

1. Mycoplasma are resistant to common antibiotics like penicillin because of
 - A) Sterols in the membrane
 - B) Lack of cell wall
 - C) Small genome size
 - D) Active repairing mechanism

2. The compound employed as a fusogen for plant protoplast fusion techniques?
 - A) Sodium chloride
 - B) Potassium chloride
 - C) Polyethylene glycol
 - D) Trehalose

3. Reverse transcriptases are encoded by retroviruses. One of the enzymes from the mammalian cells which shows reverse transcriptase-like activity is
 - A) Telomerase
 - B) Ribozyme
 - C) Caspase
 - D) Ribonuclease

4. The frequency of an allele in a population can be changed by forces like
 - A) Dominance, family selection, fitness & diversification
 - B) Selection, mutation, migration, inbreeding & random genetic drift
 - C) Forward mutation, gene conversion, neutral evolution & recombination
 - D) Gene interaction, gene transfer, gene mutation & out breeding

5. The methodology for defining gene arrangement in very long stretches of DNA (for example 50-100kb) is
 - A) Nick translation
 - B) Chromosome walking
 - C) AFLP
 - D) Southern blotting

6. Norman Borlaug, the Father of Green Revolution, revolutionized agriculture by developing new varieties of
 - A) Wheat
 - B) Rice
 - C) Maize
 - D) Corn

7. Theory of Continental Drift was proposed by
 - A) Du Toit
 - B) Charles Darwin
 - C) Alfred Wegener
 - D) Weisman

8. For a population in which mortality rate is low until the end of life span, the mode of survivorship graph is
 - A) Highly convex curve
 - B) Highly Diagonal curve
 - C) Concave curve
 - D) Linear curve

9. The mechanism that best describes the opening of stomata in plants?
 A) Influx of K^+ into the guard cells followed by endosmosis, making the cells turgid
 B) K^+ triggers the water pumps in the guard cell membrane that make them turgid
 C) Efflux of K^+ from the guard cells followed by water, making the cells flaccid
 D) Loss of K^+ from guard cells creates positive pressure leading to turgidity of the guard cells
10. How many ATP molecules or ATP equivalents are required to synthesize a protein which contains 100 amino acids?
 A) 600 B) 400 C) 200 D) 300
11. Polygonum type embryo sac is
 A) Monosporic B) Bisporic
 C) Trisporic D) Tetrasporic
12. In a frequency distribution, if the mean is less than the mode, and the median is greater than the mean but less than the mode, the distribution is considered to be:
 A) Negatively skewed B) Positively skewed
 C) Symmetrical D) Open ended
13. Which of the following computer language is used for artificial intelligence?
 A) FORTRAN B) COBOL C) PROLOG D) C
14. Cell cycle check points form a mechanism to ensure
 A) Proper DNA replication
 B) Proper chromosome separation
 C) Proper completion of each stage in cell cycle
 D) Proper termination of cell cycle
15. Which of the following type of microscopy is most useful for viewing the internal structures of unstained specimens?
 A) Phase-contrast B) Bright field
 C) Electron D) Confocal
16. Which of the following techniques would give you the most precise and accurate information about where and when a given gene is expressed?
 A) In situ hybridization
 B) DNA microarray
 C) Promoter gene fusion including introns
 D) Reporter gene fusion including introns
17. The spore of diatoms resulting from syngamy are called
 A) Autospore B) Auxospore
 C) Androspore D) Zygospor

