

**Quiz-1 (October 11, 2021)**

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**Duration: 10 mins**

**Total marks: 30**

1. Name the following:

- a) Two single celled eukaryotic organisms – [Amoeba and Yeast](#) (2 mark each)
- b) Energy currency of cell – [Adenosine triphosphate / ATP](#) (1 mark)
- c) Suicidal bag of cell – [Lysozymes](#) (1 mark)
- d) Cell organelle capable of reproducing on its own – [Mitochondria/Chloroplast](#) (1 mark)
- e) Unit for measuring the strength of a bond - [kcal/mol or kj/mol](#) (1 mark)
- f) Two cyclic isomers of glucose - [Galactose and Mannose](#) (2 mark each)
- g) Polysaccharide that makes the exoskeleton of insects – [Chitin](#) (1 mark)
- h) Condensed region of chromatin – [heterochromatin](#) (1 mark)
- i) Cytoskeleton found abundantly in muscles – [Actin](#) (1 mark)

2. Which of the following statements is incorrect?

- a. Phospholipids assemble into lipid bilayers with the help of hydrophobic forces.
- b. Nucleic acids contain sugar groups.
- c. Many amino acids have hydrophobic side chains.
- d. [DNA contains the four different bases A, G, U, and C.](#) (1 mark)

3. How many different molecules composed of four amino acids, linked together by peptide bonds, can be made from the set of 20 naturally occurring amino acids?

[20<sup>4</sup> = 160000](#) (2 marks) / [20<sup>4</sup>](#) (2 marks)

4. Which of the following forces determine the folding of a macromolecule into a unique shape? (1 mark)

- A. Covalent bonds
- B. Hydrogen bonds
- C. van der Waals attractions
- D. hydrophobic interactions
- E. ionic interactions

- a. A, B, D, E
- b. A, B, C, D
- c. [B, C, D, E](#) (1 mark)
- d. A, B, C, E
- e. A, C, D, E

5. Which of the following statements is/are correct?

- A. A DNA strand has a polarity because its two ends contain different bases.
- B. G-C base pairs are more stable than A-T base pairs.

- a. A
- b. B (1 mark)
- c. None of these
- d. Both of these

6. Mutation of Factor IX gene present on the X chromosome results in Hemophilia B in men. By contrast, most women carrying the mutation do not have this blood clotting disorder. Can you give a plausible explanation for this observation? If a woman has Hemophilia B, what can we say about her father and her mother? (4 marks)

These women carry this mutation only in one of their X chromosomes, which is inactivated. (2 marks)  
The father must be carrying the mutation on his X chromosome (1 mark). Mother may have the mutation in either one or both the copies of her X chromosomes. (1mark)

7. True or False

Each eukaryotic chromosome contains the following DNA sequence elements: multiple origins of replication, two telomeres, and one centromere - True (1 mark)

8. Which of the following statements is correct?

- A. A bacterial replication fork is asymmetrical because it contains two DNA polymerase molecules that are structurally distinct.
- B. Okazaki fragments are removed by a nuclease that degrades RNA.

- a. A
- b. B
- c. Both of these
- d. None of these (2 marks)

9. Match the following: (6 marks)

- |                   |  |
|-------------------|--|
| A. Topoisomerase  | i. Unwinds the double helical DNA                      |
| B. Primase        | ii. Degrades the RNA primer                            |
| C. DNA polymerase | iii. Releases the torsional tension during replication |
| D. DNA ligase     | iv. Adds nucleotides to the 3' end of a growing DNA    |
| E. Nuclease       | v. Seals DNA nick                                      |
| F. DNA helicase   | vi. Synthesizes the RNA primer                         |

- a. A-ii, B-vi, C-iv, D-v, E-iii, F-i
- b. A-iii, B-vi, C-iv, D-v, E-ii, F-i (6 marks)
- c. A-iii, B-ii, C-iv, D-v, E-vi, F-i
- d. A-i, B-vi, C-iv, D-v, E-ii, F-iii

10. True or False

Nucleosome core particles are 30 nm in diameter - False (1 mark)