86. Which of the following soil water fractions is most strongly influenced by matric potential?

(A) Gravitational water

(B) Hygroscopic water

(C) Capillary water

(D) Chemically bound water

87. Gamma rays are

(A) chemical mutagens

(B) physico-chemical mutagens

(C) physical mutagens

(D) UV ray type mutagens

88. Recapitulation theory was proposed by

(A) Weismann

(B) Haeckel

(C) Cuvier

(D) Wallace

89. Which of the following is ***not*** properly associated with plants?

(A) Cell wall

(B) Sexual reproduction

(C) Hox genes

(D) None of the above

90. The rapid thigmonastic movement in *Mimosa pudica* is due to

(A) cell division at the pulvinous

(B) turgor changes in motor cells

(C) auxin accumulation in leaflets

(D) phytochrome-mediated signalling

91. Which of the following statements correctly describes *Cuscuta*?

(A) It is a green, photosynthetic epiphyte.

(B) It is a leafless holoparasite.

(C) It performs full photosynthesis and is only partially dependent on the host.

(D) It grows independently in soil without a host.

92. The geological periods of Paleozoic Era in order from oldest to the youngest are

(A) Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Permian

(B) Silurian, Cambrian, Devonian, Carboniferous, Permian, Ordovician

(C) Devonian, Cambrian, Ordovician, Silurian, Permian, Carboniferous

(D) Cambrian, Silurian, Ordovician, Devonian, Permian, Carboniferous

78. The 'king of cereal' is

(A) rice

(B) wheat

(C) millet

(D) barley

79. Rice inflorescence is known as

(A) radicle

(B) spikelet

(C) panicle

(D) ear

80. Which region of India is known as 'home of primitive flowering plant'?

(A) Eastern Himalaya

(B) Deccan Peninsula

(C) Western Ghat

(D) Gangetic Plains

81. Which of the following is/are attribute(s) of a community?

(A) Number of species

(B) Relative abundance

(C) Primary structure

(D) All of the above

82. Cotton fibres are separated from seeds by means of

(A) spinning

(B) ginning

(C) retting

(D) All of the above

83. Therophytes are the plants where

(A) perennating buds are close to the ground

(B) perennating buds are exposed to the atmosphere

(C) seeds of the embryo act as perennating buds

(D) All of the above

84. Which of the following is a highly productive ecosystem, if considered globally?

(A) Tropical rain forest ecosystem

(B) Sub-tropical rain forest ecosystem

(C) Ocean ecosystem

(D) Temperate ecosystem

85. The theory of chemical evolution of life was first proposed by

(A) Miller and Urey

(B) A. I. Oparin

(C) Sydney Fox

(D) None of them

70. Which statement is correct regarding xylem and phloem development?

(A) Protoxylem matures after metaxylem.

(B) Protophloem matures before metaphloem.

(C) Metaxylem is formed before protoxylem.

(D) Protophloem and metaphloem mature simultaneously.

