A

16135 **120 MINUTES**

1. Speciation that occurs without physical separation of members of the population is known as
   A) Allopatric speciation B) Sympatric speciation
   C) Parapatric speciation D) Peripatric speciation

2. Which one of the following is a tubicolous worm?
   A) Nereis B) Chaetopterus
   C) Boniella D) Sagitta

3. Individuals of a species can be identified by
   A) Short Tandem Repeat analysis
   B) mtDNA sequence analysis
   C) cDNA sequence analysis
   D) mRNA sequence analysis

4. In mitosis separation and pole ward migration of sister chromatids are seen in
   A) Anaphase B) Pre-metaphase
   C) Prophase D) Telophase

5. The crossing over of chromosomes during meiosis takes place during
   A) Telophase B) Leptotene
   C) Metaphase D) Pachytene

6. Lampbrush chromosomes are actively involved in
   A) Synthesis of RNA and proteins
   B) Synthesis of carbohydrates
   C) Synthesis of lipids
   D) Synthesis of cholesterol

7. Haemoglobin-S is an example for
   A) Chromosomal aberration.
   B) Expression of a polycistronic gene with a single ORF.
   C) Overlapping genes.
   D) Single nucleotide polymorphism.

8. Anthrax is a serious infectious disease caused by
   A) Lenti viruses B) Gram-positive bacteria
   C) Gram-negative bacteria D) Retroviruses

9. The karyotype of Turner syndrome is
   A) 44+XXY B) 44+XY C) 44+XO D) 44+YO

10. In a dihybrid cross the phenotypic ratio will be
    A) 2:1 B) 3:1
    C) 9:3:3:1 D) 1:1:1:1

11. Extra chromosomal circular DNA is seen in
    A) Prokaryotes alone
    B) Prokaryotes and eukaryote mitochondria
    C) Prokaryotes, eukaryote mitochondria and plastids
    D) Eukaryotes alone

12. The Philadelphia chromosome that is most commonly associated with chronic myelogenous leukemia (CML) is the result of a reciprocal translocation between
    A) Chromosome 9 and chromosome 17
    B) Chromosome 9 and chromosome 14
    C) Chromosome 5 and chromosome 17
    D) Chromosome 9 and chromosome 22

13. Pleiotropic genes are
    A) 'Orphan genes' for which no specific function can be assigned.
    B) Genes which are highly specific and conserved across a large number of organisms.
    C) Jumping genes that are easily transposed from one chromosome to another.
    D) Those which are expressed in different ways in different tissues and at different times of development.

14. The concept of DNA barcoding for molecular taxonomy of eukaryotes depends on
    A) Microarray analysis of tagged genomic DNA sequences.
    B) Analyses of mitochondrial cytochrome oxidase gene sequences.
    C) RT-PCR and sequence analyses of siRNA.
    D) Analyses of sequences of satellite chromosomes

15. The size of human mitochondrial DNA is
    A) 16569 bp B) 17569 bp
    C) 18323 bp D) 19323 bp

16. The term 'Khorana Technique' is given to the invention for the
    A) Sequencing of RNA templates.
    B) Invitro synthesis of RNA templates.
    C) Sequencing of amino-acids.
    D) Invitro synthesis of peptide sequences

17. The average sedimentation value of eukaryotic ribosomes is
    A) 60 S B) 65 S C) 70 S D) 80 S

18. Which one of the following RNA is encased in a shell or capsid?
    A) Messenger RNA B) Transfer RNA
    C) Ribosomal RNA D) Viral RNA

19. Antiparallel intramolecular hairpin loops are characteristic of
    A) RNA B) DNA C) C-DNA D) B-DNA

20. The unit of DNA specifying a single polypeptide chain
    A) Muton B) Cistron C) Intron D) Recon

21. Which of the following is not a termination codon?
A) UGG B) UAA C) UGA D) UAG

22. The number of protein coding genes in human mitochondrion is
A) 13 B) 24 C) 26 D) 37

23. In a population of rabbits in Hardy-Weinberg equilibrium, the dominant allele for fur colour is B for black and the recessive allele is b for white. If 16% of the population is homozygous recessive, what will be the percent allelic frequency of BB and Bb?
A) 16 and 68. B) 36 and 48.
C) 48 and 36. D) 84 and 16.

