A

16103 **120 MINUTES**

1. The consensus sequence of Pribnow box is
   A) TATATA B) TATAAT
   C) TTAATT D) TATTAT

2. The topological form of DNA that does not occur in biological systems is
   A) A-DNA B) B-DNA
   C) C-DNA D) Z-DNA

3. The enzymes that induce slight negative supercoiling in natural DNA is
   A) DNA topoisomerase B) DNA helicase
   C) DNA primase D) DNA ligase

4. Non-covalent chemical bonds that stabilize the DNA double helix by connecting the adjacent aromatic rings of base pairs is
   A) Sigma bonds B) Delta bonds
   C) Gamma bonds D) Pi bonds

5. In DNA triple helix, the third strand is attached to the double helix by
   A) Watson & Crick pairing B) Hoogsteen pairing
   C) Agostic pairing D) Ionic pairing

6. RNA polymerase binds to a gene on the 3' end of a DNA template strand, termed
   A) Repressor B) Promoter
   C) Attenuator D) Operator

7. Intron homing is
   A) Removal of introns from the exon sequences
   B) Splicing of introns in the hnRNA
   C) Insertion of intron to an intron-less site
   D) Deletion of introns from a homologous site

8. The snRNPs are found in
   A) Ribosome B) Lysosome
   C) Replisome D) Spliceosome

9. In humans, the gene with the greatest number of introns is for
   A) Globin B) Titin
   C) Insulin D) Cyclin

10. The 1993 Nobel prize in Physiology and Medicine for the discovery of gene-splicing was awarded to
   A) Philip Allen Sharp & Richard J. Roberts
   B) Elizabeth H. Blackburn & Carol W. Greider
   C) Mario Capecchi, Martin Evans & Oliver Smithies
   D) Selman Waksman & Albert Schatz

11. In which of the following families is pseudo embryo sac present?
A) Podostemaceae B) Amaranthaceae
C) Malvaceae D) Poaceae

12. Single letter code of tryptophan
A) W B) F C) Y D) Z

13. Which of the following is not an osmolyte?
A) Proline B) Sucrose
C) Plastoquinone D) Trehalose

14. Which one of the following terms describes the repeated selection on intervening populations derived from interbreeding of selected individuals to accumulate the desirable genes for a particular quantitative character without loss of genetic variability?
A) Mater line selection B) Recurrent selection
C) Mass selection D) Pure line selection

15. Which statement is correct regarding Melbourne Code – 2011?
A) Latin diagnosis is not mandatory for names published on or after 01/01/ 2012.
B) Publication of taxa in electronic media is effective on or after 01/01/ 2012.
C) The Code is named as International Code of Nomenclature for algae, fungi and plants.
D) All of the above

16. Ames test is a test for:
A) Coliforms B) Carbohydrates
C) Mutagenecity D) Lipids

17. The basic unit of numerical taxonomy is called
A) PTU B) OTU
C) CTU D) KTU

18. What is the difference between a threatened species and an endangered species?
A) A threatened species means that the population is likely to become endangered; an endangered species has population numbers too low that it is likely to become extinct
B) A threatened species is already extinct; an endangered species means that the population's numbers have increased greatly over the last 5 years
C) A threatened species means that the population is likely to become endangered; an endangered species is already extinct
D) A threatened species and an endangered species are the same thing

19. Which among the following is not a nucleic acid database?
A) EMBL B) GenBank
C) DDBJ D) SWISS-PROT

20. Red rust is caused by:
A) *Puccinia* B) *Cephaleuros*
C) *Batrachospermum* D) *Colletotrichum*

21. Which of the following is diploid in moss plant?
A) Spore B) Leaves
C) Spore mother cell D) Gametes

22. Linen is obtained from:
A) Flax B) Hemp
C) Sisal D) Manila hemp

23. A cross in which the sexes of the parents are the reverse of another cross:
A) Reciprocal cross B) Back cross
C) Test cross D) Dihybrid cross

24. The androecium of family Asteraceae is
A) Syngenesious B) Polyadelphous
C) Synandrous D) Monoadelphous

25. A specimen selected from the original material to serve as a nomenclatural type when no holotype was designated at the time of publication is called:
A) Neotype B) Lectotype
C) Epitype D) Syntype

26. Which one of the following is the first known fossil vascular plant?
A) *Cooksonia* B) *Zosterophyllum*
C) *Rhynia* D) *Williamsonia*

27. BLAST is used:
A) To find similarity between sequences
B) To align sequences
C) To design primers
D) To amplify DNA

28. All of the following act to increase species diversity, except
A) Key stone species B) Competitive exclusion
C) Moderate disturbances D) Pachy environments