71. Bicollateral vascular bundles are found in

(A) sunflower

(B) *Cucurbita*

(C) maize

(D) *Helianthus*

72. Quinine is associated with

(A) Cinchona

(B) Neem

(C) Digitalis

(D) Aloe vera

73. Black tea is an excellent beverage, however, it also contains anti-nutritional component, namely

(A) tannin

(B) alcohol

(C) phytate

(D) sugar

74. Which traditional fermented alcoholic beverage conferred 'geographical indication tag'?

(A) Judima

(B) Xaj pani

(C) Lau pani

(D) All of the above

75. The most appropriate method for breeding of 'self-pollinated crop' is

(A) bulk breeding

(B) mass selection

(C) single seed breeding

(D) pedigree breeding

76. The visible spectrum of light used by plants is

(A) 200–800 nm

(B) 100–300 nm

(C) 390–700 nm

(D) 280–690 nm

77. The concentration of certain chemicals, such as DDT, in higher trophic levels of an ecosystem is known as

(A) eutrophication

(B) biomagnification

(C) biogeochemical cycling

(D) energy transfer

62. Which of the following is ***not*** a terrestrial food chain?

(A) Oak tree → Aphids → Spiders → Small birds → Hawk

(B) Phytoplankton → Zooplankton → Predator insects → Stork → Kingfisher

(C) Plants → Grasshoppers → Lizards → Hawk

(D) Plants → Mouse → Snake → Hawk

63. The State that has the lowest percentage of its geographical area under forest is

(A) Manipur

(B) Meghalaya

(C) Nagaland

(D) Assam

64. Homologous organs indicate

(A) convergent evolution

(B) divergent evolution

(C) adaptive radiation only

(D) random evolution

65. How many ATP molecules are required to reduce one molecule of N_2 to NH_3 by nitrogenase?

(A) 2

(B) 8

(C) 16

(D) 32

66. In nitrogenase-catalyzed reduction of N_2 to NH_3, the electrons required for the reaction are primarily supplied by

(A) NAD^+ and FAD

(B) ferredoxin

(C) ATP directly

(D) cytochrome C

67. Okazaki fragments are formed during replication of

(A) leading strand

(B) lagging strand

(C) both leading and lagging strands

(D) only circular DNA

68. The experiment which proved semiconservative replication of DNA was conducted by

(A) Hershey and Chase

(B) Griffith

(C) Meselson and Stahl

(D) Watson and Crick

69. Which shade tree is known for nitrogen fixation and soil fertility improvement in tea gardens?

(A) *Grevillea robusta*

(B) *Albizia lebbeck*

(C) *Pinus roxburghii*

(D) *Magnolia grandiflora*

38. Cellulose is a complex polysaccharide made up of repeating units of

(A) α-D-glucose

(B) β-D-glucose

(C) fructose

(D) galactose

39. The first mutant discovered by Morgan in *Drosophila* had

(A) vestigial wing

(B) white eye

(C) curly wing

(D) yellow body

40. Independent assortment of genes takes place because of chromosomal orientation during

(A) M phase of mitosis

(B) M phase I of meiosis

(C) M phase II of meiosis

(D) All of the above

41. In photorespiration, the enzyme Rubisco fixes

(A) only CO_2

(B) both CO_2 and O_2

(C) only O_2

(D) None of the above

42. During oxidative decarboxylation of pyruvate, which molecules are produced?

(A) Acetyl CoA + CO_2 + NADH

(B) Acetyl CoA + ATP + $FADH_2$

(C) Acetyl CoA + CO_2 + $FADH_2$

(D) Pyruvate + CO_2 + ATP

43. High auxin to cytokinin ratio favours

(A) root formation

(B) shoot formation

(C) embryogenesis

(D) callus necrosis

44. Which of the following is **not** a day-neutral plant?

(A) Cotton

(B) Soybean

(C) Maize

(D) Tomato

45. In potato tuber, the small white dots visible on the surface are

(A) stomata

(B) nodes

(C) lenticels

(D) scars

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30. The movement of a gene from one linkage group to another is possible. The mechanism behind this is

(A) inversion

(B) translocation

(C) duplication

(D) crossing-over

31. The spindle fibres of a mitotic cell consist of

(A) actin

(B) myosin

(C) collagen

(D) tubulin

32. Hydroxylamine causes mutation specifically by modifying

(A) cytosine to hydroxylamino-cytosin

(B) adenine to hypoxanthine

(C) guanine to xanthine

(D) thymine to 5-hydroxymethyl-uracil

33. The interphase of a cell cycle is ***not*** associated with

(A) G1 phase

(B) S phase

(C) G2 phase

(D) M phase

34. The cristae are

(A) outer mitochondrial membrane

(B) structure within the mitochondrial matrix

(C) folded mitochondrial inner membrane

(D) mitochondrial lumen

35. The lysosomes are 'suicidal bags' of cell. This is because they

(A) cause autolysis when ruptured

(B) digest other cell organelles

(C) digest non-functional proteins

(D) contain digestive enzymes

36. In case of 'incomplete dominance'

(A) both the gene products are expressed

(B) a new phenotype is developed from both the gene products

(C) recessive gene becomes dominant

(D) dominant gene supressed

37. Example of industrial melanism in peppered moth is a classic case of

(A) mutation pressure

(B) gene flow

(C) directional selection

(D) genetic drift

24. The composite fruit in Mulberry is formed from

(A) calyx

(B) perianth and peduncle

(C) entire inflorescence

(D) ovary only

25. In lichens, the fungal partner derives its nutrition mainly from

(A) a nitrogen-fixing bacteria

(B) algal partner

(C) decomposition of soil humus

(D) symbiosis with other fungi

26. The natural polyploidy during cell division is due to

(A) crossing-over in prophase I

(B) failure of cytokinesis after telophase

(C) point mutation in DNA replication

(D) None of the above

27. 'Bagasse', the raw material used to produce ecofriendly disposable tableware and paper, is

