COMBINED TECHNICAL SERVICES EXAMINATION

(NON-INTERVIEW POSTS)

COMPUTER BASED TEST

PAPER – II – BIO CHEMISTRY

(PG DEGREE STANDARD) (CODE: 460)

1. Which Vitamin, while working in the lipid phase of membranes and guarding against the impacts of free radicals will function as the body's most significant antioxidant?

(A) Vitamin E
(B) Vitamin C
(C) Vitamin D
(D) Vitamin K
(E) Answer not known

2. Which among the unsaturated fatty acid present most abundant in milk fat?

(A) Linolenic acid
(B) Linoleic acid
(C) Oleic acid
(D) Palmitoleic acid
(E) Answer not known

3. H_2O_2 – Hydrogen peroxide is broken down to H_2O and O_2 by the enzyme

(A) Catalase
(B) Hydrolase
(C) Lipase
(D) Peroxidase
(E) Answer not known

4. What is the Primary role of Vitamic C in human body?

(A) Enhancing Vision
(B) Regulating blood sugar levels
(C) Blood clotting
(D) Acting as antioxidant
(E) Answer not known

5. This enzyme is responsible for the initial steps of β-oxidation of fatty acids

(i) Acetyl – CoA carboxylane

(ii) Succinyl – CoA

(iii) Enolase

(iv) Carnitine Palmitoyl transferase – I

(A) Step 1 – Digestion of lipids, Step 2 – Absorption of lipid, Step 3 – Oxidation to Acetyl CoA

(B) Step 1 – Acetyl CoA – fatty acid, Step 2 – Electron Transfer, Step 3 – Transport of lipid

(C) Step 1 – Acetyl CoA – CO_2, Step 2 – Fatty acid – Acetyl CoA, Step 3 – Transfer of Electron

✓(D) Step 1 – Fatty acid – Acetyl CoA, Step 2 – Acetyl CoA – CO_2, Step 3 – Transfer of electron

(E) Answer not known

6. Milk is deficient in which Vitamin?

✓(A) Vitamin C

(B) Vitamin B

(C) Vitamin A

(D) Vitamin K

(E) Answer not known

7. Which Vitamin behaves as an antioxidant?

(A) Vitamin A

(B) Vitamin D

(C) Vitamin B

✓(D) Vitamin C

(E) Answer not known

8. In the biosynthesis of Palmitate, _____ enzyme catalyzes migration of acetyl group from cysteine to malonyl group.

(A) β-Ketoacyl – ACP reductase
(B) Malonyl CoA – ACP transacylase
(C) β-Ketoacyl – ACP Synthase
(D) Acetyl CoA – ACP transacylase
(E) Answer not known

9. Among the following organs, which one do not utilize Ketone bodies?

(A) Liver
(B) Heart
(C) Brain
(D) Muscle
(E) Answer not known

10. When energy levels are low, triacyl glycerols and stored fat are degraded by the process called lipolysis, identify from the following the byproducts of lipolysis

(i) Fatty acid and glycerol
(ii) Glycerol and acetyl CoA
(iii) Acetyl CoA and fatty acid
(iv) Glycerol and glycerol 3 - phosphate

(A) (ii) and (iii)
(B) (i) only
(C) (i) and (ii)
(D) (iv) only
(E) Answer not known

11. All the Carbon atoms of Cholesterol derived from _____.

(A) Adipose
(B) Steroid
(C) Acetate
(D) Glycerol
(E) Answer not known

12. The first reaction step in lipogenesis is the conversion of

(A) Pyruvate to lactate
(B) Acetyl CoA to malonyl CoA
(C) Pyruvate to glycerol
(D) Oxaloacetate to acetyl CoA
(E) Answer not known

13. Accumulation of _____ is observed in Tay-Sachs disease.

(A) Sphingomyelin
(B) GM1 ganglioside
(C) GM2 ganglioside
(D) Thromboxane A2
(E) Answer not known

14. The amphipathic lipids form all the following, Except

(A) Miscells
(B) Liposomes
(C) Lipid bilayer
(D) Triacylglycerol
(E) Answer not known

15. Gallstones result from the formation of _____ rich stones.

(A) Phosphates
(B) Bile acids
(C) Steroids
(D) Cholesterol
(E) Answer not known

16. Phosphoglycerides are found in membranes. Which one of the following phosphoglycerides is also called as Cardiolipin?

(A) Phosphatidylcholine
(B) Phosphatidylserine
(C) Phosphatidyl glycerine
(D) Diphosphatidyl glycerol
(E) Answer not known

17. Phospholipids and Sphingolipids are degraded in

(A) Mitochondria
(B) Ribosomes
(C) Nucleus
(D) Lysosomes
(E) Answer not known

18. Melting point of the fatty acids are determined by the following factors:

(A) Length of the hydrocarbon chain and OH group
(B) Length and degree of unsaturation of the hydrocarbon chain
(C) Degree of the unsaturation of the hydrocarbon chain and carboxylic acid group
(D) Length and –OH group of the hydrocarbon chain
(E) Answer not known

19. Which among the following is a non-Amphipathic lipid?

(A) Fatty acid
(B) Phospholipid
✓(C) Triacylglycerol
(D) Sphingolipid
(E) Answer not known

20. Upon heating the gel, nature of glycerophospholipids changes to

(A) Crystalline state
(B) Liquid state
✓(C) Liquid crystalline state
(D) Gel nature retained
(E) Answer not known

21. Which among the following statements are true about enzymic antioxidants?

(i) Catalase uses Hydrogen peroxide as electron donor.
(ii) Superoxide dismutase act as both oxidant and reductant.
(iii) Vitamin E act as a scavengers of free radicals.