29. Evidence shows that some grasses benefit from being grazed. Which of the following terms would best describe this plant herbivore interaction?
A) Predation B) Mutualism
C) Competition D) Parasitism

30. Gene flow is a concept best used to describe an exchange between
A) Individuals B) Species
C) Chromosomes D) Populations

31. Which of the following terms best describes the process in which organisms reach sexual maturity while retaining some juvenile characteristics?
A) Cladogenesis B) Paedomorphosis
C) Allometric growth D) Homoplasy

32. Carrying capacity (K)
A) Differs among species, but does not vary within a given species
B) Is always eventually reached in any population
C) Remains constant in all environments
D) Is often determined by resource limitation

33. The stratosphere extends to a height ranging from:
A) About 10 km - 50 km B) About 5 km to 10 km
C) About 50 km – 85 km D) About 60 km - 90 km

34. Which is the inhibitor which inhibits the transfer of electrons from PS II to cytochrome complex?
A) Paraquat B) Methylviologen
C) DCMU D) DCBQ

35. The function of the electron transport proteins in the thylakoid membranes is
A) Production of ADP by chemiosmosis
B) Production of NADPH by substrate-level phosphorylation
C) Pumping of hydrogens into the lumen for later generation of ATP by chemiosmosis
D) Pumping of hydrogens into the inner cristae space for later generation of ATP by chemiosmosis

36. One of the following is an inhibitor of mitochondrial ETC
A) Rotenone B) Chloramphenicol
C) Cyclohexamide D) DCPIP

37. One of the following is an inhibitior of electron transport in thylakoids.
A) DCPIP B) DCMU
C) Rotenone D) Zeaxanthin

38. One of the following is not a stress protein
A) HSP B) LEA
C) Dehydrins D) Phosphoprotein

39. The following is a mobile electron carrier of electron transport in thylakoids.
A) Plastoquinone B) Cytb/f
C) phylloquinone D) Phaeophytin

40. Oxygen Evolving Complex consists of following number of polypeptides
A) 4 B) 3
C) 2 D) 1

41. Identify the component in the thylakoid electron transport chain, which is more sensitive to any stress
A) PS II B) PS I C) Cytb/f D) PQ

42. Inhibitor of GA
A) TIBA B) Placobutrazol
C) DAA D) Cyclohexane

43. In lichens that have both green algal and cyanobacterial symbionts, the cyanobacteria are restricted to structures called:
A) Cephalodia B) Isidia C) Soredia D) Soralia

44. An organism that uses glucose as a source of both energy and carbon is called:
A) Photoautotroph B) Photoheterotroph
C) Chemoautotroph D) Chemoheterotroph

45. Which of the following vitamin is a precursor of coenzyme A?
A) Folic acid B) Riboflavin
C) Pantothenic acid D) Niacin

46. What is the function of statoliths?
A) Photoreception B) Signaling
C) Gravity sensing D) Senescence

47. Transport of proteins into mitochondria is through:
A) F_0& F_1 Complexes B) Tom & Tim Complexes
C) GERL Complexes D) Toc & Tic Complexes

48. Which of the following is an illegitimate name?
A) Superfluous name B) Later homonyms
C) Tautonyms D) All the above

49. A *nomennudum* is a name:
A) Without a type B) Without a figure
C) Without a description D) Without an author's name

50. Coffee rust is caused by:
A) *Puccinia graminis* B) *Cephaleuros coffeae*
C) *Helminthosporium coffeae* D) *Hemileia vastatrix*

51. Jute is obtained from:
A) *Corchorus* B) *Cannabis*
C) *Linum* D) *Crotalaria*

52. The element taken up by mycorrhizal fungus directly from leaf litter is
A) Calcium B) Potassium
C) Nitrogen D) Phosphorous

53. The first eukaryotic cell in which the entire genome was sequenced is
A) *Saccharomyces cerevisiae*
B) *Schizosaccharomyces pombe*
C) *Saccharomyces carisbergensis*
D) *Saccharomyces pastorianus*

54. Shotgun cloning stands for
A) Cloning cDNAs
B) Chromosome walking
C) Cloning a genome
D) Restriction analysis of DNA

55. Rice was first domesticated approximately 5,000 years ago, in:
A) Southeast Asia
B) Southwest Asia
C) South Asia
D) Asia Pacific