24. The evidence for endosymbiotic theory of the origin of mitochondria is supported by
1. The presence of circular DNA.
2. The fact that the genetic code of mitochondria DNA is the same as in all genomic DNA.
3. The presence of ribosomes similar to that of prokaryotes.

A) 1, 2 and 3. B) 1 and 3 only
C) 2 and 3 only D) 1 and 2 only

25. The human haploid genome consists of about
A) 3.3×10^9 bpDNA B) 6.6×10^9 bpDNA
C) 0.33×10^9 bp DNA D) 0.66×10^9 bp DNA

26. The consensus signal sequence required both for cleavage and for polyadenylation of most of the mRNA of higher eukaryotes is
A) AAUAAA B) AACAUU
C) AACCGU D) AACCUU

27. In a DNA sequence analysis of the genome of an organism, the quantity of thymine was estimated to be 30%. Then the percentages of pyrimidines and cytosine will be
A) 20% and 50% B) 30% and 20%
C) 50% and 20% D) 70% and 50%

28. The first genetically engineered product which was approved for clinical use in humans is:
A) Adenine de-aminase. B) Blood clotting factor VIII.
C) Humulin. D) Somatotropin

29. The amelogenin marker is used in
A) Gender diagnosis B) Sarcoma diagnosis
C) AML diagnosis D) CML diagnosis

30. Rho factor is required for the termination of
A) Replication B) Transcription
C) Translation D) Transversion

31. "The presence of a gene does not guarantee the appearance of the character with which it is associated". Which among the following arguments can be sustained as the most probable explanation for this?
    1. Absence of an upstream promoter.
    2. Post-transcriptional gene regulation by RNA interference.
    3. Presence of a homologous dominant gene.
    4. Presence of introns.

    A) 1 and 2 only B) 2 and 3 only
    C) 1, 2 and 3 only D) 4 only

32. A protein with 306 amino acids was discovered to have a pre-mRNA with 120 nucleotides as intron sequences. The length of the corresponding gene will be approximately:
    A) 1278 nucleotides. B) 1038 nucleotides.
    C) 222 nucleotides. D) 426 nucleotides

33. Pulsed-field gel electrophoresis is used to separate
    A) High molecular weight DNA
    B) Low molecular weight DNA
    C) Supercoiled DNA
    D) Transfer RNA

34. Which one of the following is used as a selectable marker for eukaryotic cells?
    A) Chloramphenicol B) Erythromycin
    C) Tetracyclin D) Hygromycin

35. In G-protein coupled signalling pathways, the conformational change of the receptor is triggered by:
    A) Attachment of the ligand to the receptor.
    B) Attachment of the G-protein to the receptor.
    C) Attachment of GTP to the receptor.
    D) Attachment of Na+/K+ ions to the receptor.

36. Oligo-dT cellulose columns are used to separate
    A) tRNA B) mRNA
    C) rRNA D) Micro RNA

37. Which of the following statement is correct?
    A) An enhancer that promotes the transcription of a gene is seen invariably at 5' to the transcription start site.
    B) An enhancer that promotes the transcription of a gene is seen invariably at 3' to the transcription start site.
    C) An enhancer that promotes the transcription of a gene is seen invariably at intergenic region of the gene.
    D) An enhancer that promotes the transcription of a gene is seen either at 5' or 3' region of the gene.

38. Induced mutations in Drosophila have revealed the presence of genes that influence embryonic development. A set of such genes which determine the relative position of anatomical structures along the major body axis during development is

A) Let 7 B) Son-of-seven-less (SOS)
C) Hox D) TATA box

39. Which of the following has sticky ends that enable efficient recombination?

A) Plasmids B) Cosmids
C) Phagemids D) Short Tandem Repeats.

