

Ph.D. ENTRANCE EXAMINATION, APRIL 2021**BIOCHEMISTRY**

Time : Two Hours

Maximum : 100 Marks

Part A*Choose the correct answer from given options.**Answer **all** questions.**Each question carries 2 marks .*

1. For an acid buffer solution the pH is 3. The pH can be increased by :
 - (a) Increasing the concentration of salt.
 - (b) Increasing the concentration of acid.
 - (c) Decreasing the concentration of salt.
 - (d) Independent of concentration of acid and salt.
2. What makes water a liquid at room temperature ?
 - (a) Hydrogen bonds between water molecules.
 - (b) Covalent bonding.
 - (c) Non covalent interactions.
 - (d) Van der Waals forces of attraction.
3. Which of the following does not affect the stability of α -helix ?
 - (a) Electrostatic repulsion.
 - (b) Bulkiness.
 - (c) Interaction between R groups spaced three residues apart.
 - (d) Occurrence of alanine and glycine residues.
4. Which of the following is an example of reversible inhibitor of enzyme ?
 - (a) DIPF.
 - (b) Penicillin.
 - (c) Iodoacetamide.
 - (d) Protease inhibitors.

Turn over

5. Which of the following forces is favorable for protein folding ?
- (a) Hydrophobic interactions. (b) Hydrogen bonding.
(c) Vander Waals forces. (d) Ionic bonding.
6. Name the amino acid which acts as a precursor of auxin biosynthesis ?
- (a) Serine. (b) Tryptophan.
(c) Valline. (d) Tyrosine.
7. Which of the following is the precursor of steroid hormone ?
- (a) Protein. (b) Cholesterol.
(c) Carbohydrate. (d) Lipid.
8. Who discovered nucleic acid ?
- (a) Watson and Crick. (b) Griffith.
(c) Friedrich Miescher. (d) Walter Gilbert.
9. Which type of chromatography can separate proteins based on enzyme-substrate binding ?
- (a) Affinity. (b) Thin layer.
(c) Size exclusion. (d) Ion exchange.
10. CHIP Assay is employed to identify :
- (a) Transcription factors. (b) Secretory proteins.
(c) Membrane bound proteins. (d) Membrane lipids.
11. Hershey and Chase experiment proving DNA as the genetic material was based on the principle :
- (a) Transduction. (b) Transformation.
(c) Transcription. (d) Translation.
12. cDNA is synthesized from RNA by the enzyme :
- (a) DNA polymerase. (b) DNA synthetase.
(c) DNA convertase. (d) Reverse transcriptase.

13. How many types of DNA libraries are possible ?
- (a) 1. (b) 2.
(c) 3. (d) 4.
14. Which of the following reagents would be most useful in determining the N-terminal amino acid of a polypeptide ?
- (a) 1 mol/L HCl. (b) Trypsin.
(c) Phenylisothiocyanate. (d) Cyanogen bromide.
15. Enzyme immobilization is commonly done with :
- (a) Sodium arginine. (b) Sodium alginate.
(c) Sodium glutamate. (d) Sodium pyruvate.
16. Which of the following instruments is based on Beer-Lambert law ?
- (a) Raman spectroscopy. (b) FTIR.
(c) Fluorescence spectroscopy. (d) UV-Vis Spectroscopy.
17. Which is the Positive acute-phase protein in the serum ?
- (a) Retinol binding protein. (b) Ceruloplasmin.
(c) Transferrin. (d) Albumin.
18. What is the role of SDS in SDS-PAGE ?
- (a) To reduce disulfide bonds.
(b) To cleave peptide bonds.
(c) To remove side chain of amino acids.
(d) To provides a negative charge to each protein.
19. Polyphenol found in green tea is :
- (a) Epigallocatechin. (b) Epigallocatechin gallate.
(c) Epicatechin. (d) All of the above.
20. Plasma membrane bulging in apoptosis is known as :
- (a) Blebbing. (b) Telomere.
(c) Spikes. (d) Apoptopodia.

21. DAPI is a :
- (a) DNA stain. (b) Nuclear counter stain.
(c) Fluorescent stain. (d) All of the above.
22. Which of the following proteins is the best indicator of hemolysis ?
- (a) Ceruloplasmin. (b) Hemosiderin.
(c) Transferrin. (d) Ferritin.
23. Committee constituted for human experimentation and ethics in India :
- (a) CECHR. (b) ICHR.
(c) IEC. (d) IIHR.
24. The committee constituted by all institutions in India handling hazardous micro-organisms and/or GE organisms is :
- (a) Genetic Engineering Appraisal Committee (GEAC).
(b) Genetic Engineering Approval Committee (GEAC).
(c) Review Committee on Genetic Manipulation (RCGM).
(d) Institutional Bio Safety Committee (IBSC).
25. A precise, testable statement of what the researcher predict will be the outcome of the study is :
- (a) Theory. (b) Argument.
(c) Hypothesis. (d) Experiment.

(25 × 2 = 50 marks)

Part B

*Answer all questions.
Each question carries 10 marks .*

1. What is CRISPR-Cas9 ? How does it work in genome editing ?
2. What is RT - PCR? How is the COVID-19 Virus detected using Real Time RT-PCR ?
3. What is Ramachandran plot ? What is its importance in protein structure prediction ?
4. Write an essay of in *silico* drug design? What are the methods involved in *silico* drug design ?
5. What is the role of THF in one carbon metabolism? Give an account on its application in medical field ?

(5 × 10 = 50 marks)