18. Infectious single stranded RNA in plants that are not associated with any protein is known as
 A) Viruses
 B) Viroids
 C) Priones
 D) Satellite viruses
19. Powdery lesions on the underside of the coffee leaves appear as orange yellow to red orange in colour known as coffee rust is caused by
 A) *Hemileia vastatrix*
 B) *Puccinia graminis*
 C) *Cronartium ribicola*
 D) *Uromyces phaseoli*
20. Which of these spores are characteristic of the black bread mold *Rhizopus*?
 A) Basidiospores
 B) Arthrospores
 C) Sporangiospores
 D) Ascospores
21. Litmus, a dye used in laboratories as an indicator of acid-base, is obtained from
 A) *Rocella*
 B) *Usnea*
 C) *Peltigera*
 D) *Everina*
22. Sporophyte with Synangium, homosporous with eusporangite development is seen in the pteridophyte
 A) *Psilotum*
 B) *Lycopodium*
 C) *Isoetes*
 D) *Marselia*
23. Birbal Sahni (1948) made the first collection of fossilized pteridophyte Pentoxylales from the village Nipania of
 A) Bihar
 B) Assam
 C) Utter Pradesh
 D) Kashmir
24. Who among the following proposed a phylogenetic system of classification?
 A) Carl Linnaeus
 B) Bentham and Hooker
 C) John Hutchinson
 D) Charles Darwin
25. Plants with stellate hairs, mucilaginous, free lateral stipule, solitary flowers, free petals with contorted aestivation, monoadelphous stamen, ovules with axile placentation is seen in the family
 A) Malvaceae
 B) Rutaceae
 C) Caryophyllaceae
 D) Meliaceae
26. Pavement tissue, a unique region occurs in the ovule of the gymnosperm
 A) *Gnetum*
 B) *Taxus*
 C) *Agathis*
 D) *Ephedra*
27. Study of medical aspects of pollen grains is known as
 A) Latropalynology
 B) Mellitopalynology
 C) Aeropalynology
 D) Copropalynology

28. Strip of parenchyma cells, polygonal or radially elongated, lying in between vascular bundle is known as
 A) Cambium
 B) Bundle sheath
 C) Medullary rays
 D) Endodermis
29. Feulgen staining of DNA is based on the reaction of Schiff's reagent with
 A) Free aldehyde group of pentose sugar
 B) Purines at N-7 position
 C) Pyrimidines at N-1 position
 D) Phosphate moiety of nucleotide
30. Winged bean is the common name of
 A) *Psophocarpus tetragonolobus*
 B) *Vicia angularis*
 C) *Lens culinaris*
 D) *Cyamopsis tetragonoloba*
31. The chemistry of raphide crystal is
 A) Silica
 B) Calcium oxalate
 C) Calcium carbonate
 D) Ferric sulphate
32. In a competitive inhibition the K_m and V_{max} values of an enzyme
 A) K_m and V_{max} values decrease
 B) K_m value increases whereas V_{max} remains unchanged
 C) K_m and V_{max} values increase
 D) K_m value remains unchanged and V_{max} value decreases
33. The proteins in the native PAGE are separated on the basis of
 A) Molecular mass
 B) Net charge and size
 C) Net charges
 D) Based on isoelectric value
34. Which is the strongest reducing agent in photosynthetic electron transport cycle in chloroplast?
 A) P700*
 B) P680*
 C) Plastoquinone
 D) Plastocyanin
35. If a carotenoid-less mutant plant was grown under normal sunlight, then occurs
 A) Increased chlorophyll oxidation and necrosis
 B) Increased chlorophyll synthesis
 C) Increased photosynthetic rate
 D) Reduced photorespiration
36. Plasma membrane infoldings are characteristic of
 A) Transfer cells
 B) Transfusion tissue
 C) Mitochondria
 D) Companion cells

