Chapter 2
Biochemistry

1. Which of the following statements are TRUE for hydrogen bonds? Strength of hydrogen bond is
(A) low in a solvent of high dielectric constant
(B) low in a solvent of low dielectric constant
(C) lower in water as compared to organic solvents
(D) higher in water as compared to organic solvents

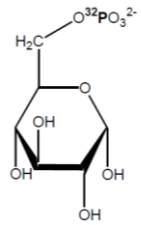
2. Which of the following statements are TRUE for cellulose?
(A) Cellulose serves a structural role
(B) Cellulose is a branched polysaccharide
(C) Cellulose is a homopolysaccharide composed of (α1→4) linked D-glucose units
(D) Cellulose is a homopolysaccharide composed of (β1→4) linked D-glucose units

3. Which of the following are NOT true for photosynthesis?
(A) Reduction of CO_2 and H_2O
(B) Oxidation of CO_2 and H_2O
(C) Reduction of CO_2 and oxidation of H_2O
(D) Oxidation of CO_2 and reduction of H_2O

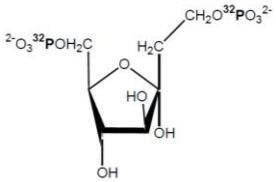
4. Which of the following statements are CORRECT?
(A) Fluorescence has a much longer decay period than that of phosphorescence.
(B) Radiative transition from T_1 to S_0 is phosphorescence.
(C) Radiative transition from S_1 to S_0 is fluorescence.
(D) Enhancing the lifetime of the excited state is quenching.

5. Which of the following organs are correctly paired with their function?
(A) Large intestine — Protein digestion
(B) Oral cavity — Starch digestion
(C) Pancreas — Bile production
(D) Small intestine — Fat digestion

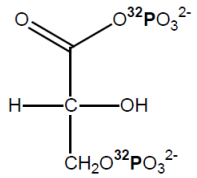
6. Glucose is incubated with enzymes of glycolytic pathway (except pyruvate kinase), gamma ^{32}P-ATP and unlabeled inorganic phosphate. Which of the following products is/are formed?



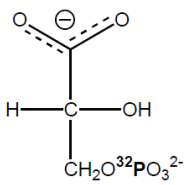
(A) Glucose 6-phosphate



(B) Fructose 1,6-bisphosphate

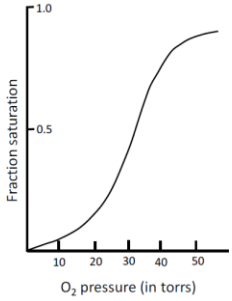


(C) 1,3-Bisphosphoglycerate



(D) 3-Phosphoglycerate

7. The characteristic oxygen binding profile of hemoglobin shown below arises due to the_____.



(A) quaternary structure
(B) subunit dissociation
(C) cooperativity
(D) conformational change

8. The advantage(s) of storing chemical energy in the form of starch and not as free glucose is/are that it_____.
(A) minimizes diffusion
(B) enables compact storage
(C) reduces osmotic pressure
(D) protects against chemical reactivity of aldehyde groups

9. Which of the following is(are) TRUE about photosynthesis?
(A) In C_3 plants the first organic product of carbon fixation is 3-phosphoglycerate.
(B) In C_4 plants the first organic product of carbon fixation is oxaloacetate.
(C) Crassulacean acid metabolism occurs in succulent plants living in arid conditions.
(D) Oxygen is generated from carbon dioxide.

10. Which of the following is(are) CORRECT?
(A) Both glucose and fructose have the same molecular formula.
(B) The positions of the oxygen and carbon differ in the structures of glucose and fructose.
(C) Both glucose and fructose have the same physical properties.
(D) Both glucose and fructose are monosaccharides.

11. Which of the following factors are responsible for conformational changes in biomolecules?
(A) pH
(B) Binding of ligands
(C) Surface groups
(D) Ion concentration

12. Which of the following sets of three items each belong to the category mentioned against them?
(1) Lysine, glycine, arginine – Amino acids
(2) Myosin, Oxytocin, Gastrin – Hormones

(3) Rennin, Helicase, Hyaluronidase – Enzymes
(4) Optic nerve, Oculomotor, Vagus – Sensory nerves

13. Which statement best describes how cholesterol affects cell membrane?
(1) With decrease in temperature it increases membrane fluidity.
(2) Cholesterol inhibits phase transitions in lipids
(3) With increase in temperature it increases membrane fluidity.
(4) At low concentration it makes bilayers less fluid.

14. The term SALTING IN refers to
(1) increasing the solubility of a protein in solution by adding ions.
(2) decrease in electrostatic free energy of the protein.
(3) decrease the activity of solvent.
(4) start at low temperature.

15. Which of the following amino acids are more likely to be found in a protein's interior away from aqueous solvent molecules?
(A) Val, and Lue **(B)** Ser, and Val
(C) Gln, and Tyr **(D)** Ile, Met and Phe

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16. A Glucogenic amino acid is one which is degraded to
(A) pyruvate. **(B)** citric acid cycle intermediates.
(C) keto-sugars. **(D)** acetoacetyl CoA.

17. Which characteristic does this double-stranded molecule have when it forms a B-DNA structure?
(1) The two strands will have parallel orientation and identical sequences.
(2) Every base-pair will contain one purine and one pyrimidine.
(3) The pyrimidine C2 keto group not involved in H-bonding in the A:T base pair.
(4) There are both covalent and non-covalent bonds between the two chains.

18. Which macromolecule are abundantly found though being of critical importance for biological mechanisms?
(A) Proteins **(B)** Lipids
(C) Nucleic acids **(D)** Polysaccharides

19. Which of the following are correctly matched pairs?
(A) Proteins – Peptide bond
(B) Nucleic acid – Hydrogen bond
(C) Polysaccharide – Glycosidic bond
(D) Phospholipids – Phosphate linkage

20. Which of the following statements are true?
(A) The reaction tends to go in the forward direction if ΔG is large and positive.
(B) The reaction tends to move in the backward direction if ΔG is large and negative.

(C) The system is at equilibrium if $\Delta G = 0$.
(D) The reaction tends to move in the backward direction if ΔG is large and positive.

Answer Key
1. (A), (C)
2. (A), (D)
3. (A), (B), (D)
4. (B), (C)
5. (B), (D)
6. (A), (B), (D)
7. (A), (C), (D)
8. (A), (B), (C), (D)
9. (A), (B), (C), (D)
10. (A), (B), (D)
11. (A), (B), (D)
12. (A), (C)
13. (A), (B)
14. (A), (B), (D)
15. (A), (D)
16. (A), (B)
17. (B), (C)
18. (A), (C), (D)
19. (A), (C), (D)
20. (A), (B), (C)