

P.G./INTEGRATED P.G. ENTRANCE EXAMINATION, APRIL 2023

BIOCHEMISTRY

Time : Two Hours

Maximum : 400 Marks

*Each question carries 4 marks.
1 mark will be deducted for each wrong answer.*

- Identify the radioactive isotope.
 - ^{13}C Carbon.
 - ^{14}C Carbon.
 - ^{16}O Oxygen.
 - Deuterium (^2H).
- The SI unit of radioactivity :
 - Becquerel.
 - Curie.
 - Geiger.
 - Radon.
- As the pKa of an acid increase, the acid will be :
 - More weaker.
 - More stronger.
 - Converted to neutral solution.
 - Converted to basic solution.
- Normal pH of blood is :
 - 7.0.
 - 7.2.
 - 7.3.
 - 7.4.
- The principal cation in extracellular fluid is :
 - Sodium.
 - Potassium.
 - Calcium.
 - Magnesium.
- What symbol is used to denote 'molarity' ?
 - M.
 - m.
 - mM.
 - n.

Turn over

7. Which cell organelle is involved in apoptosis :
- (a) Lysosome. (b) ER.
(c) Golgi. (d) Mitochondria.
8. Which of the following is energy independent ?
- (a) Active transport. (b) Primary active transport.
(c) Secondary active transport. (d) Passive transport.
9. Which amino acid is abundantly found in collagen ?
- (a) Tryptophan. (b) Alanine.
(c) Glycine. (d) Serine.
10. _____ is an example of epimers ?
- (a) Mannose and Glucose. (b) Glucose and Ribose.
(c) Galactose and Mannose. (d) Glucose and Galactose.
11. Glucose residues are linked β C1 - C4 glycosidic bonds in _____.
- (a) Starch. (b) Cellulose.
(c) Glycogen. (d) Amylose
12. Which of the following sugars give a positive test with Seliwanoff test ?
- (a) Glucose. (b) Galactose.
(c) Mannose. (d) Fructose.
13. Sugar present in DNA is _____.
- (a) β D ribose. (b) β D 2 deoxy ribose.
(c) α L ribose. (d) α deoxy ribose.

14. _____ is a choline-containing lipid ?
- (a) Phosphatidy lethanolamine. (b) Phosphatidylserine.
(c) Sphingomyelin. (d) Phosphatidy lglycerol.
15. A fatty acid which is not synthesized in the body and has to be supplied in the diet is :
- (a) Palmitie acid. (b) Lauric acid.
(c) Linolenic add. (d) Palmitic acid.
16. A Vitamin that helps blood clotting is :
- (a) Vit A. (b) Vit C
(c) Vit K. (d) Vit B6.
17. The primary structure of protein represents :
- (a) Linear sequence of amino acids joined by peptide bond.
(b) 3-dimensional structure of protein.
(c) Helical structure of proteins.
(d) Subunit structure of proteins
18. All are sequence alignment tools *except* :
- (a) Rasmol. (b) BLAST.
(c) FASTA. (d) Clustal W.
19. Which is a water-soluble vitamin :
- (a) Vitamin D. (b) Vitamin K.
(c) Vitamin C. (d) Vitamin A.
20. Nucleic acids and proteins absorb light respectively at :
- (a) 280 and 260 nm. (b) 260 and 280 nm.
(c) 270 and 280 nm. (d) 260 and 270 nm.

Turn over

27. Isoenzymes are :
- (a) Different forms of an enzyme that have different electrophoretic mobility but catalyse the same reaction.
 - (b) Different forms of an enzyme similar in all properties.
 - (c) Catalysing different reactions.
 - (d) Regulatory metabolites.
28. In column chromatography, the stationary phase is made of _____ and the mobile phase is made of _____.
- (a) Solid, liquid.
 - (b) Liquid, liquid.
 - (c) Liquid, gas.
 - (d) Solid, gas.
29. Which of the following factors does not influence electrophoretic mobility ?
- (a) Molecular weight.
 - (b) Shape of molecule.
 - (c) Size of molecule.
 - (d) Stereochemistry of molecule.
30. In a gel filtration column :
- (a) Smaller proteins enter the beads more readily.
 - (b) Large proteins elute first.
 - (c) Both (a) and (b).
 - (d) Large proteins enter the beads more readily.
31. In the electron transport chain the final acceptor of electron is :
- (a) Cytochrome b.
 - (b) Cytochrome a.
 - (c) Oxygen.
 - (d) CoQ.