56. The "Guttiferae" has been renamed as
A) Arecaeae
B) Apiaceae
C) Clusiaceae
D) Fabaceae

57. The characteristic type of inflorescence of the Genus *Arisaema*
A) Capitulum
B) Spadix
C) Cyathium
D) Compound spadix

58. Robert Brown published the name *Capparis lasiantha* and did not give the diagnosis for it. Later de Candolle studied the specimen and agreed the validity of the name and published Latin diagnosis for it. The plant name should be noted as
A) *Capparis lasiantha* R. Br., ex. DC
B) *Capparis lasiantha*R. Br. ex. DC
C) *Capparis lasiantha*R.Br.(DC)
D) *Capparis lasiantha*(R.Br.) D

59. Sequence of taxonomic categories is-
A) Class-Phylum-Tribe-Order-Family-Genus-Species
B) Division-Class-Family-Tribe-Order-Genus-Species
C) Division-Class-Order-Family-Tribe–Genus–Species
D) Phylum-Order-Class-Tribe-Family–Genus–Species

60. Which is the plant family having characteristic umbel inflorescence
A) Asteraceae
B) Acanthaceae
C) Apiaceae
D) Poaceae

61. The main mineral constituents of wood are salts of
A) Carbon, magnesium and potassium
B) Calcium,magnesium and potassium
C) Carbon, nitrogen and potassium
D) Calcium, potassium and manganese

62. Sodium Dodecyl Sulphate (SDS) is used while separating proteins by polyacrylanide gel electrophoresis
A) It helps in solubilization of proteins thereby making it easier to separate
B) It binds to proteins and confers uniform negative charge density thereby making them move during electrophoresis
C) Decreases the surface tension of the buffer used for electrophoresis
D) Stabilizes the proteins

63. Which of the following statements is true about the Krebs (citric acid) cycle and the Calvin (light independent) cycle?
A) They both result in a net production of ATP and NADH
B) They both result in a release of oxygen
C) They both are carried out by enzymes located within an organelle matrix
D) They both take place within the cytoplasmic matrix

64. Arctic animals maintain their body temperature because they have more
A) Transducing protein B) Uncoupling protein
C) Myoglobin protein D) F0F1 ATPase

65. Which is not a free radical?
A) Superoxide B) Singlet oxygen
C) Dioxide D) Hydrogen peroxide

66. Bengal famine was caused by
A) *Helminthosporium oryzae* B) *Phytophthora infestans*
C) *Puccinia graminis* D) *Erysiphae graminicola*

67. Major cause of evolution of genes and protein is
A) Point mutation B) Chromosomal mutation
C) Sexual reproduction D) Gene duplication and divergence

68. A protein which is to be degraded in proteasome is tagged with
A) Polyglycine B) Polyproline
C) Ubiquitin D) Formyl methionine

69. Taxa which occupy mutually exclusive geographical areas are termed
A) Sympatric B) Allopatric
C) Pantropical D) New world taxa

70. Taxa shows distribution pattern which are interrupted by considerable areas from which the taxon is absent are termed
A) Vicariance B) Disjunct
C) Plesiomorphic D) Alien

71. The first herbarium in the world was founded in
A) Kew, UK B) Padua, Italy
C) Paris, France D) Leningrad, Russia

72. Permanent wilting coefficient represents ..... form of water.
A) Hygroscopic B) Runaway
C) Capillary D) Chemically combined

73. Which of the following region is widely used for barcoding in plants and animals?
A) matK in plants and COI in animals
B) ITS in both
C) trnL in plants trnF in animals
D) rbcL in plants, atpB in animals

74. These are various steps of immunoblotting. Give the sequence in order.
i) Binding with specific antibody
ii) Electrophoresis to separate antigens
iii) Production of replica of the gel on nitrocellulose paper
iv) Addition of secondary antibody to primary antibody, which in turn is attached to an enzyme detected by a chromogenic reaction

A) i, ii,iii,iv B) ii, iii,iv,i C) ii,iii,i,iv D) iii,iv,i,ii

75. Estimating or predicting the unknown values of one variable from the known values of another variable.
A) Correlation analysis B) Regression analysis
C) Comparative analysis D) Conformational analysis

76. Who described the NPC system of pollen classification?
A) Blackman B) Edalman C) Erdtman D) Stihlman

77. One of the following is not a limitation of somaclonal variation technique.
A) The technique is applicable only to those species of cell cultures which regenerate complete plants.
B) Selected cell lines often show reduced regeneration potential.
C) Many selected clones show reduced fertility, growth and even overall performance
D) This may bring about 'new' alleles or even 'new' mutations.