37. The antibody that binds to mast cells, promote the release of histamine and other agents that produce allergic symptoms
 A) Ig M B) Ig G C) Ig E D) Ig D
38. *Deinococcus radiodurans* an extremophilic bacterium is able to survive even exposure to massive radiation?
 A) Because it possess a thick shell which acts as a shield from the radiation
 B) Because it has unique repair mechanisms
 C) Because its cell wall contains radioactive neutralizing elements
 D) Because it has many copies of genes encoding DNA repair
39. The presence of pyrenoid in the middle of the chloroplast in a bryophyte, a unique feature, makes it apparently resemble with algae is seen in
 A) *Funaria* B) *Riccia*
 C) *Anthoceros* D) *Porella*
40. *Canada balsam* is obtained from
 A) *Podocarpus acutifolius* B) *Taxus baccata*
 C) *Agathis alba* D) *Abies balsamea*
41. Taxonomy, when it is strengthened by incorporating data from semantides and non semantides is called
 A) Numerical taxonomy B) Cytotaxonomy
 C) Chemotaxonomy D) Alpha taxonomy
42. Botanical Survey of India was established in 1890 under the Ex-officio Director
 A) Sir George King B) Sir Arthur James
 C) J.D. Hooker D) Robert Kyd
43. A fossil bryophyte identified from Rhaetic, Upper Triassic is
 A) *Naiadita* B) *Plagiochasma*
 C) *Leucobryum* D) *Plagiochila*
44. Carnoy's fluid employed in cytological preparations consists of the following
 A) Absolute alcohol + chloroform + glacial acetic acid
 B) Absolute alcohol + chloroform + distilled water
 C) Absolute alcohol + Formalin + glacial acetic acid
 D) Absolute alcohol + Chromic acid + glacial acetic acid
45. Abnormal functioning of cambium and multiple cambial ring formation leads to anomalous secondary growth in
 A) *Bignonia* B) *Bauhinia*
 C) *Boerhavia* D) *Eupatorium*
46. The chemotherapeutic drug derived from *Taxus* species which is used to treat breast cancer is
 A) Vincristin B) Vinblastin
 C) Paclitaxel D) Taxine

47. Melting of DNA molecule leads to
 A) Decrease in optical density B) Increase in optical density
 C) No change in optical density D) Fluctuation in optical density
48. When the cell is Plasmolyzed, its
 A) $DPD = OP$ B) $DPD = 0$
 C) $DPD = OP + TP$ D) $DPD = OP - TP$
49. A transitional zone between two ecosystems is called
 A) Fragile ecosystem B) Biome
 C) Ecotone D) Buffer zone
50. Whose name is most closely associated with molecular evolution?
 A) Theodosius Dobzhansky B) Motoo Kimura
 C) Frederick Sanger D) Stephen Jay Gould
51. International Conservation for Nature and Natural Resources (IUCN) headquarters is located at
 A) Morges, Switzerland B) Paris, France
 C) Vienna, Austria D) New York, USA
52. The Gangetic estuary of Sunderban region is rich in
 A) Deciduous forests B) Evergreen forests
 C) Subtropical forests D) Mangrove vegetation
53. A gene inherited from female is not recognized in either male or female offspring, but the same gene is expressed in both male and female offspring when inherited from male. This can be aptly explained by
 A) Repression B) Deletion
 C) Recombination D) Imprinting
54. Chromosomal puffs are active sites of
 A) RNA synthesis B) DNA replication
 C) Lipid synthesis D) Polysaccharide synthesis
55. Satellite DNA is
 A) Short repetitive nucleotide sequence
 B) Single gene regions
 C) Ribosomal RNA genes
 D) Extra chromosomal DNA
56. The factor involved in the control of epigenetic gene expression in eukaryotes is?
 A) RNA polymerase II B) DNA methyltransferase
 C) TF II D D) TF II H
57. In a population, 75% are with dominant phenotype and the rest are with the recessive phenotype. If the population is in equilibrium with respect to this locus, what is the frequency of the dominant allele?
 A) 0.5 B) 0.25 C) 0.75 D) 0.40