(A) the liquid residue left after sugar crystallization

(B) the fibrous, dry pulp remaining after sugarcane juice extraction

(C) the wax coated on the outer surface of sugarcane

(D) the leaves and tops of the sugarcane plant

28. Heredity of a character within pure line is

(A) zero

(B) 100%

(C) 75%

(D) 50%

29. The plant breeding method which is most effective to correct a specific defect in popular high-yielding variety is

(A) backcross method

(B) test cross method

(C) alternate cross method

(D) pedigree method

9. Alternate segregation of a reciprocal translocation heterozygote produces

(A) only unbalanced gametes

(B) only balanced gametes

(C) half balanced gametes, half unbalanced gametes

(D) gametes with deletions

10. In self-pollinated species, which evolutionary trend is more prominent?

(A) High genetic variability

(B) Increased homozygosity

(C) Polyploidy as a rule

(D) Continuous hybrid vigour

11. Pollinia are characteristics of which plant family?

(A) Fabaceae

(B) Poaceae

(C) Orchidaceae

(D) Solanaceae

12. The first successful experimental proof of totipotency in plants was given by

(A) Skoog and Miller

(B) Haberlandt

(C) Steward

(D) White

13. The Khasi pine (*Pinus kesiya*) mostly found in

(A) Nalbari and Barpeta

(B) Dhubri and Goalpara

(C) Dima Hasao and Karbi Anglong

(D) All of the above

14. Triploid plants (3n), such as seedless bananas, are typically sterile because

(A) they cannot undergo mitosis

(B) they produce aneuploid gametes during meiosis

(C) they lack a cell wall

(D) All of the above

15. *Raphanobrassica* is a classic intergeneric hybrid and allopolyploid developed by crossing

(A) cabbage and mustard

(B) radish and cabbage

(C) tomato and potato

(D) wheat and rye

16. Cytoplasmic male sterility (CMS) in plant breeding is essential for the commercial production of

(A) pure line varieties

(B) hybrid seeds

(C) clonal varieties

(D) polyploid plants

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1. Which pair is wrongly matched?

(A) Eye colour—Quantitative trait

(B) Height—Quantitative trait

(C) Skin colour—Quantitative trait

(D) Blood group type—Quantitative trait

2. Phytochrome-mediated response that promotes germination in lettuce seeds is triggered by

(A) red light

(B) far-red light

(C) blue light

(D) darkness

3. The main chemical component of bast fibre is

(A) lignin

(B) cellulose

(C) pectin

(D) hemicellulose

4. Which of the following is an example of intraspecific competition affecting population size?

(A) Lion predating on zebra

(B) Overcrowded deer competing for grass

(C) birds competing for nesting sites with squirrels

(D) cowbird laying eggs in host bird's nest

5. The chief alkaloid present in Sarpagandha is

(A) atropine

(B) reserpine

(C) quinine

(D) piperine

6. Which phase is the shortest in mitosis?

(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

7. Carbon sequestration refers to

(A) release of carbon from rocks

(B) storage of carbon in long-term reservoirs

(C) burning of carbon-based fuels

(D) fixation of nitrogen

8. Which of the following is an exception to Mendel's law of independent assortment?

(A) Multiple alleles

(B) Linkage

(C) Incomplete dominance

(D) Codominance

17. Magnolia represents a primitive angiosperm because it has

(A) tygomorphic floral symmetry

(B) spiral arrangement of floral parts

(C) fused floral parts

(D) simple fruits

18. Which subfamily of fabaceae is characterized by diadelphous stamens?

(A) Mimosoideae

(B) Papilionoideae

(C) Caesalpinioideae

(D) Detarioideae

19. Which of the following viruses contains double-stranded RNA (ds RNA) as genetic material?

(A) Retrovirus

(B) Reovirus

(C) Adenovirus

(D) Bacteriophage λ

20. Deficiency of which micronutrient causes 'whiptail disease' in cauliflower?

(A) Zinc (Zn)

(B) Boron (B)

(C) Molybdenum (Mo)

(D) Copper (Cu)