Turn over

32. Fructose 1 6 diphosphate is cleaved into glyceraldehyde 3 phosphate and dihydroxy acetone phosphate by :
- (a) Enolase. (b) Aldolase.
(c) Dihydroxylase. (d) Phospho fructokinase
33. Carnitine is required for the transport of :
- (a) Cholesterol into liver.
(b) Triglycerides into mitochondria.
(c) Short chain fatty acids into mitochondria.
(d) Long chain fatty acids into mitochondria.
34. Transamination reactions are carried out by _____.
- (a) Aminotransferases. (b) Aminoacid carboxylase.
(c) Aminoacid oxidases. (d) Dehydrogenase.
35. Which of the following is the Complex I of the ETS ?
- (a) NADH dehydrogenase.
(b) Cytochrome aa3.
(c) Cytochrome bc1.
(d) ATP synthase.
36. Which of the following is correct sequence of processes in the oxidation of glucose ?
- (a) Krebs cycle - glycolysis - electron transport.
(b) Glycolysis - Krebs cycle - electron transport.
(c) Electron transport - Krebs cycle - glycolysis.
(d) Krebs cycle - electron transport - glycolysis.
37. Which of the following metabolite integrates glucose and fatty acid metabolism ?
- (a) Acetyl CoA. (b) Pyruvate.
(c) Citrate. (d) Lactate.

38. An uncoupler of oxidative phosphorylation such as dinitrophenol :
- (a) Inhibits electron transport and ATP synthesis.
 - (b) Allow electron transport to proceed but disrupts ATP synthesis.
 - (c) Inhibits electron transport without impairment of ATP synthesis.
 - (d) Specially inhibits complex 1.
39. The enzymes of β -oxidation are found in :
- (a) Mitochondria.
 - (b) Cytosol.
 - (c) Golgi apparatus.
 - (d) Nucleus.
40. Which organ synthesizes ketone bodies ?
- (a) Liver.
 - (b) Skeletal muscles.
 - (c) Kidney.
 - (d) Brain.
41. The rate limiting step of urea cycle is mediated by :
- (a) Arginase.
 - (b) Carbamoyl phosphate synthetase I.
 - (c) Arginosuccinate synthetase.
 - (d) Ornithine transcarbamoylase.
42. Albinism is caused by the deficiency of :
- (a) Tyrosinase.
 - (b) HMG CoA reductase.
 - (c) Phenylalanine hydroxylase.
 - (d) Arginase.
43. Where does the photosynthesis take place ?
- (a) Leaves.
 - (b) Chloroplast.
 - (c) Flowers.
 - (a) Root.
44. The bacterial cell multiplication is usually by :
- (a) Mitosis.
 - (b) Meiosis.
 - (c) Binary-fission.
 - (d) Conjugation.

Turn over

45. Conversion of inosine monophosphate to xanthine monophosphate is catalysed by :
- (a) IMP dehydrogenase.
 - (b) Formyl transferase.
 - (c) Xanthine-guanine phosphoribosyl transferase.
 - (d) Adenine phosphoribosyl transferase.
46. Which is the committed step of pyrimidine synthesis that exhibits allosteric inhibition by cytidine triphosphate :
- (a) Aspartate transcarbamoylase.
 - (b) Hypoxanthine Guanine phosphoribosyl Transferase.
 - (c) Thymidylate synthase.
 - (d) Xanthine oxidase.
47. Pyrimidine and purine nucleoside biosynthesis share a common precursor :
- (a) PRPP.
 - (b) Glycine.
 - (c) Fumarate.
 - (d) Alanine.
48. Which metal is present in the chloroplasts ?
- (a) Iron.
 - (b) Manganese.
 - (c) Magnesium.
 - (d) Cobalt.
49. In photosynthesis light energy is converted to :
- (a) Kinetic energy.
 - (b) Thermal energy.
 - (c) Chemical energy.
 - (d) Physical energy.
50. Isoelectric pH of an amino acid is that pH at which it has a :
- (a) Positive charge.
 - (b) Negative charge.
 - (c) Neutral charge.
 - (d) All of these.
51. _____ is a gaseous plant hormone.
- (a) IBA.
 - (b) Ethylene.
 - (c) Abscisic acid.
 - (d) NAA.