(A) (i) and (ii)
✓(B) (i) and (iii)
(C) (ii) and (iii)
(D) (i), (ii) and (iii)
(E) Answer not known

22. The components of respiratory chain that act as proton pumps are

(A) Complex I, II and III
(B) Complex II, III and IV
(C) Complex I, III and IV
(D) Complex I, II and IV
(E) Answer not known

23. Enzymes accelerate reactions by

(A) Increasing the free energy of activation
(B) Decreasing the free energy of activation
(C) Increasing ΔG of the reaction
(D) Decreasing ΔG of the reaction
(E) Answer not known

24. Two types of enzymes found both in animals and plants are categorized under

(A) Peroxidases and Catalase
(B) Oxidases and Oxygenases
(C) Oxidases and Peroxidases
(D) Dehydrogenases and Hydroxylases
(E) Answer not known

25. What is the energy of hydrolysis of a thioester?

(A) 12 KJ/mol
(B) 24 KJ/mol
(C) 33 KJ/mol
(D) 50 KJ/mol
(E) Answer not known

26. The functions flaring group dependent Dehydrogenase Enzymes are presenting compartmentalization is

(A) Lysosomes
(B) Peroxysomes
(C) Microsomes
(D) Mitochondria
(E) Answer not known

27. All of the below compounds are inhibitors of electron transport chain, except

(A) Antimycin A
(B) Amytal
(C) Rotenone
(D) Rifampicin
(E) Answer not known

28. Which part of the ATP synthase has the catalytic activity?

(A) F_0 subunit
(B) F_1 subunit
(C) Both F_0 and F_1 subunits
(D) Neither F_0 nor F_1 subunit
(E) Answer not known

29. Assertion [A] : ATP is called the energy "currency" of the cell.

Reason [R] : ATP passes on this free energy to drive the processes requiring energy.

(A) [A] is true, but [R] is false

(B) Both [A] and [R] are true; and [R] is the correct explanation of [A]

(C) [A] is false, but [R] is true

(D) Both [A] and [R] are true, but [R] is not the correct explanation of [A]

(E) Answer not known

30. Assertion [A] : Oxidative Phosphorylation takes place in the Inner Mitochondrial membrane.

Reason [R] : The increase in surface area of the inner mitochondrial membrance creates more sites for oxidative phosphorylation.

(A) [A] is true, but [R] is false

(B) Both [A] and [R] are true; and [R] is the correct explanation of [A]

(C) [A] is false, but [R] is true

(D) Both [A] and [R] are true, but [R] is not the correct explanation of [A]

(E) Answer not known

31. Which part of the F_1F_0 – ATP ase complex remain stationary?

(A) $\gamma\varepsilon - C_{12}$ complex

(B) $ab_2 - \alpha_3\beta_3$ complex

(C) $ab_2 - \alpha_3\beta_3\delta$ complex

(D) $ab - \alpha_3\beta_3\delta$ complex

(E) Answer not known

32. Electron flow in cytochrome *c* oxidase can be blocked by

(A) Cyanide, azide and carbon monoxide
(B) Rotenone
(C) Amytal
(D) Antimycin
(E) Answer not known

33. Oxydative Phosphorylation results in the formation of

(A) NADH
(B) ADP
(C) ATP
(D) Oxygen
(E) Answer not known

34. Identify the correct pair of mitochondrial compartments and its corresponding enzymes:

(1)	Outer membrane	–	Creatine Kinase
(2)	Inter membrane space	–	F_0F_1 ATP synthase
(3)	Inner membrance	–	Cytochrome C
(4)	Matrix	–	Pyruvate dehydrogenase complex

(A) (1) and (2) correctly paired
(B) (2) and (3) correctly paired
(C) (3) and (4) correctly paired
(D) (4) and (1) correctly paired
(E) Answer not known

35. Which among the following inhibits or blocks electron transfer in the Electron transport chain?

(A) Oligomycin
(B) 2, 4, dinitrophenol
(C) Rotenone
(D) Atractyloside
(E) Answer not known

36. The classical pathway for apoptosis triggers the activation of

(A) Amylases
(B) Carboxylases
(C) Proteases
(D) Lipases
(E) Answer not known

37. During apoptosis, the following cellular morphological feature exists, except

(A) Chromatin condensation
(B) Blebbing of cells
(C) Cellular swelling
(D) Cellular shrinkage
(E) Answer not known

38. The molecule that is transported into mitochondria through the carnitine system is

(A) 3-hydroxy butyric acid
(B) Aceto acetic acid
(C) Long-chain fatty acids
(D) Acetic acid
(E) Answer not known

39. Which of the following statement is Not true for ferroptosis?

(A) Regulated cell death
(B) Requires iron
(C) Similar to Apoptosis
(D) Toxic buildup of lipid peroxidation
(E) Answer not known

40. The three Ras genes present in humans are

(A) H-ras, N-ras and K-ras
(B) H_a-ras, N-ras and K-ras
(C) H_a-ras, N_a-ras and K-ras
(D) H-ras, N_a-ras and K-ras
(E) Answer not known

41. In Casein Ca^{2+} binds to protein via _____ group.

(A) Carboxylate
(B) Amino
(C) Phosphate
(D) Hydroxyl
(E) Answer not known

42. Which of the following protein not present in the supernatant liquid when milk is acidified?

(A) Casein
(B) Lactalbumin
(C) Lactoglobulin
(D) Whey
(E) Answer not known

43. Colostrum of human milk has Whey : Casein ratio of

(A) 10 : 90
(B) 90 : 10
(C) 60 : 40
(D) 40 : 60
(E) Answer not known

44. Milk is deficient in the mineral

(A) Iron
(B) Potassium
(C) Calcium
(D) Sodium
(E) Answer not known

45. Whey : Casein ratio of mature milk of human is

(A) 90 : 10
(B) 10 : 90
(C) 60 : 40
(D) 40 : 60
(E) Answer not known

46. Alkaptonuric patients suffer from arthritis due to deposition of _____.

(A) Benzoquinone acetate
(B) Alkapton
(C) Tyrosine
(D) *p* – Hydroxy phenyl pyruvate
(E) Answer not known

47. Treatment of maple syrup urine disease entails rigid control of diet limiting the intake of _____ amino acid.

(A) Leucine
(B) Alanine
(C) Phenyl alanine
(D) Glycine
(E) Answer not known

48. The inheritable disease alkaptonuria occurs due to defectiveness in catabolism of _____ amino acid.

(A) Proline
(B) Phenyl alanine
(C) Glutamine
(D) Glutamate
(E) Answer not known

49. The name phenylketonuria is coined due to the presence of which metabolites?

(A) Phenyl lactate
(B) Phenyl acetate
(C) Phenyl pyruvate
(D) Phenyl acetyl glutamine
(E) Answer not known