40. Choose the correct match:

1.	Ligases	a.	Ti plasmid
2.	Molecular scissors	b.	cDNA
3.	Shuttle vector	c.	BAC
4.	Reverse transcriptase	d.	RFLP

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

41. Which of the following is/are not directly useful in forensic science/DNA fingerprinting?

1.VNTRs 2.RFLP 3.Blood group 4.Q-PCR

A) 1, 2 and 3 only B) 3 and 4 only
C) 4 only D) 1 and 2 only

42. From the following, identify the person(s) credited with the discovery of nucleic acid.

A) Avery, MacLeod and McCarty.
B) Erwin Chargaff.
C) Frederick Meischner.
D) James Watson, Maurice Wilkins and Francis Crick

43. A leucine zipper is a common three-dimensional structural motif in proteins with a characteristic 30-amino acid segment and a periodic repetition of leucine residues at

A) Every fifth position over a distance covering eight helical turns.
B) Every sixth position over a distance covering eight helical turns.
C) Every seventh position over a distance covering eight helical turns.
D) Every eigth position over a distance covering eight helical turns.

44. Huntington's disease is caused by --------- repeat expansion on the gene coding for the protein HTT.

A) Dinucleotide B) Trinucleotide
C) Tetranucleotide D) Pentanucleotide

45. In agarose gel electrophoresis of RNA,formamide is used as a

A) RNase inhibitor B) RNA hydrolyzing agent
C) RNA stabilizing agent D) RNA denaturing agent

46. During electrophoretic separation of proteins strong detergents like SDS is added to the proteins
A) To convert all peptides to a uniform charge
B) To enhance the separation of peptides
C) To convert all peptides to a stable configuration
D) To enhance the staining of proteins

47. Which one of the following enzyme is used in DNA sequencing?
A) DNA polymerase B) Polynucleotide kinase
C) Exonuclease D) RNA polymerase

48. Which of the following experiment(s) proved that both DNA and RNA can function as genomic material?
1. Griffith's experiment.
2. Hershey and Chase experiment.
3. Beadle and Tatum experiment.
4. Conrat and Singer experiment.

A) 1 and 3 only B) 2 and 4 only
C) 1, 2 and 4 only D) 3 and 4 only

49. The 5'and 3' ends of DNA indicate the position of carbon molecule in the
A) Purine ring B) Pyrimidine ring
C) Deoxyribose sugar molecule D) Imidazole ring

50. Cytosine to Thymine transition takes place by consecutive
A) Methylation and deamination
B) Methylation and amination
C) Methylation and decarboxylation
D) Deamination and decarboxylation

51. The resolving power of a light microscope can be increased by
A) Increasing the wave length of the light
B) Decreasing the wave length of the light
C) Decreasing the refractive index of the medium
D) Decreasing the numerical aperture of the objective lens

52. The selectable markers used in the plasmid pBR322 are
A) Ampicillin and Kanamycin
B) Ampicillin and Tetracyclin
C) Chloramphenicol and erythromycin
D) Chloramphenicol and Tetracyclin

53. The enzyme used for 5' end labeling of DNA is
A) Polynucleotide kinase B) Klenow fragment polymerase
C) DNA polymerase D) DNase I

54. The common baker's yeast, *Saccharomyces cerevisiae*, in its haploid state contains
A) 4 chromosomes B) 8 chromosomes
C) 16 chromosomes D) 32 chromosomes

55. The enzyme which catalyze the dissociation of carbonic acid is
A) Decarboxylase B) Carbonic anhydrase
C) Deaminase D) Carboxylase

56. In acidic condition oxygen dissociates more readily from haemoglobin, which is called
A) Bohr effect B) Chloride shift
C) Altitude sickness D) Asphyxia

57. The cardiac muscles are innervated by the
A) Vagus B) Hypoglossal
C) Abducens D) Trigeminal

58. The loop of Henle is highly specialised for
A) Urine dilution
B) Absorption of glucose
C) Urine concentration
D) Absorption of vitamins