52. Name the class of secondary metabolites which is characterized by the presence of the hydroxyl group with an aromatic ring ?
- (a) Glycosides. (b) Phenolics.
(c) Alkaloids. (d) Terpenes.
53. The thick filaments in myofibrils are composed almost entirely of :
- (a) Actin. (b) Myosin.
(c) Troponin. (d) Tropomyosin.
54. The basic structure of antibodies are _____.
- (a) Y-shaped. (b) X-shaped.
(c) Linear. (d) Hyperbolic.
55. Which immunoglobulin can pass through placenta ?
- (a) IgD. (b) IgE.
(c) IgM. (d) IgG.
56. Name the class of immunoglobulin which takes part in hypersensitivity reaction ?
- (a) IgG. (b) IgE.
(c) IgA. (d) IgM.
57. Which of these is NOT a characteristic feature of adaptive immunity ?
- (a) Immunogenic memory. (b) Antigen nonspecific.
(c) Self/non-self recognition. (d) Diversity.
58. 2D gel electrophoresis separates proteins based on :
- (a) Molecular mass
(b) Differences in isoelectric points
(c) Affinity to gel
(d) Both (a) and (b).

Turn over

59. The immunity acquired by inoculation of living organism of attenuated virulence is :
- (a) Artificial active immunity. (b) Passive immunity.
(c) Natural active immunity. (d) Local immunity.
60. Differential staining of bacteria on Gram staining is due to
- (a) Difference in the cell wall components of Gram positive and Gram negative bacteria.
(b) Difference in the cell structure of Gram positive and Gram negative bacteria.
(c) Difference in the mode of nutrition of Gram positive and Gram negative bacteria.
(d) None of the above
61. What is the principle of ELISA ?
- (a) Amplification. (b) Antigen antibody interaction.
(c) Adhesion. (d) Adsorption.
62. Western blotting is the technique for the detection of :
- (a) Specific DNA in a sample. (b) Specific RNA in a sample.
(c) Specific protein in a sample. (d) Specific glycolipid in a sample.
63. Bacterial cell wall is made up of :
- (a) Chitin. (b) Cellulose.
(c) Dextran. (d) Peptidoglycan.
64. Which cell produces antibodies ?
- (a) Monocytes. (b) Basophils.
(c) Lymphocytes. (d) NK cells.
65. Coenzyme A contains the vitamin :
- (a) Riboflavin. (b) Pantothenic acid.
(c) Pyridoxine. (d) Thiamine.

66. What is the basic principle of immunisation and vaccination ?
- (a) It is based on the number of B and T lymphocytes.
 - (b) It is based on the property of memory of the immune system.
 - (c) It is based on antigen-anti body interactions.
 - (d) It is based upon the number of white blood cells.
67. Gout is due to the accumulation of :
- (a) Urea.
 - (b) Uric acid.
 - (c) Creatinine.
 - (d) Ornithine.
68. Which of the following best reflects kidney function ?
- (a) Glucose.
 - (b) Creatinine.
 - (c) LDL.
 - (d) HDL.
69. Which of the following plasma enzymes is increased in alcoholic subjects ?
- (a) Alkaline phosphatase.
 - (b) Acid Phosphatase.
 - (c) Lactate dehydrogenase.
 - (d) Gamma-glutamyl transferase.
70. Which of the following is not a liver function test ?
- (a) Serum Bilirubin.
 - (b) SGPT.
 - (c) Albumin.
 - (d) Urea.
71. HbA1c analysis reveals the mean glucose level over the previous :
- (a) 12 months.
 - (b) 2 to 3 months.
 - (c) 6 months.
 - (d) 8 months.
72. If sample is taken in EDTA tube, which of the following biochemistry test result will affect ?
- (a) Glucose.
 - (b) Urea.
 - (c) Cholesterol.
 - (d) Calcium.

Turn over

73. Beriberi is caused by deficiency of :
- (a) Vitamin B1. (b) Vitamin B12.
(c) Vitamin B2. (d) Vitamin B3.
74. The hormone which regulates the basal metabolism in our body is secreted from ?
- (a) Pancreas. (b) Adrenal cortex.
(c) Thyroid. (d) Pituitary gland.
75. Which of the following is an example of attenuated vaccine ?
- (a) Tetanus. (b) Hepatitis B.
(c) Meningococcal. (d) Smallpox.
76. Neurotransmitters carry signals across the _____.
- (a) Refractory gap. (b) Axonal gap.
(c) Synaptic gap. (d) Hippocampal gap.
77. The enzyme amino acyl tRNA synthetase is involved in :
- (a) Dissociation of discharged tRNA from 80S ribosome.
(b) Charging of tRNA with specific amino acids.
(c) Termination of protein synthesis.
(d) Nucleophilic attack on esterified carboxyl group of peptidyl tRNA
78. In DNA replication the enzyme required in the first step is :
- (a) DNA directed polymerase. (b) RNA poly merase.
(c) DNA ligase. (d) Helicase.
79. Sigma and Rho factors are required for :
- (a) Replication. (b) Transcription.
(c) Translation. (d) Polymerisation.