50. In the synthesis of glutamate from α–ketoglutarate, glutamine serves as a _____.

(A) Carbon source
(B) Oxygen source
(C) Sulfur source
(D) Nitrogen source
(E) Answer not known

51. Which of the amino acid is Not derived from Pyruvate?

(A) Leucine
(B) Isoleucine
(C) Valine
(D) Glycine
(E) Answer not known

52. The activity of transaminases are dependent on the coenzyme _____.

(A) Biotin
(B) Pyridoxal phosphate
(C) Coenzyme A
(D) FAD
(E) Answer not known

53. Indole acetate is an intermediate formed during catabolism of _____ amino acid.

(A) Tyrosine
(B) Phenylalanine
(C) Tryptophan
(D) Lysine
(E) Answer not known

54. In the catabolism of Methionine to succinyl – CoA, the process that is involved in the conversion of methylmalonyl – CoA to Succinyl – CoA is _____.

(A) Transamination
(B) Oxidative decarboxydation
(C) Epimerization
(D) Reductive amination
(E) Answer not known

55. Carbamoyl group in Urea cycle is activated by formation of _____.

(A) Carbamoyl amide
(B) Carbamoyl acetate
(C) Guanidine
(D) Carbamoyl phosphate
(E) Answer not known

56. Choose the right matches among the following:

(1)	Collagen of tendons	–	Soft and flexible
(2)	α-helix with s-s crosslink	–	Tough, insoluble
(3)	α-keratin	–	Right handed α-helix
(4)	Silk fibroin	–	Collagen triple helix

(A) (1) and (2) correct
✓(B) (2) and (3) correct
(C) (3) and (4) correct
(D) (4) and (1) correct
(E) Answer not known

57. The peptide alanyl, glutamyl alanyl glycyl leucine has _____ peptide bonds.

(A) 3
✓(B) 4
(C) 5
(D) 6
(E) Answer not known

58. β-hairpin motif has

✓(A) antiparallel strands connected by tight reverse turns
(B) parallel strands connected by reverse turns
(C) parallel strands connected by loop
(D) 2 helix are connected
(E) Answer not known

59. Choose the right matches from the following:

(1) Histidine – Basic amino acid
(2) Proline – Aliphatic cyclic amino acid
(3) Tyrosine – Aromatic amino acid
(4) Glutamine – Acidic amino acid

(A) (1) and (2) but not (3)
(B) (1) and (4) but not (3)
(C) (2) and (3) but not (1)
✓(D) (2) and (3) but not (4)
(E) Answer not known

60. Which among the following statements are true about selenocysteine?

(i) is derived from serine
(ii) is derived from cysteine
(iii) is a rare aminoacid coded by UGA
(iv) is created by photosynthetic modification

✓(A) (i) and (iii) only
(B) (i) and (iv) only
(C) (ii) and (iv) only
(D) (ii) and (iii) only
(E) Answer not known

61. What is the role of the glucose uniporter GLVT 2?

(A) Glucose uptake
✓(B) Rapid uptake or release of glucose
(C) Insulin-stimulated glucose uptake
(D) Absorption of glucose
(E) Answer not known

62. Glycophorin is a trans membrane protein found on erythrocytes. Identify the incorrect statement about glycophorin.

(A) Amino terminal end is on the outer surface
(B) Carboxy terminal is on the outer surface
(C) Carboxy terminus is on the inner surface
(D) Amino terminus can be cleared by trypsin
(E) Answer not known

63. Which among the following serves as a Marker for Plasma membrane?

(A) Glucose 6-phosphatase
(B) Adenylylcyclase
(C) ATP synthase
(D) Sialyl transferase
(E) Answer not known

64. Lipids and proteins are integral part of biological membranes, however, not all lipids are present in all cell types. From the list below identify the characteristic lipids associated with mitochondrial membranes.

(A) Cholesterol
(B) Sphingolipid
(C) Cardiolipin
(D) Phosphatidyl Choline
(E) Answer not known

65. Amoeboid movement

(A) Cellular locomotion
(B) Cell breakdown
(C) Receptors
(D) Cell adhesion
(E) Answer not known

66. Which type of ATPase pumps protons using the energy of ATP hydrolysis?

(A) P-type ATPase
(B) V-type ATPase
(C) T-type ATPase
(D) Na^+ K^+ ATPase
(E) Answer not known

67. The hormone, vasopressin causes translocation of aquaporins from cytoplasm to the basolateral membrane of the collecting duct cells, this promotes

(A) Reabsorption of water from the body
(B) Imbalance in body water volume
(C) Lowering of the body water content
(D) Reabsorption of water from the renal tubules
(E) Answer not known

68. Which among the following protein present in the tight junctions of cell membrane prevent the diffusion of macromolecules between cells?

(A) desmosome
(B) careolin
(C) adherens
(D) occludin
(E) Answer not known

69. _____ allow the passage of ions such as Na^+, K^+ or Cl^- across the plasma membrane.

(A) Membrane proteins
(B) Membrane lipids
(C) Ion channels
(D) Carrier proteins
(E) Answer not known

70. Choose the multidrug resistance transporter from the following:

(A) P-type ATPases
(B) V-type ATPases
(C) ABC transporters
(D) A-type ATPases
(E) Answer not known

71. Mention the optimum pH for cell culture.

(A) 5.5 – 6.5
(B) 6.5 – 7.1
(C) 7.2 – 7.4
(D) 7.5 – 8.2
(E) Answer not known

72. Hybridoma cells used for the production of antibodies can be grown in

(A) Glass bead reactor
(B) Airlift fermenter
(C) Ceramic matrix
(D) Hollow fibre reactor
(E) Answer not known

73. The protective agent used during Cryopreservation is

(A) Glycerol
(B) Fetal Bovine Serum
(C) Antibiotics
(D) Phosphate Buffered Saline
(E) Answer not known

74. The first mammalian cell cultures date back to the early 20th century. Who showed the first nerve fibre growth in vitro?