59. Gamaaminobutyric acid is an
A) Excitatory neurotransmitter
B) Inhibitory neurotransmitter
C) Non-functional neurotransmitter
D) None of these

60. Tendons connect
A) Muscle to bone B) Muscle to muscle
C) Muscle to nerve D) Bone to bone

61. The organ of Corti is formed of
A) Four rows of hair cells
B) Tympanum
C) Tympanic cavity and Eustachian tube
D) Malleus, incus and stapes

62. Anti-malarial drug, Quinine is produced from
A) Aconite plant B) Cinchona plant
C) Eucalyptus plant D) Tectonagrandis

63. Which one of the following is an essential amino acid?
A) Alanine B) Aspartic acid
C) Threonine D) Tryptophan

64. The flow of electrons in the electron transport chain is maintained by
A) Transferring them to hydrogen and then to NADP.
B) Transferring them to oxygen and result in the formation of water molecules.
C) Transferring them to oxygen and result in the formation of carbon-di-oxide molecules.
D) Super-oxide dismutase enzyme.

65. The hormone that promotes the uptake of sodium ions and water in the kidneys with simultaneous elimination of potassium ions is
A) Aldosterone. B) Parathormone.
C) Renin. D) Vasopressin.

66. Which one of the following is not a colligative property of solutions?
A) Elevation of boiling point B) Depression in freezing point
C) Osmotic pressure D) Tyndal effect

67. The deamination of aspartic acid yields
A) Acetoacetic acid B) α- ketoglutaric acid
C) Oxaloacetic acid D) Pyruvic acid

68. Respiratory chain in eukaryotes is located in the
A) Inner mitochondrial membrane
B) Outer mitochondrial membrane
C) Plasma membrane
D) Endoplasmic reticulum

69. Which is the most common neurotransmitter in the brain?
A) Aspartate B) Choline esterase
C) Glutamate D) Gama amino butyric acid (GABA)

70. Sickle cell anemia occurs as a result of a mutation in the beta chain of the globin gene, resulting in a substitution of the amino acid
A) Alanine for glutamine B) Glutamate for alanine
C) Glutamate for Valine D) Valine for Glutamate

71. Histones are
A) Basic proteins B) Neutral proteins
C) Acidic proteins D) None of the above

72. What is the concentration of H+ in a solution of 0.1 M NaOH?
A) 10^{-1}M B) 10^{-13} M
C) 10^{-14} M D) None of the above

73. The hydrolysis of alpha-linked polysaccharides such as starch and glycogen by the enzyme α-amylase yield
A) Glucose and maltose B) Glucose and fructose
C) Glucose and mannose D) Glucose and galactose

74. Adenylyl cyclase catalyzes the conversion of ATP to
A) Adenine sulphate B) Cyclic AMP
C) Inositol phosphate D) Cyclic GMP

75. A solution of 0.1M NaOH(Molecular weight of NaOH is 40) is prepared by dissolving
A) 0.04 gmNaOH in 100 ml B) 0.1gmNaOH in 100 ml
C) 0.4 gmNaOH in 100 ml D) 4.0gmNaOH in 100 ml

76. In Michaelis-Menten equation, K_m is the concentration of substrates when the reaction reaches half of V_{max}. Accordingly a small K_m indicates
A) High affinity with the substrate since it means the reaction can reach half of V_{max} in a small number of substrate concentration.
B) Low affinity with the substrate since it means the reaction can reach half of V_{max} in a small number of substrate concentration.
C) Low affinity with the substrate since it means the reaction can reach V_{max} in a large number of substrate concentration.
D) Low affinity with the substrate since it means the reaction can reach V_{max} in a small number of substrate concentration.