80. **Pyrimidine dimers** are formed on :
- (a) **Exposure to UV light.** (b) **On exposure to dark.**
(c) **On exposure to X rays.** (d) **On exposure to IR rays.**
81. **Chromosome constitution of normal human males** can be written as :
- (a) 46. (b) 44 + 2.
(c) 44A + XY. (d) 44A + XX.
82. **Anticodons** are present on :
- (a) **Coding strand of DNA.** (b) **mRNA.**
(c) **tRNA.** (d) **rRNA.**
83. **Golden rice** is a **genetically modified crop plant** where the incorporated genes are meant for biosynthesis of _____.
- (a) **Vitamin A.** (b) **Vitamin C.**
(c) **vitamin B.** (d) **Beta-carotene.**
84. The **trp operon** transcribed when :
- (a) **Trypsin is needed in the cell.**
(b) **Trypsinogen is available to the cell.**
(c) **There is not much tryptophan in the cell.**
(d) **There is lot of tryptophan in the cell.**
85. **Restriction enzymes** are named for :
- (a) **The person who discovered.**
(b) **The bacterium they are derived from.**
(c) **The viral DNA that they attack.**
(d) **None of the above.**

Turn over

86. Which enzyme is used for joining two different types of DNA molecules?
- (a) Ligase. (b) Endonuclease.
(c) Exonuclease. (d) Protease.
87. Who developed the chemical techniques to synthesize polynucleotides ?
- (a) Barbara McClintock. (b) James Watson.
(c) Fredrick Sanger. (d) H. Gobind Khorana
88. The most important feature in a plasmid to be used as a vector is _____.
- (a) Origin of replication(ori).
(b) Presence of a selectable marker.
(c) Presence of sites for restriction endonuclease.
(d) Its size.
89. The virus mediated gene transfer using genetically modified bacteriophage is called :
- (a) Transformation. (b) Transduction.
(c) Transfection. (d) Conjugation.
90. Introduction of DNA into cells by exposing to high electric pulse :
- (a) Electroporation. (b) Electrophoresis.
(c) Electro fission. (d) Electrolysis.
91. Glucagon is secreted by which type of pancreatic cell :
- (a) Beta cells. (b) Alpha cells
(c) D cells(Delta cells). (d) F cells (PP cells).
92. Thyroid hormones are synthesized by the iodination of _____ amino acid :
- (a) Phenylalanine. (b) Lysine.
(c) Tyrosine. (d) Glycine.

93. A hormone or ligand can be considered as _____.
- (a) First messenger. (b) Second messenger.
(c) Third messenger. (d) Fourth messenger.
94. G protein coupled receptor is :
- (a) An intracellular receptor.
(b) Extracellular receptor with no intracellular domain.
(c) 5 transmembrane domain receptors.
(d) 7 transmembrane domain receptors.
95. Which of the following is true of estroge ?
- (a) Responsible for high pitch voice.
(b) Regulation of female sexual behaviour.
(c) Regulation of the growth of female secondary organs.
(d) All of the above.
96. The hormone required for uterine muscle contraction for childbirth is :
- (a) Progesterone. (b) Estrogen.
(c) Oxytocin. (d) Vasopressin.
97. The hormone measured in urine to test pregnancy is :
- (a) Anterior pituitary luteinizing hormone.
(b) Androgen.
(c) Estrogen.
(d) Choroinic gonadotropin.
98. Steroid hormones are synthesised from :
- (a) Cholesterol. (b) 7-Dehydrocholesterol.
(c) Calcitriol. (d) 7-Hydroxycholesterol.

Turn over

99. Which of these is a second messenger ?

(a) ATP.

(b) cAMP

(c) AMP.

(d) GTP

100. Which of the following transports only one kind of substrate ?

(a) Uniport carriers.

(b) Symport carriers.

(c) Antiport carriers.

(d) Membrane proteins.