(A) Alexis Carrel
(B) Ross Harrison
(C) Rous and Jone
(D) Carrel and Rivera
(E) Answer not known

75. Among the following, which is not an example of natural media?

(A) Serum Lymph
(B) MEM
(C) Pleural fluid
(D) Extracts of spleen
(E) Answer not known

76. Production of which hormones causes the deactivation of cAMP cascade?

(A) Glucagon
(B) Insulin
(C) Epinephrine
(D) Estrogen
(E) Answer not known

77. Which among the following induces gene expression?

(A) Cell surface receptors
(B) Toll-like receptors
(C) Nuclear receptors
(D) Ligand-gated ion channel receptors
(E) Answer not known

78. The neurotransmitters that are delivered to target cells at specialised cell functions are called

(A) Synaptic signalling
(B) Paracrine signalling
(C) Endocrine signalling
(D) Autocrine signalling
(E) Answer not known

79. Name the active aminoacid located in the activation loop of the insulin receptor involved PTK activity.

(A) Tyrosine
(B) Glycine
(C) Serine
(D) Lysine
(E) Answer not known

80. An example of a signal that act through phospholipase C and IP3 pathway is

(A) Glucagon
(B) Cortico tropin
(C) Thyrotropin releasing hormone
(D) Serotonin
(E) Answer not known

81. Which spectral-technique is most suitable for determining the molecular structure of metabolomics?

(A) NMR spectroscopy
(B) UV-Vis spectroscopy
(C) IR spectroscopy
(D) X-ray Diffraction
(E) Answer not known

82. What is the wavelength of protein in spectro photometer?

(A) 280 nm
(B) 240 nm
(C) 320 nm
(D) 250 nm
(E) Answer not known

83. Which one of the following does not correspond to chromatography techniques?

(A) Eluting agents
(B) Hydrogen bonding agents
(C) Calcium sulphate
(D) Helium gas
(E) Answer not known

84. The energy released during the transition of a nuclear spin from the higher to the lower energy state can be emitted as heat into the environment and is called as

(A) Chemical shift
(B) Spin-spin coupling
(C) Spin lattice relaxation
(D) Integration
(E) Answer not known

85. Which type of light is used in circular dichroism spectroscopy?

(A) Unpolarised light
(B) Stray light
(C) Left and right handed polarized light
(D) Infrared light
(E) Answer not known

86. Among the radioisotopes, all are β emitters, except

(A) ^{32}P
(B) ^{125}I
(C) ^{35}S
(D) ^{14}C
(E) Answer not known

87. Posimetry is an analytical technique that measures the amount of radiation by

(A) Geiger-Muller Counter
(B) Auto radiography
(C) Scintillation Counter
(D) Gamma Counter
(E) Answer not known

88. Consider following terms. Identify those which are not relevant to Atomic Force Microscopy.

(A) Surface topography of the specimen
(B) Intact the Biological molecules
(C) Nano scale technology
(D) Ligand-Receptor bond
(E) Answer not known

89. FISH – Fluorescence Insitu Hybridization employs the specificity of florescently labelled

(A) DNA and RNA sequences
(B) Peptide sequences
(C) Aminoacid sequences
(D) Polymer sequences
(E) Answer not known

90. Which type of radiation is the most penetrating?

(A) Alpha particles
(B) Beta particles
(C) Gamma rays
(D) Neutrons
(E) Answer not known

91. All the following are connected to Western blot, except

(A) Nitrocellulose membrane

(B) Ponceau staining

(C) Silver staining

(D) Use of primary and secondary antibodies

(E) Answer not known

92. Separation of proteins can be done using several chromatographic techniques. Match the following techniques that can be used to separate the proteins listed:

List I		List II
(a) Size exclusion chromatography	–	1. Protein that bind to ATP
(b) Anion exchange chromatography	–	2. +vely charged protein
(c) Adsorption chromatography	–	3. Large proteins above 5000 kDa
(d) Cation exchange chromatography	–	4. Negatively charged protein

	(a)	(b)	(c)	(d)
(A)	3	4	2	1
(B)	3	2	1	4
(C)	3	2	4	1
(D)	3	4	1	2

(E) Answer not known

93. Cross linkers are used to stabilize acrylamide gels, identify the cross linker from the following list of molecules.

(A) Mercapto ethanol

(B) Sodium dodecyl sulphate

(C) Bis acrylamide

(D) Ammonium persulfate

(E) Answer not known

94. The ratio of velocity *(V)* of biomolecule in a medium under constant electric field *(E)* is called Electrophoretic mobility of an ion and is denoted as 'μ'. 'μ' is mathematically expressed as

(A) $\mu = E/V$

(B) $\mu = V/E$

(C) $\mu = 1/EV$

(D) $\mu = VE$

(E) Answer not known

95. Which among the following statements about a molecular probe is true?

(i) Short complementary DNA fragment.

(ii) Can be labelled with radio isotope.

(iii) Binds to complementary strand on the agarose gel.

(iv) Binds to complementary strand on the nitro cellulose membrane.

(A) (i) and (iii) but not (ii)

(B) (i) and (ii) but not (iii)

(C) (i), (ii) and (iii)

(D) (i), (ii) and (iv)

(E) Answer not known

96. Retention time can be determined in the one of the followings:

(A) Paper chromatography
(B) Thin layer chromatography
(C) Gel filtration chromatography
(D) HPLC
(E) Answer not known

97. In molecular-sieve chromatography, the elution time is a function of

(A) Molecular weight and size
(B) Molecular size and shape
(C) Molecular weight and shape
(D) Molecular size and charge
(E) Answer not known

98. Which of the following is used as a carrier gas in gas chromatography?

(A) Carbon dioxide
(B) Helium
(C) Oxygen
(D) Methane
(E) Answer not known

99. Chromatography with solid stationary phase is called

(A) Circle chromatography
(B) Square chromatography
(C) Solid chromatography
(D) Adsorption chromatography
(E) Answer not known

100. In a chromatographic separation which one of the following is most appropriate to elute the substances?

(A) Taking factor
(B) Quality factor
(C) Retention time
(D) Resolution
(E) Answer not known

101. Lactose is a reducing sugar because

(A) The reducing end of galactose is free
(B) The reducing end of glucose is free
(C) The reducing ends of both the monosaccharides are free
(D) Lactose receives hydrogen from other donors
(E) Answer not known

102. The monosaccharide units are linked by α 1-4 glycosidic linkage is

(A) Maltose
(B) Sucrose
(C) Cellulose
(D) Cellobiose
(E) Answer not known

103. In which of the following groups are all Polysaccharides?

(A) Sucrose, glucose and fructose
(B) Maltose, lactose and fructose
(C) Glycogen, sucrose and maltose
(D) Glycogen, cellulose and starch
(E) Answer not known

104. Cellulose, a tough fibrous, water insoluble, unbranched homopolysaccharide cannot be digested easily by humans. Which among the following statements is not true about cellulose?