78. If the wave length of transmitted light of dye bound product is shifted away from that of the dye, the condition is called
A) Orthochromasia B) Metachromasia
C) Laevochromasia D) Dextrochromasia

79. The fine endings of the hyphae of mycorrhiza in the cell-site of nutrient exchange between the fungus and the host.
A) Vesicles B) Arbuscules
C) Nutrioles D) Hypioles

80. Enzymes differ from co enzymes as
(i) Enzymes have high molecular weight; Co enzyme has low molecular weight
(ii) Enzymes are not stable beyond 40^0C: Co enzymes are heat stable

A) Both are correct B) Only (i) is correct
C) Only (ii) is correct D) Both are wrong

81. Identify the statement which does not characterize mollicutes.
A) The Mollicutes are a class of bacteria distinguished by the absence of a cell wall.
B) They are parasites of various animals alone, living on or in the host's cells.
C) Individuals are very small, typically only 0.2–0.3 m in size and have a very small genome size.
D) Many are able to move about through gliding.

82. What is meant by fuelgen reaction?
A) DNA-erythrosin reacts with free aldehyde to form red product
B) DNA-ethidium bromide reacts with free aldehyde to form red product
C) *DNA*-leucobasicfuchsin reacts with free aldehyde to form red product
D) DNA-acetocarmine reacts with free aldehyde to form red product

83. Identify the synthetic stain from the following.
A) Hematoxylin-Harris stain B) Orcein
C) Carmine D) Cotton blue

84. Two stage fixation procedure using glutraldehyde buffered with phosphate followed by osmium tetraoxide is generally adopted in the case of
A) Electron microscopy
B) Fluorescence microscopy
C) Phase contrast microscopy
D) Confocal microscopy

85. Name an instrument where the cell separation is done based on the bound flurochrome to the DNA.
A) Cell sorter B) Fluorometer
C) Flow cytometer D) Fluorescence spectroscope

86. Pick out a non antioxidant from the list below
A) Ascorbate B) Beta tocopherol
C) Carotenoids D) Glutathione

87. Relationship by descent from a common ancestor is termed as
A) Consanguinity B) Heritability
C) Relativity D) Ancestroy

88. Give the correct definition for gene sanctuaries.
A) Place where germplasm can be conserved in living state
B) Areas of land in which germplasm collections of growing plants are assembled
C) Genetic diversity is sometimes conserved under natural habitat
D) Germplasm of asexually propagated species.

89. The DNA segments may be mapped by locating the restriction sites through restriction enzymes, called restriction mapping. When this is extended to complete chromosome it is called
A) Chromosome walking B) Chromosome mapping
C) Chromosome jumping D) Chromosome locating

90. Identify the sentence which does not fit for the definition of genomic imprinting.
A) Genomic imprinting is an epigenetic phenomenon by which certain genes can be expressed in a parent-of-origin-specific manner.
B) It ensures that transposable elements remain epigenetically silenced throughout gametogenic reprogramming to maintain genome integrity.
C) It is a non inheritance process dependent of the classical Mendelian inheritance
D) Genomic imprinting is an epigenetic process that can involve DNA methylation and histone modulation in order to achieve monoallelic gene expression without altering the genetic sequence.

91. Pick out the numerical test not used to assess the significance of a deviation
A) T-test B) X^2 test
C) F test D) X test

92. What is the role of aspirator in killing and fixation of plant materials?
A) Helps the application of the killing and fixing solution
B) Helps the section to submerge by creating vacuum
C) Helps the sections to float
D) Helps the sections to be properly distributed.

93. Identify the stain used to stain proteins
A) PAS reagent B) Naphthol yellow S
C) Rhodamine B D) Azure B

94. In air layering, cutting the bark off the stem, known as girdling is performed for
A) Stimulating root formation just above the point of girdling
B) Helping in breaking off the stem when it is rooted
C) Gradually starving the stem
D) All of the above

95. The set of seeds distributed to certified seed growers to be further multiplied for distribution.
A) Breeder seed B) Foundation seed
C) Registered seed D) Certified seed.

96. Lichen with a 3-dimensional branching, bushy appearance, like a leafless shrub is called

A) Fruticose lichen B) Foliose lichen
C) Crustose lichen D) Anastomose lichen

97. Specialized cell typical of many fungal plant pathogens that is used to infect host plants.

A) Hyphae B) Vesicles
C) Appressorium D) Germ tube

98. Which is the fruiting body of ascomycetes.

A) Cleistothecium B) Perithecium
C) Gymnothecium D) All of the above

99. A second reduction division following the usual two meiotic divisions reputed to occur in the ascus of certain fungi.