77. Pasteur effect explains
A) Production of ATP in the electron transport chain.
B) Production of ATP through anaerobic glycolysis.
C) Technique of sterilisation of milk by rapid heating followed by snap cooling.
D) Swan necked experiment and abiogenesis

78. Which one of the following molecule is phosphagen in vertebrates?
A) Glyceraldehyde-3-phosphate
B) Creatine phosphate
C) Glucose phosphate
D) Tyrosine phosphate

79. Coelom of Aschelminthes is
A) Eucoelom B) Pseudocoel
C) Haemocoel D) Enterocoel

80. Syrinx of birds is used for
A) Respiration B) Excretion and osmoregulation
C) Sound production D) Digestion

81. Alkaptonuria is characterized by the accumulation of
A) Phenyl alanine and its derivatives
B) Homogentisic acid
C) Haemoglobin and other pigments
D) Melanin

82. Which one of the following statement regarding pentose phosphate pathway is not correct?
A) The pathway can account for the conversion of glucose -6-phosphate to Ribose-5-phosphate.
B) The pathway produces NADPH.
C) The pathway does not generate ATP.
D) The pathway has an oxidative phase, which is reversible.

83. T-cells are released from
A) Thyroid B) Tendon
C) Thymus D) Tympanum

84. In myogenic hearts,
1. Acetylcholine inhibits heart beat while adrenaline accelerates it.
2. Acetylcholine accelerates heart beat while adrenaline inhibits it.

A) Acetylcholine and adrenaline do not affect heartbeat.
B) Both statements are false.
C) Statement 1 is true, statement 2 is false.
D) Statement 1 is false, statement 2 is true.

85. Which among the following statement(s) is/are true?
1. The acetyl moiety in the acetyl co-enzyme A comes from fatty acid catabolism.
2. The co-enzyme in acetyl co-enzyme A is vitamin B3.

A) Both statements are false. B) Both statements are true.
C) Statement 1 only. D) Statement 2 only.

86. The oral polio vaccine is
A) A vaccine made by recombinant DNA technology.
B) An attenuated, active, bacterial vaccine.
C) An attenuated, active, viral vaccine.
D) An attenuated, passive, viral vaccine.

87. The pacemaker of the human heart is
A) Sinoatrial node. B) Atrioventricular node.
C) Mitral valve. D) Bundle of His.

88. Functional unit of muscle is called
A) Sarcomere B) Branchioles
C) Lamellae D) Shields

89. Human eye lens is
A) Spherical and can be moved forward
B) Biconvex and cannot be moved forward
C) Spherical and cannot be moved forward
D) Biconvex and can be moved forward

90. The anticoagulant present in human blood is
A) Hemerythrin B) Heparin
C) Hirudin D) Thrombin

91. Which one of the following statement regarding carbamate pesticides is not correct?
A) They are irreversible inhibitors of acetylcholine esterase.
B) They are esters of carbamic acid
C) They are more degradable than organophosphates.
D) They affect central nervous system.

92. The tissue fixative Carnoy's solution is composed of
A) Ethanol, chloroform and formaldehyde
B) Ethanol, chloroform and picric acid
C) Ethanol, chloroform and glacial acetic acid
D) Ethanol, chloroform and formic acid

93. The development of the anterior-posterior axis in fruit flies is controlled by
A) Segmentation genes B) Homeotic genes
C) Maternal effect genes D) All of these

94. Tornaria is the larva of
A) Limulus B) Metridium
C) Balanoglossus D) Rhabdopleura

95. Blastula of frog is called
A) Discoblastula B) Coeloblastula
C) Holoblastula D) Amphiblastula

96. The pollen basket of the foraging worker bees is seen on its
A) Prothoracic legs B) Mesothoracic legs
C) Metathoracic legs D) None of the above

97. Which of the following is a greenhouse gas?
A) Methane B) Nitrous oxide
C) Carbon dioxide D) All of these

98. Blood pressure is controlled by
A) Adrenal glands B) Thyroid gland
C) Thymus Gland D) Corpus gland

99. In water pollution, industries are said to be the
A) Line sources B) Point sources
C) Area sources D) None of these

100. The gas not associated with global warming is
A) CO_2 B) CH_4 C) SO_2 D) Argon

101. Ozone layer in the upper atmosphere is destroyed by
A) HCl B) N_2 C) CFC D) SO_2

102. Which combination of the following elements constitutes a major portion of earth's crust?

A) Oxygen and Silicon B) Oxygen and Iron
C) Mg and Iron D) Aluminium and Iron

103. Assertion (A): Chlorofluorocarbons deplete ozone.
Reason (R): These compounds contain Chlorine, Bromine and Fluorine.
Which of the following is right?