(A) Cellulose is secreated by symbiotic micro organisms in cattle

(B) Cellulose is not secreted in saliva of humans

(C) Cellulose degrades ($\beta\, 1 \rightarrow 4$) glycosidic linkages

(D) Cellulose degrades ($\alpha\, 1 \rightarrow 4$) glycosidic linkages

(E) Answer not known

105. Among the following, which are epimers?

(i) D-Glucose and D-Galactose

(ii) D-Glucose and L-Glucose

(iii) D-Glucose and D-Mannose

(iv) D-Galactose and D-Mannose

(A) (i) and (iii)

(B) (i) and (iv)

(C) (ii) and (iv)

(D) (ii) and (iii)

(E) Answer not known

106. During anaerobic glycolysis, pyruvate is converted to lactate for

(A) removal of pyruvate

(B) removal of fructose

(C) generation of NAD^+

(D) generation of H^+

(E) Answer not known

107. During the light reactions of photosynthesis, energy absorbed from sunlight drives the synthesis of _____ and _____, coupled to the oxidation of H_2O to O_2.

(A) NADPH, GTP
(B) ATP, Acetyl – CoA
(C) ATP, NADPH
(D) NADPH, Acetyl CoA
(E) Answer not known

108. Which among the following coenzymes is not part of Pyruvate dehydrogenase complex?

(A) CoA-SH
(B) NAD^+
(C) TPP
(D) $NADP^+$
(E) Answer not known

109. Pyruvate formed by glycolysis is converted to _____ under aerobic conditions.

(A) Acetyl CoA
(B) Lactate
(C) Ethanol
(D) Phosphoenol Pyruvate
(E) Answer not known

110. Under anaerobic conditions, the possible catabolic fates of pyruvate includes

(i) Fermentation to alcohol

(ii) Formation of Acetyl Co-A

(iii) Fermentation to lactate

(A) (i) only
(B) (iii) only
(C) (i) and (iii) only
(D) (i) and (ii) only
(E) Answer not known

111. Plants contain which one of the following specialized organelles that involves in gluconeogenesis?

(A) Cellular wall
(B) Mitochondria
(C) Lysosomes
(D) Glyoxysomes
(E) Answer not known

112. The light reaction of photosynthesis generates NADPH and ATP. This process is supported by which one of the following?

(A) Glyoxysomes
(B) Lysosomes
(C) Photosystem I and II
(D) Ribosomes
(E) Answer not known

113. The interconversion of Lactate to Pyruvate is catalysed by the enzyme _____.

(A) Pyruvate DHase
(B) Lactate DHase
(C) Thiolase
(D) Thiokinase
(E) Answer not known

114. In the calvin cycle of photosynthesis _____ molecules of carbon dioxide are used to generate a molecule of glucose.

(A) 3
(B) 4
(C) 5
(D) 6
(E) Answer not known

115. The Phytol chain is attached to which Pyrrole ring of chlorophyll?

(A) Ring I
(B) Ring II
(C) Ring III
(D) Ring IV
(E) Answer not known

116. If the methyl group of Pyrrole ring II of chlorophyl *a* is replaced by aldehyde group, _____ is obtained.

(A) Phycobillin
(B) Phyco erythrobillin
(C) β-Carotene
(D) Chlorophyll *b*
(E) Answer not known

117. Match correctly the fat soluble vitamin with functions:

List I	List II
(a) Vitamin A	1. Anti-hemorrhagic factor
(b) Vitamin D	2. Growth factor
(c) Vitamin E	3. Maintains calcium and phosphorous in blood
(d) Vitamin K	4. Anti-sterility factory

	(a)	(b)	(c)	(d)
(A)	2	3	4	1
(B)	3	2	4	1
(C)	4	2	3	1
(D)	4	2	1	3

(E) Answer not known

118. Tetrahydrafolates is a carrier of an

(A) Two carbon units
(B) One carbon units
(C) Three carbon units
(D) Four carbon units
(E) Answer not known

119. Vitamin D regulates the plasma levels of _____ and _____.

(A) Calcium and Phosphate
(B) Acid and Alkaline
(C) Zinc and Iron
(D) Phosphate and Zinc
(E) Answer not known

120. Consumption of raw eggs can cause deficiency of

(A) Calcium
(B) Lipoic acid
(C) Biotin
(D) Vitamin A
(E) Answer not known

121. Immune response is suppressed by

(A) Helper T Cells
(B) B Cells
(C) NK Cells
(D) Regulatory T Cells
(E) Answer not known

122. Immunoglobulin M molecules usually have

(A) a secretory piece
(B) 8 heavy chains
(C) a J chain
(D) the capacity to cross the placenta
(E) Answer not known

123. The Maturation of Immune system cells by some soluble factor namely

(A) Mutagens
(B) Mitogens
(C) Hormone like substance
(D) Secretins
(E) Answer not known

124. A Hapten

(A) is the Epitope of an antigen
(B) is the paratope of an antibody
(C) is a carrier molecule
(D) needs a carrier to become immunogenic
(E) Answer not known

125. Among the following statements about antibody production, which ones are false?

(i) An antigen induces antibody production.
(ii) A Hapten by itself can elicit production of specific antibodies.
(iii) A Hapten when covalently attached to a larger molecule can act as an antigenic determinant.
(iv) Every human can produce about 1×10^3 different antibodies.

(A) (i) and (ii) are false
(B) (ii) and (iii) are false
(C) (ii) and (iv) are false
(D) (iii) and (iv) are false
(E) Answer not known

126. This Live, attenuated vaccine is from viral origin

(A) Rubella vaccine
(B) BCG vaccine
(C) Cholera vaccine
(D) Typhoid vaccine
(E) Answer not known

127. Among the following statements, which are true regarding pus?

(i) They comprise of live and dead B cells.