58. Xeroderma pigmentosum is an autosomal recessive genetic disease that causes a variety of phenotypic changes in skin cells on exposure to light like freckles on face, arms, and legs. What is the most likely disorder of this DNA repair mechanism?
- A) Base excision repair
 B) Nucleotide excision repair
 C) Defective RNA transcription from TATA- less promoter
 D) Impaired DNA repair by photo reactivation
59. Which was the first eukaryotic chromosome sequenced with 315 kb?
- A) Yeast chromosome III B) Yeast chromosome XI
 C) Arabidopsis chromosome IV D) Arabidopsis chromosome III
60. Elite plants of a population are selected at the time of harvest and their seeds are bulked for sowing in the next season is termed as
- A) Pure line selection B) Mass selection
 C) Line breeding D) Recurrent selection
61. First genetically modified plant produced in 1982 was
- A) Transgenic tobacco B) Transgenic maize
 C) Transgenic tomato D) Transgenic cotton
62. The mechanism that can cause a gene to move from one linkage group to another is
- A) Translocation B) Inversion
 C) Crossing over D) Duplication
63. A mouse in which one particular gene has been replaced by its inactivated form generated *in vitro* is called
- A) Transgenic mouse B) Knockout mouse
 C) Humouse D) Recombinant mouse
64. The field of horticulture involved in fruit growing and study of all fruits and nuts is
- A) Pomology B) Olericulture
 C) Arboriculture D) Floriculture
65. Which among the following tribal community receives benefit of the use of *Trichopus zeylanicus* as per benefit sharing system?
- A) Kuruchiyar B) Kaatunaikan
 C) Kani D) Mullukurumba
66. Bacterial artificial chromosome, cosmid, P1 phage and plasmid are common cloning vectors with a range from 1 to 300k. Which of the following is the proper order for these vectors in terms of cloning capacity?
- A) Bacterial artificial chromosome, cosmid, P1 phage, plasmid
 B) Cosmid, Bacterial artificial chromosome, P1 phage, plasmid
 C) P1 Phage, cosmid, Bacterial artificial chromosome, plasmid
 D) Plasmid, cosmid, P1 phage, Bacterial artificial chromosome

67. The first step of proof reading during protein synthesis is carried out by?
 A) Ribosomes B) aminoacyl t-RNA synthetase
 C) m-RNA D) t-RNA
68. Position effect is the result of
 A) Mutations B) Deletions
 C) Transversions D) Inversions
69. A taxonomic system based only on the traits that reflect the order in time in which branches arose in a phylogenetic tree is called
 A) Phylogeny
 B) Cladistic
 C) Classical evolutionary taxonomy
 D) Phenetics
70. A keystone species is one that
 A) Exhibits higher likelihood of extinction than a non keystone species
 B) Exerts a strong influence on an ecosystem
 C) Leads to extinction of other species
 D) Has a weak influence on an ecosystem
71. Plant succession initiated on such areas where there is extreme scarcity of water is known as
 A) Lithosere B) Hydrosere
 C) Xerosere D) Psammosere
72. The total biomass of photosynthetic autotrophs present in an ecosystem is known as the
 A) Net primary productivity B) Standing crop
 C) Trophic efficiency D) Standing state
73. Paratracheal parenchyma may be found:
 A) at the interface of spring and summer wood
 B) around wood rays
 C) around xylem vessels
 D) in phloem
74. Endosperm haustoria with vermiform appendage is reported in
 A) *Grevillea* B) Coconut
 C) *Adoxa* D) *Hyoscymus*
75. Pseudostem with sheathing leaf base, thick midrib, spathaceous bracts, corolla two lipped, stamens 5, ovary inferior with many ovules on axile placentation – these are seen in
 A) Arecaceae B) Aroideae
 C) Poaceae D) Musaceae
76. Prokaryotes contain one RNA polymerase. How many are there in eukaryotes?
 A) 1 B) 3 C) 2 D) 4