21. *Frankia* species form nitrogen-fixing nodules in

(A) grasses

(B) woody plants like *Alnus*

(C) legumes only

(D) conifers like *Pinus*

22. Barbara McClintock worked extensively on which organism?

(A) *Drosophila melanogaster*

(B) *Escherichia coli*

(C) *Zea mays*

(D) *Saccharomyces*

23. In the inactive state, the G-protein α-subunit binds

(A) GDP

(B) GTP

(C) ATP

(D) cAMP

46. *Thermus aquaticus* is important in biotechnology because it provides

(A) ribosomes

(B) DNA polymerase

(C) antibiotics

(D) photosynthetic pigments

47. Histone protein plays a role in

(A) spindle formation

(B) DNA packaging

(C) cytokinesis

(D) kinetochore attachment

48. Which of the following is an example of distant hybridization?

(A) *Triticum aestivum* × *Triticum durum*

(B) *Triticum aestivum* × *Aegilops squarrosa*

(C) *Pisum sativum* × *Pisum fulvum*

(D) *Oryza sativa* × *Oryza indica*

49. Which of the following is useful to find out genotype of an unknown parent?

(A) Backcross

(B) Test cross

(C) Monohybrid test cross

(D) Recessive cross

50. Which of the following is correct in case of dihybrid test cross?

(A) 9 : 3 : 3 : 1

(B) 2 : 2 : 2 : 2

(C) 1 : 1 : 1 : 1

(D) 1 : 2 : 1 : 2

51. The mutation that arises in absence of a known mutagen is called

(A) fused mutation

(B) induced mutation

(C) spontaneous mutation

(D) frameshift mutation

52. In *Drosophila*, sometimes X chromosome is attached to one another and becomes (XX). They always segregate together. Some flies thus contain a set of attached X chromosomes plus Y chromosome. The sex of such fly will be

(A) male

(B) female

(C) both male and female

(D) neither male nor female

53. The classical theory of ecological succession can be explained by

(A) random colonization model

(B) tolerance model

(C) inhibition model

(D) facilitation model

54. Colchicine arrests mitosis at

(A) prophase

(B) metaphase

(C) anaphase

(D) telophase

55. The age-area hypothesis assumes that

(A) all species have different rates of dispersal

(B) all species have the same rate of dispersal

(C) dispersal is not related to age

(D) evolution occurs only in tropics

56. Which enzyme is primarily involved in mobilizing stored food in germinating seeds?

(A) Amylase

(B) Protease

(C) Lipase

(D) All of the above

57. The peninsular India has highest diversity in endemic plants. The most appropriate explanation for this is

(A) Western Ghat is a part of peninsular India

(B) the disturbance is less in peninsular India

(C) unique and diverse habitats are common in peninsular India

(D) the disturbance is very high in peninsular India

58. Which of the following exclusively comes from mother to child?

(A) X chromosome

(B) Y chromosome

(C) Mitochondrial DNA

(D) XX chromosomes

59. Geographically isolated populations are known as

(A) sympatric population

(B) parapatric population

(C) allopatric population

(D) semipatric population

60. Darwin's finches best represent

(A) adaptive radiation

(B) coevolution

(C) migratory birds

(D) convergent evolution

61. The theory of tolerance in phytogeography is

(A) based on macro-distribution of plants

(B) based on macro- and micro-distributions of plants

(C) based on micro-distribution of plants

(D) None of the above

93. The 'Age of Ferns' in the geological timescale refers to which period?

(A) Paleozoic

(B) Mesozoic

(C) Cenozoic

(D) Precambrian

94. A drug which reduces high blood pressure is obtained from

(A) *Solanum nigrum*

(B) *Rauvolfia serpentina*

(C) *Aconitum chasmanthum*

(D) *Centella asiatica*

95. Which of the following is considered as living linking species between reptiles and mammals?

(A) *Ichthyostega*

(B) *Archaeopteryx*

(C) *Peripatus*

(D) *Ornithorhynchus*

96. In a Gram staining procedure, if crystal violet is omitted, cells will appear after counterstaining as

(A) gram-positive → purple; gram-negative → pink

(B) both gram-positive and gram-negative → pink

(C) both gram-positive and gram-negative → purple

(D) both gram-positive and gram-negative → colourless

97. The mordant in Gram staining is

(A) safranin

(B) alcohol

(C) iodine

(D) malachite green

98. Which codon serves as the universal start codon in eukaryotes and prokaryotes?

(A) UAA

(B) AUG

(C) UAG

(D) GUG

99. Which of the following gases was **not** used in the Miller-Urey experiment?

(A) Methane

(B) Ammonia

(C) Carbon dioxide

(D) Hydrogen

100. Which type of humus is acidic, poorly decomposed, and commonly found in coniferous forests?

(A) Mor humus

(B) Mull humus

(C) Moder humus

(D) Black cotton soil humus