(ii) It reflects an acute inflammatory process.

(iii) It may be localized or disseminated through tissue planes.

(iv) Infections which induce pus formation are called apyogenic infections.

(A) (i) and (ii) are true
(B) (ii) and (iii) are true
(C) (iii) and (iv) are true
(D) (i) and (iv) are true
(E) Answer not known

128. The process of reducing the virulence of pathogens, retaining their antigenicity is termed as _____.

(A) Exaltation
(B) Attenuation
(C) Inactivation
(D) Resolution
(E) Answer not known

129. The nature of the vaccine used against Tetanus is _____.

(A) Inactivated exotoxin
(B) Attenuated bacteria
(C) Live bacteria
(D) Polysaccharides derived from tetani
(E) Answer not known

130. Natural Killer (NK) cells can recognize and destroy target cells through which of the following mechanisms?

(A) By expressing T-Cell receptors that specifically recognize tumor antigen.

(B) By binding to antigens presented by MHC class II molecules on the target cells.

(C) By using NK cells receptors to detect reduced class I MHC molecules or abnormal surface antigens.

(D) By producing antibodies against the target cells and causing direct lysis.

(E) Answer not known

131. Macrophages phagocytize a foreign cell and incorporate foreign cell antigen with _____. Macrophages adopt this mechanism of presenting the foreign antigen to other immune cells.

(A) MHC – I

(B) MHC – II

(C) NH Cells

(D) Neutrophils

(E) Answer not known

132. The main function of MHC – II molecules is _____.

(A) Presentation of self antigens

(B) Presentation of foreign antigens

(C) Cell adhesion to vascular endothelium

(D) Cell adhesion to extra cellular matrix

(E) Answer not known

133. The gene for the λ light chain in humans is encoded in _____ chromosome.

(A) 2 (B) 14

(C) 22 (D) 12

(E) Answer not known

134. How many Beta pleated sheets make up the peptide building cleft in MHC – II molecules?

(A) 4 (B) 2

(C) 6 (D) 8

(E) Answer not known

135. With reference to major histo compatibility complex, which of the following statements are true?

(i) Class I MHC molecules are expressed on all nucleated cells.

(ii) Class II MHC are involved in presentation of endogenous antigens to helper T Cells.

(iii) $CD8^+$ T Cells are class II MHC restricted.

(iv) Class III MHC are involved in inflammation.

(A) (i) and (iii) are true (B) (i) and (iv) are true

(C) (ii) and (iv) are true (D) (ii) and (iii) are true

(E) Answer not known

136. Which of the following antibodies has high chance of developing Type III hypersensitivity?

(A) Ig A (B) Ig E

(C) Ig D (D) Ig M

(E) Answer not known

137. Acute rejection duration taking place in time in transplantation and mediated Lymphocytes

(A) months
(B) years
(C) days or weeks
(D) with in minutes
(E) Answer not known

138. Which of the following is example for Type III hypersensitivity?

(A) Asthma
(B) Serum sickness
(C) Hay fever
(D) Hemolytic disease of the newborn
(E) Answer not known

139. A person with 'B' group blood is transfused with 'A' blood. What kind of adverse reaction he is expected to develop?

(A) Asthma
(B) Hemolysis
(C) Glioma
(D) Crohn's disease
(E) Answer not known

140. Transplantation of tissues between the genetically identical individuals of same species is termed _____.

(A) Isograft
(B) Allograft
(C) Autograft
(D) Xenograft
(E) Answer not known

141. Among the following statements regarding enzyme, which are true?

(i) Amino acids at a distance from active site are not critical.

(ii) Enzymes can differentiate between α and β linkages.

(iii) Enzymes are much larger than their substrates.

(iv) Enzymes cannot differentiate between optical isomers.

(A) (ii) and (iv) are true
(B) (i) and (iii) are true
(C) (i) and (ii) are true
(D) (ii) and (iii) are true
(E) Answer not known

142. In a one-substrate enzyme-catalyzed reaction, following Michaelis-Menten Kinetics, which among the following statements is true?

(A) $K_m = [S]$ when $V_0 = \frac{1}{2} V_{max}$
(B) $K_m = \frac{1}{2} V_{max}$ when $V_0 = \frac{1}{2} [S]$
(C) $K_m = \frac{1}{2} [S]$ when $V_0 = V_{max}$
(D) $K_m = V_{max}$ when $V_0 = \frac{1}{2} V_{max}$
(E) Answer not known

143. Majority of the coenzymes are derived from _____ vitamins.

(A) B-Complex
(B) Vitamin – C
(C) Vitamin – D
(D) Vitamin – A
(E) Answer not known

144. _____ enzyme was first achieved the isolation and crystallization by James Sumner.

(A) Urease
(B) Lyase
(C) Ligase
(D) Succinate
(E) Answer not known

145. At what pH does the enzyme pepsin reach V_{max}?

(A) 1.0
(B) 1.5
(C) 2.0
(D) 2.5
(E) Answer not known

146. Which of the following is produced with the combination of apoenzymes and coenzymes?

(A) Holoenzymes
(B) Enzyme substrate complex
(C) Prosthetic group
(D) Enzyme product complex
(E) Answer not known

147. The type of inhibition followed by Aspartate transcarbamoylase under high concentration of CTP is termed _____.

(A) Feed back inhibition
(B) Competitive inhibition
(C) Non competitive inhibition
(D) Un competitive inhibition
(E) Answer not known

148. Phenol phosphotransferases transfer phosphate group to which of the following amino acids of enzymes during covalent modification?

(A) Tryptophan
(B) Threonine
(C) Serine
(D) Tyrosine
(E) Answer not known

149. Cholera toxin modifies the cellular proteins by which of the following mechanisms?

(A) ADP Ribosylation
(B) Acetylation
(C) Adomet - methylation
(D) Phosphorylation
(E) Answer not known

150. The post transcriptional processing of primary tRNA transcript is catalysed by _____.

(A) RNase P
(B) RNA ligase
(C) Reverse transcriptase
(D) S_1 nuclease
(E) Answer not known

151. One of the major disadvantages of immobilized enzymes is that in the due course of time, ———— of the enzyme is changed.