A) Secomeiosis B) Ascomeiosis
C) Brachymeiosis D) Redomeiosis

100. Name the order to which *Pandorina* belongs

A) Chlamydomonales B) Volvocales
C) Fucales D) Laminariales

101. A protective covering in gymnosperms, which morphologically is equivalent to ovuliferous scale, develops next to the integument.

A) Perichaetium B) Epimatium
C) Epigynium D) Perigynium

102. Identify the monotypic gymnosperm genus.

A) *Welwitschia* B) Zamia
C) Araucaria D) Gnetum

103. Pureline breeding refers to the following

A) Homozygosity only B) Heterozygosity only
C) Heterozygosity and linkage D) Homozygosity and self assortment

104. What is the role of DMSO in plant biotechnology?

A) Hormonal substitute B) Chelating agent
C) Phenol absorbent D) Cryoprotectant

105. Pick out an endemic disease from the following

A) Wheat stem rust (*Puccinia graminis tritici*)
B) Late blight of potato (*Phytophthora infestans*),
C) Red rot of sugar cane(*Colletotrichum falcatum*),
D) Citrus canker (*Xanthomonas axonopodis* pv citri)

106. Identify the characters of an offspring developed as a result of inbreeding
A) Increased genetic disorders
B) Higher infant mortality
C) Depression on growth rate
D) All of the above

107. What are the ecological effects of Eutrophication?
A) Decreased biodiversity B) New species invasion
C) Algal blooms D) All of the above

108. A group of one or more species derived from a sequential development pattern which involves continual and uniform changes from an extinct ancestral form on an evolutionary scale.
A) Perinospecies B) Chronospecies
C) Ecospecies D) Evospecies

109. Succession beginning with sand is called
A) Lithosere B) Sanosere
C) Psammosere D) Hydrosere

110. Lime loving plants are referred to as
A) Calcifuge B) Calciferous
C) Calcicoles D) Calcareous

111. Match the most suiting ones

p) Fusogen	l) Inhibitor of giberellin
q) KCN	m) Poly ethylene Glycol
r) Placobutrazol	n) Inhibitor of terminal oxidase
s) TIBA	o) Auxin inhibitor

A) p-n, q-o, r-m, s-l B) p-m, q-n, r-o, s-l
C) p-m, q-n, r-l, s-o D) p-m, q-l, r-n, s-o

112. Match the following class of algae with their reserve food material

p) Xanthophyceae	l) Fat and leucosin
q) Chrysophyceae	m) Oil
r) Bacillariophyceae	n) Mannitol and laminarin
s) Phaeophyceae	o) Fat and volutin

A) p-l, q-m, r-n, s-o B) p-m, q-l, r-o, s-n
C) p-o, q-n, r-m, s-l D) p-n, q-o, r-l, s-m

113. Match the algae with the respective economic importance

p) Source of salad	l) Ulva
q) Source of iodine	m) Acetabularia
r) Material for photosynthesis research	n) Laminaria
s) To study nuclecytoplasmic interactions	o) Chlorella

A) p-o, q-n, r-m, s-l B) p-l, q-m, r-n, s-o
C) p-m, q-n, r-o, s-l D) p-l, q-n, r-o, s-m

114. Which is the most primitive tribal groups found in Kerala?
A) Cholanaikkans B) Kurumbas
C) Kattunaikans D) Kadars

115. In gel permeation chromatography, _____ is eluted first from the column.
A) Cations B) Anions
C) Smaller molecules D) Bigger molecules

116. Following are some statements related to mitochondrial electron transport
1) Alternate oxidase is inhibited by salicylhydroxyamic acid
2) NADH hydrogenase is inhibited by rotenone
3) Succinate dehydrogenase is inhibited by Antimycin
4) ATPase is inhibited by paraquat

Which of the following combinations of above statements are true?

A) (1) and (2) B) (1) and (3)
C) (1) and (4) D) (2) and (3)

117. A person with Klinefelter syndrome is with ..... condition.
A) Monosomic B) Triploid
C) Trisomic D) Nullisomic

118. To which of this class, sub class "Metzgeriidae" belongs to
A) Sphaeropsida B) Jungermanniopsida
C) Anthoceratopsida D) Bryopsida

119. Where is the location of Birbal Sahini Institute for Palaeobotany?
A) Indore B) Kanpur
C) Delhi D) Lucknow

120. One of these methods tends to preserve the more robust plant parts such as seeds or woody stems as fossils.
A) Compression B) Petrifactions
C) Casts D) Mineralisations

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