

BB101
Quiz

21 February 2024

Total Marks: 10

Duration: 12 minutes

Name: _____

Roll No.: _____

1. Proteins have eight major functions namely defensive, enzymatic, structural, motor, transport, reception, storage, and hormonal. For each of the following protein, mention the corresponding protein function: (2 mark)
 - a. Collagen – *structural*
 - b. Actin – *motor*
 - c. Antibody – *defensive*
 - d. Insulin – *hormonal*
 - e. GPCR – *reception*
 - f. Hemoglobin – *transport*
 - g. Testosterone – *Hormone*
 - h. Ligase – *Enz*
 - i. DNA polymerase – *Enz.*
 - j. Ovalbumin – *storage*
2. Rahul wants to study about the Krebs's cycle. Which cell organelle should he research about? (0.5 mark)
 - a. Nucleus
 - b. Golgi Apparatus
 - c. Endoplasmic Reticulum
 - ☒ d. Mitochondria
3. SDS-PAGE is commonly used to analyze protein samples by separating them based on their: (0.5 mark)
 - a. Shape
 - b. Density
 - c. Charge
 - ☒ d. Size
4. Disulfide bonds are covalent interactions formed between the sulfur atoms of two cysteine residues. The enzyme RNase A requires the formation of four disulfide bonds among its 8 cysteine residues. If this is entirely a random phenomenon, the probability that the first disulfide bond will be formed is $1/7$. Following the same logic, what is the probability of the formation of all four disulfide bonds? (1 mark)

$$\frac{1}{105}$$

5. Which of the following high-throughput technique can be used to study biomolecular interactions? (0.5 mark)
- a. SDS-PAGE
 - b. Ion-Exchange chromatography
 - ☒ c. Protein Microarray
 - d. 2-Dimensional Electrophoresis
6. In convergent evolution, organisms share physical similarities because they: (0.5 mark)
- a. Have a common ancestor
 - b. Develop homologous structures
 - ☒ c. Live in the same environment
 - d. Are closely related
7. Two organisms that have a common ancestor, but overtime evolved into different species. This is called: (0.5 mark)
- a. Convergent Evolution
 - ☒ b. Divergent Evolution
 - c. Co-evolution
 - d. None of these
8. What type of metabolism allows you to break down food into energy for your cells? (0.5 mark)
- ☒ a. Catabolism
 - b. Anabolism
 - c. Hydration
 - d. Dehydration
9. Which of the following structures describes the overall 3D folding of a polypeptide? (0.5 mark)
- a. Primary level
 - b. Secondary level
 - ☒ c. Tertiary level
 - d. None of the above

10. Which one of the following is an example of anabolism? (0.5 mark)

- a. Fermentation
- b. Aerobic respiration
- c. Glycolysis
- ~~d. Photosynthesis~~

11. Match the following techniques to study proteins with their proteins. (1 mark)

Technique	Principle
a) 2-Dimensional Electrophoresis (ii)	I) Identification of charged molecular species based on mass to charge (m/z) ratio (b)
b) Mass Spectrometer (i)	II) Isoelectric point and molecular weight (a)
c) Surface Plasmon Resonance (iv)	III) Antigen-antibody reaction (d)
d) Protein Microarray (iii)	IV) Change in refractive index of medium directly in contact with the sensor surface (c)

12. Treatment of RNaseA with 8M urea, but without adding mercaptoethanol would: (0.5 mark)

- a. not have unfolded the protein.
- ~~b. denature the protein without formation of Cys-SH residues~~
- c. result in the formation of Cys-SH residues
- d. denature the protein and reduce the disulphide bonds

13. Match the following omics technologies with their corresponding definition: (1 mark)

Omics Technology	Application
a. Metabolomics (iv)	I) Study of the genes (a)
b. proteomics (ii)	II) Study of the proteins (b)
c. Genomics (i)	III) Study of RNA (d)
d. Transcriptomics (iii)	IV) Study of metabolites (c)

14. The strong conclusion from Anfinsen's work on RNaseA was that: (0.5 mark)

- ~~a. the native conformation of a protein is adopted spontaneously.~~
- b. irreversible denaturation of proteins violates the "Thermodynamic Hypothesis".
- c. Cys-SH groups are not found in vivo.
- d. disulfide bonds (S-S) in proteins can be reduced in vitro.