(A) Substrate
(B) Amino acid sequence
(C) Molecular weight
(D) Michaelis-Menten constant
(E) Answer not known

152. Which one of the following immobilized enzymes can be used for fruit juice clarification?

(A) Asparaginase
(B) Aminoacylases
(C) Pectinases
(D) Cellulases
(E) Answer not known

153. Which of the following is NOT true for immobilised enzymes?

(A) Immobilized enzymes are more resistant to environmental changes
(B) Multiple reuse of enzymes not possible
(C) Enzyme ability will not be affected
(D) Catalytic activity will be same
(E) Answer not known

154. The quality of milk is assessed by measuring the activity of

(A) Methylene blue reductase
(B) Lactase
(C) Phenol oxidase
(D) Trypsin
(E) Answer not known

155. Creatine phospho kinase level rises within ———— hours of initiation of myocardial infarction

(A) 2 to 3 hours
(B) 10 to 15 hours
(C) 30 mins to 1 hour
(D) 24 to 30 hours
(E) Answer not known

156. What is normal level of LDH in serum?

(A) 10 to 50 IU/litre

(B) 60 to 250 IU/litre

(C) 50 to 100 IU/litre

(D) 1000 to 1500 IU/litre

(E) Answer not known

157. The enzyme, creatine phospho kinase is used as marker to diagnose myocardial infraction because

(A) In myocardium, the isozyme of CPK has two M subunits

(B) The isozyme of CPK in myocardium has two B subunits

(C) The isozyme of CPK in myocardium has one M and one B subunit

(D) The myocardium has two isozymes of CPK-one with two M subunits and another with two B subunits

(E) Answer not known

158. One of the following enzyme is oligomeric enzyme

(A) Carboxy peptidase

(B) Lactate dehydrogenase

(C) Thiol protease

(D) Papain

(E) Answer not known

159. Which of the following is not true for isoenzymes?

(A) Many enzymes occur in several molecular forms called isoenzymes

(B) Different isoenzymes catalyze same chemical reaction

(C) Isoenzymes are coded by different genes

(D) Isoenzymes not differ in their physical and chemical properties

(E) Answer not known

160. A non competitive inhibitors can combine with an enzyme molecules to produce a

(A) Ternary complex

(B) Multiple complex

(C) Dead end complex

(D) Primary substrate complex

(E) Answer not known

161. Which component of the DNA duplex causes the molecules to have a net negative charges at Physio logical pH?

(A) Deoxyribose

(B) Ribose

(C) Phosphate group

(D) Adenine

(E) Answer not known

162. Among the following statements, which are true regarding organelle DNA?

(1) All organelle genome are linear

(2) Organelle DNA is a repetitive sequence

(3) Chloroplast DNA range between 120 – 200 kb

(4) Mitochondrial DNA range between 2000 – 2500 kb

(A) (1) and (2) are true

(B) (2) and (3) are true

(C) (1) and (4) are true

(D) (2) and (4) are true

(E) Answer not known

163. DNA polymerase catalyze the formation of a phosphodiester bond between

(A) The last 5′-phosphate group of a dNTP and the 3′-hydroxyl group of the first nucleotide in the old strand

(B) The first 5′ hydroxyl group of a new dNTP and the 3′-phosphate group of the last nucleotide in the newly synthesized strand

(C) The first 5′-phosphate group of a new dNTP and the 3′-hydroxyl group of the last nucleotide in the newly synthesized strand

(D) The last 5′ hydroxyl group of a new dNTP and the 3′-phosphate groups of the first nucleotide in the newly synthesized strand

(E) Answer not known

164. A mRNA molecule that encode for several different polypeptide chains are called

(A) Monocistronic mRNA
(B) Leader
(C) Spacer
(D) Polycistronic mRNA
(E) Answer not known

165. The Okazaki fragments formed during DNA replication are joined together by

(A) DNA polymerase
(B) DNA helicase
(C) DNA ligase
(D) DNA isomerase
(E) Answer not known

166. The type of protein it triggers the degradation of the nicked strand is

(A) Rur C
(B) Mut L
(C) Mut S
(D) Rec G
(E) Answer not known

167. Homologous recombination in eukaryotes contributes to all of the following except

(A) DNA repair
(B) Loss of functional genes leading to mutations
(C) Segregation of chromosomes in Meosis I
(D) Enhances genetic diversity in a population
(E) Answer not known

168. The diversity of variable region in immunoglobulin is an example of _____ type of recombination.

(A) Site specific
(B) Transposition
(C) Homologous end joining
(D) Non-homologous end joining
(E) Answer not known

169. The donor strand gradually displaces the recipient strand is termed as

(A) Strand pairing
(B) Branch migration
(C) Assimilation
(D) Strand breakage
(E) Answer not known

170. The expansion of lines in transposons are

(A) Linear interspersed nuclear elements
(B) Long interspersed nuclear elements
(C) Long internal nuclear elements
(D) Long interspersed numerous elements
(E) Answer not known

171. RNA polymerase copy one strand of duplex DNA into RNA, and the RNA sequence is ———— to template strand ———— to coding strand.

(A) Identical, Complementary
(B) Complementary, Identical
(C) Complementary, Complementary
(D) Identical, Identical
(E) Answer not known

172. During the gene transcription, RNA polymerase finds the promoter sequences of a gene by

(A) Random binding until reaches the promoter
(B) Exact binding of the promoter sequences
(C) Binding to enhance elements
(D) Alternate binding CG elements
(E) Answer not known

173. The region of sense strand of DNA which is actually transcribed into RNA, is termed as

(A) Non coding region
(B) Regulator region
(C) Coding region
(D) Foot printing
(E) Answer not known

174. Initiation factor of transcription event in bacteria

(A) TF II B factor
(B) Sigma factor
(C) Nus A factor
(D) Rho factor
(E) Answer not known

175. mRNA carries the single codes for the synthesis of simple protein molecule is termed as

(A) Monocistron C
(B) Polycistron C
(C) Heterogeneous
(D) Polynucleotide
(E) Answer not known