A) Both (A) and (R) are true and (R) is the correct explanation of (A)
B) Both (A) and (R) are true but (R) is not the correct explanation of (A)
C) (A) is true but (R) is false
D) (A) is false but (R) is true

104. The main atmospheric layer near earth is

A) Troposphere B) Mesosphere
C) Ionosphere D) Stratosphere

105. Biotic environment includes

A) Producers B) Consumers
C) Decomposers D) All the above

106. The cause of lung cancer Mesothalemia is

A) Arsenic B) Asbestos
C) Chromium D) Mercury

107. Which one of the following is the correct food chain?

A) Algae -> Daphnia -> Dragon Fly Nymph -» Newt -» Grass Snake
B) Daphnia -» Dragon Fly Nymph ->Newt -» Algae -> Grass Snake
C) Grass Snake -> Newt -» Dragon Fly Nymph -> Daphnia -> Algae
D) Newt -» Grass Snake -» Dragon Fly Nymph -» Algae -> Daphnia

108. Match the items in List - I with List - II and select the correct answer using codes given below:

List I	List - II
a. CFC	(i) Bhopal Gas Tragedy
b. CO_2	(ii) Global Warming
c. BOD	(iii) Ozone depletion
d. MIC	(iv) Water pollution Code

A) a-iv, b- iii, c- i, d- ii B) a-i, b- ii, c- iii, d- iv
C) a-iv, b- iii, c- ii, d- i D) a-iii, b- ii, c- iv, d- i

109. The five kingdom classification was proposed by

A) Carl Woese B) Carolus Linnaeus
C) Paul Hebert. D) Robert Whitaker.

110. Which of the following analytical technique is used to estimate Sodium?
A) Coulometry B) Flame Photometry
C) Gas chromatography D) HPLC

111. Algal bloom results in
A) Global warming B) Salination
C) Eutrophication D) Biomagnification

112. A high Biological Oxygen Demand (BOD) indicates that
A) Water is pure
B) Absence of microbial action
C) Low level of microbial pollution
D) High level of microbial pollution

113. The effects of radioactive pollutants depends on
A) Rate of diffusion
B) Energy releasing capacity
C) Rate of deposition of the contaminant
D) All of these

114. A temperature at 98.6 degrees Fahrenheit corresponds to -------degrees Celsius and ------degrees Kelvin
A) 37, 310 B) 310, 37
C) 55, 328 D) 328, 55

115. The influence of the two bordering communities on each other is known as
A) Edge effect B) Competition
C) Interference D) None of the above

116. Animals with bilaterally symmetrical larvae and pentamerically symmetrical adults are seen in
A) Coelenterates only.
B) Fresh water echinoderms.
C) Marine echinoderms.
D) Both marine and fresh water echinoderms.

117. Which among the following proceeds to G1 phase, then returns and remains permanently in G0 phase of the cell cycle?
A) B lymphocytes. B) Hepatocytes
C) Nerve cells. D) Reticulocytes.

118. The third cleavage in the embryogenesis of frog is
A) Holoblastic, equatorial and results in the formation of eight identical blastomeres.
B) Holoblastic, equatorial and results in the formation of four large and four small blastomeres.
C) Holoblastic, latitudinal, and results in the formation of four large and four small blastomeres.
D) Meroblastic, meridional and results in the formation of four small and four large blastomeres.

119. The drones of the honey bee are

A) Diploid B) Haploid
C) Polyploid D) Aneuploid

120. The 'army worm' which attack paddy is the larvae of

A) *Cnaphalocrosis medinalis*
B) *Nilaparvata lugens*
C) *Spodoptera mauritia*
D) *Trypoyza incertulas*
