time : **2:30** Hours] [Total Marks : **70**

1 (A) Write the correct answers for the questions. **4**

(1) Define ionic 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.

(B) Explain with diagram: Covalent bonds in water **2**

(C) Give note on hydrogen bond formation. **3**

(D) Write the significance of secondary bonds. **5**

2 (A) Write the correct answers for the questions. **4**

(1) Define atom and give example.

(2) Give the definition of Electronegativity.

(3) Define ion and give types.

(4) What is bond energy?

(B) Briefly write about the disulfide bond. **2**

(C) Explain van der Waal's interaction. **3**

(D) Explain the types of covalent bonds. **5**

3 (A) Write the correct answers for the questions. **4**

(1) Write about ionization of water.

(2) When Coenzyme Q receives electrons and protons during process of electron transport in mitochondria, the process is called oxidation, reduction, both or neither of the two?

(3) 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?

(4) Define Reduction potential.

(B) Explain ΔG° with its sign and value for system. **2**

(C) By taking example of your choice; calculate free energy change. **3**

(D) What is enthalpy? Give its function in biological system. **5**

4 (A) Write the correct answers for the questions. **4**

(1) What is thermodynamics?

(2) What is isothermal process? Give example.

(3) Give the example of reduction process.

(4) Define: Gibbs free energy (ΔG).

(B) Give first law of thermodynamics. **2**

(C) Write note on free energy changes for ATP hydrolysis. **3**

(D) Write a note on coupled reaction with example. **5**

5 (A) Write the correct answers for the questions. **4**

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

(2) Write the use of pH meter.

(3) Define buffer solution giving suitable example.

(4) Write the use of pH paper strips.

(B) If the H^+ ion concentration is 0.00001 M/1, what will be the pOH of solution? **2**

(C) Explain and draw the titration curve for strong base to strong acid. **3**

(D) Explain any two Biological buffers. **5**

6 (A) Write the correct answers for the questions. **4**

(1) What is buffer? Give two examples.

(2) Define the strong acid with example.

(3) Draw the diagram of glass electrode.

(4) What is Amphoteric substance?

(B) Write definition and reaction for Arrhenius acid and base. **2**

(C) Write about the function of Haemoglobin as buffer. **3**

(D) Explain in detail: pH meter. **5**

7 (A) Write the correct answers for the questions. **4**

(1) What is simple diffusion?

(2) Define osmotic pressure.

(3) Define fluidity and viscosity.

(4) Why diffusion is faster in air compared to the liquid solutions?

(B) Write significance of viscosity in biological systems. **2**

(C) Write the different applications of Activated charcoal. **3**

(D) Write importance of diffusion in living systems. **5**

8 (A) Write the correct answers for the questions. **4**

(1) Write the difference between absorption and adsorption.

(2) Can glucose diffuse through the plasma membrane? Why?

(3) What do you understand by reverse osmosis?

(4) Define viscosity.

(B) Give any three differences between physical and chemical adsorption. **2**

(C) With the help of diagram; explain the process of osmosis when living cell (RBC) is placed in different concentrated solutions. **3**

(D) Give the factors affecting viscosity. **5**

9 (A) Write the correct answers for the questions. **4**

(1) Define molar solutions.

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

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

(4) 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.

(B) How will you prepare 20 mL, 10 ppm solution? **2**

(C) The concentration of H^+ in a solution is 4×10^{-4} M. Calculate the pH pOH. **3**

(D) Prepare 20 mL of 5 mg% solution from the 2M stock solution of NaCl. **5**

10 (A) Write the correct answers for the questions. **4**

(1) A buffer solution contains 0.36 M sodium acetate (CH_3COONa) and 0.45 M acetic acid (CH_3COOH), pK_a = 4.8. What is the pH of this buffer solution?

(2) Define the term Normality.

(3) 0.1 M solution contains how many moles in 500 ml of the solution?

(4) What do you mean by percent solution?

(B) Calculate the number of moles present in 18% glucose solution. **2**

(C) Calculate the molarity of 3.6 mg/mL glucose solution. **3**

(D) Calculate the number of molecules present in 200 mL, 0.1 mM glucose solution. **5**

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