176. The first stage of protein synthesis takes place in

(A) Nucleus
(B) Ribosomes
(C) Mitochondria
(D) Golgi
(E) Answer not known

177. In Eukaryotes, intron splicing takes place within large protein complexes called spliceosomes which are associated with

(A) In RNAs
(B) Sn RNAs
(C) Si RNAs
(D) mi RNAs
(E) Answer not known

178. In prokaryotes the recognition sequence of initiation codon is referred to as

(A) Kozak sequences
(B) Shine Dalgarno sequence
(C) DNA sequences
(D) Chemical sequence
(E) Answer not known

179. The initiation codon AUG is recognizable because it is contained in a short sequence; 5' – ACCATGG 3' is termed as

(A) Palindromic sequence
(B) Okazaki fragments
(C) Klenow fragment
(D) Kozak consensus
(E) Answer not known

180. In 1989, Cech and Altman were awarded the nobel prize for the discovery of

(A) Transposons
(B) Ribozyme
(C) tRNA
(D) Interferon
(E) Answer not known

181. The expansion of RFLP is

(A) Restriction Fragment length Polymorphisms
(B) Random Fragment Long Polymerase
(C) Restriction For Length Protein
(D) Both (B) and (C)
(E) Answer not known

182. Third generation sequencing able to sequence long

(A) 10,000 bases
(B) 15,000 bases
(C) 12,000 bases
(D) 5,000 bases
(E) Answer not known

183. Regarding gene mapping, which of the following statements are incorrect?

(1) On the genetic map, distances between markers are measured in terms of centimeter (cm)

(2) A genetic distance of 1 cm is roughly equal to a physical distance of 1Mb

(3) Fish maps has a resolution @ 1Kb

(4) Genetic mapping is based on statistical analysis of inheritance patterns and gives a relative ordering of markers used

(A) (1) and (2) are incorrect
(B) (2) and (3) are incorrect
(C) (1) and (3) are incorrect
(D) (2) and (4) are incorrect
(E) Answer not known

184. Among the following methods to detect SNPs, which does not require electrophoresis

(A) Single strand conformation poly morphism
(B) Heteroduplex analysis
(C) DNA sequencing
(D) Fluorescence exchange-based methods
(E) Answer not known

185. Arrange the following steps in a sequencial order to perform DNA fingerprinting experiment

(1) Completely digest the DNA with chosen restriction enzyme

(2) Clone the DNA

(3) Analyse the fragments using agarose gel electrophoresis

(A) (1), (2), (3)
(B) (3), (2), (1)
(C) (2), (1), (3)
(D) (1), (3), (2)
(E) Answer not known

186. What is the purpose of MATRIX in Matrix – Assisted Laser Description Ionisation technique?

(A) To promote multiple information
(B) To absorb laser energy and form radical ions
(C) To provide a suitable solvent for the analyse
(D) To enable the analyte to crystalize
(E) Answer not known

187. The CRISPR/Cas system developed by Jennifer Doudna and Emmanuelle Charpentier requires

(A) Only Cas 9
(B) Cas 9 and gRNA
(C) Cas 9 and TracrRNA
(D) Cas 9 and sgRNA
(E) Answer not known

188. Single nucleotide polymorphisms (SNP) can be detected by using various methods like

(A) Pyrosequencing method
(B) Real time PCR method
(C) Microscopic visualization method
(D) Both (A) and (B)
(E) Answer not known

189. Rapid and simultaneous detection of thousands of gases can be carried out using micro arrays. Identify the incorrect statement about genomic arrays

(A) Contains oligomers representing the entire genome
(B) Contains oligomers derived from CDNAS
(C) Each slide is a high density array of oligomers
(D) It is the most commonly used global gene expression profiling method
(E) Answer not known

190. This technique involves particles that are ionized and separated according to their mass to charge ratio

(A) NMR
(B) MALDI – TOF
(C) DNA micro array
(D) Circular dichroism
(E) Answer not known

191. Swiss-model, a bio informatics tool can be used for studying

(A) Protein 3D structure prediction
(B) Fragment assembly
(C) Template detection
(D) Peptide assembly
(E) Answer not known

192. With reference to 3-D structure of proteins, which of the statements is true?

(A) It is easy, in general, to predict 3D structure from amino acid sequence
(B) The number of unique protein folds is quite limited
(C) There are many proteins with the same fold with lot of sequence similarity
(D) Missense mutations altering the protein structure are unlikely
(E) Answer not known

193. The complex gene expression patterns of eukaryotic cells can be easily studied by

(A) Data bank
(B) DNA micro array
(C) Both (A) and (B)
(D) DNA replication
(E) Answer not known

194. Arrange the basic components of a mass spectrometer

(1) Data system

(2) Mass filter

(3) Inlet

(4) Detector

(5) Ion source

(A) (3), (5), (2), (4), (1)
(B) (5), (3), (4), (2), (1)
(C) (5), (2), (3), (1), (4)
(D) (3), (2), (5), (1), (4)
(E) Answer not known

195. Who discovered the secondary structural element of protein first?

(A) G.N. Ramachandran
(B) Linus Pauling and Corey
(C) Sanger
(D) Dayhoff and Dayhoff
(E) Answer not known

196. The biological data base belongs to a protein sequence database is

(A) DDBJ
(B) EMBL
(C) Gen bank
(D) Swiss-prot
(E) Answer not known

197. The nucleotide sequence of gene bank in the form of clusters, representing genes are related to

(A) Unigene
(B) Swiss prot
(C) Prosite
(D) Relibase
(E) Answer not known

198. Which one of the following is the specialised database?

(A) Gen bank
(B) Uniprot
(C) PDB
(D) KEGG
(E) Answer not known

199. Find the mismatched one in the following

(A) FASTA – Compare the RNA sequence
(B) TFASTA – Compare the protein and nucleotide sequence
(C) LFASTA – Compare the one or more regions
(D) PLFASTA – Similar two sequences
(E) Answer not known

200. The local sequence alignment algorithm that does not make use of heuristic shortcuts and similar regions between two strings of nucleic acid and protein sequences.

(A) Needleman-Wunsch
(B) Smith-Waterman
(C) BLAST
(D) FASTA
(E) Answer not known