86. Which of the following is incorrect?
 A) Root apical meristem is the meristem of synthesis of cytokinin
 B) Methionine is the precursor of Ethylene
 C) Tryptophan is the precursor of IAA
 D) Thidiazuron is the most abundant naturally occurring cytokinin of higher plants
87. Agar is obtained from the algae
 A) *Gelidium* B) *Gracillaria*
 C) Both A & B D) *Polysiphonia*
88. The most common type of chromosome rearrangement involving acrocentric chromosomes of humans is
 A) Robertsonian translocation B) Inversion
 C) Duplication D) Deletion
89. In amphivasal vascular bundles
 A) Peripherally arranged xylem elements enclose a mass of phloem
 B) Peripherally arranged phloem elements enclose a mass of xylem
 C) Xylem and phloem are arranged side by side
 D) Xylem is seen on either side of the phloem
90. A Pteridophyte member with ridged stem, consists of alternating vallecular and carinal canal with V shaped poorly developed xylem
 A) *Selaginella* B) *Equisetum*
 C) *Microsorium* D) *Marsilea*
91. The Gymnosperm known as living fossil and represented worldwide distribution in Jurassic is
 A) *Ginkgo* B) *Ephedra*
 C) *Williamsonia* D) *Lyginopteris*
92. The specimen collected from the same locality from where the holotype was originally collected and is the contingent from the same population is known as
 A) Tototype B) Neotype
 C) Epitype D) Isotype
93. The family characterized by herbaceous plants, swollen nodes, dichasial cyme, complete, actinomorphic, hypogynous flower, obdiplostemonous condition, ovules on free central placentation.
 A) Caryophyllaceae B) Ranunculaceae
 C) Cruciferae D) Rutaceae
94. If a diploid cell contains six chromosomes, how many possible random arrangements of homologous could occur during Metaphase- I
 A) 4 B) 8 C) 6 D) 64
95. A plant of genotype AB/ab is test crossed to ab/ab. If the two loci are 10 map units apart, what proportion of the progeny will be AB/ab?
 A) 5% B) 45% C) 10% D) 20%

96. The genome of a typical bacterium contains about 5×10^6 base pairs and can be replicated in about 41 minutes. The human genome is 600X larger (3×10^9 base pairs) and at the rate of a bacterium would require 300 hours (~12 days) to be replicated; yet the entire human genome can be replicated within a few hours. How is this possible?
- A) Eukaryotic DNA is simpler to replicate than prokaryotic DNA
 B) Human DNA polymerases works much faster than that of prokaryotes
 C) The nucleosomes of eukaryotic DNA allow for faster DNA replication
 D) Human DNA contains more origins of replication than prokaryotic DNA
97. Choose the mismatch
- | | |
|-------------------------|-----------------------------------|
| A. DNase I | 1. Cleaves only ds DNA |
| B. Maxam-Gilbert method | 2. Chemical modification of bases |
| C. Dideoxy terminator | 3. Sanger method |
| D. Biotin | 4. Water soluble vitamin |
98. The bacterial enzyme that changes positively supercoiled DNA into negatively supercoiled DNA is
- A) DNA helicase
 B) DNA gyrase
 C) Single stranded binding protein
 D) Polymerase
99. In sheep, dominant allele B produces white wool and its recessive allele b produces black wool. In a total of 900 sheep, 891 are white and 9 are black. Estimate the frequency of the B allele
- A) 0.1 B) 0.9 C) 0.3 D) 0.7
100. A bag contains 10 black and 20 white balls and a ball is drawn in random. What is the possibility of drawing a black ball?
- A) 0.33 B) 0.22 C) 0.55 D) 0.88
101. Rosalind Franklin's pictures of DNA double helix were taken using the technique known as
- A) Diffraction B) X-ray crystallography
 C) Fluorescence D) Transmission electron microscopy
102. An analysis of chromosomal DNA by Southern blot technique, involves the following steps
 1. Autoradiography 2. Blotting 3. Cleavage 4. Electrophoresis 5. Hybridization
 Which of the following sequence of steps best illustrates this technique?
- A) 1,2,3,4,5 B) 1,3,2,4,5
 C) 3,5,2,4,1 D) 3,4,2,5,1

