DU_BOTANY_2014

Section A

1. Which one of the following statements is true about zoospore and aplanospores?
   (a) Zoospores are flagellate while aplanospores are non-flagellate
   (b) Zoospores are non-flagellate while aplanospores are flagellate
   (c) Both are flagellate
   (d) Both are non- flagellate
2. Phycocyanin and phycoerythrin are characteristics of
   (a) Phaeophyceae (b) Chlorophyceae (c) Cyanophyceae (d) Rhodophyceae
3. In chlorophyceae the pyrenoid is generally embedded in
   (a) cell wall (b) chloroplast (c) cytoplasm (d) nucleus
4. Nannandrium form is found in
   (a) *Chlamydomonas* (b) *Volvox* (c) *Oedogonium* (d) *Chara*
5. Carpogonium is a
   (a) male reproductive structure (b) asexual reproductive body
   (c) embryo like structure (d) female reproductive structure
6. Hormogonia are means of
   (a) vegetative multiplication in Cyanophyceae (b) sexual reproduction in Chlorophyceae
   (c) sexual reproduction in Phaeophyceae (d) asexual reproduction in Xanthophyceae
7. Heterocysts are mainly related to
   (a) photosynthesis (b) sexual reproduction
   (c) nitrogen fixation (d) mucilage production
8. Agar-Agar is mainly obtained from
   (a) *Nostoc* and *Anabaena* (b) *Gracillaria* and *Gelidium*
   (c) *Sargassum* and *Laminaria* (d) *Polysiphonia* and *Fucus*
9. The cell wall in the members of Bacilariophyceae is made of
   (a) chitin with rich deposits of calcium
   (b) cellulose with rich deposits of sodium
   (c) murin with rich deposits of lead
   (d) pectic substance richly reinforced with deposits of silica
10. Single large chloroplast with pyrenoid in each cell of plant body is a characteristic feature of which one of the following?
    (a) Anthocerotales (b) Musci (c) Marchantiales (d) Equisetales

11. Which one of the following statements is not correct?
    (a) In *Funaria* extensively branched protonema is produced after spore germination
    (b) In *Sphagnum* the sperm dispersal occurs by air
    (c) In *Riccia* the sporophyte remain embedded in the thallus
    (d) In bryophytes the calyptra on the capsule is formed from the venter of archegoium
12. In the sporophyte of liverworts, elaters are produced from
    (a) spore mother cells (b) columella cells (c) capsule wall cells (d) seta cells
13. In which of the following, retort cells of stem and hyaline cells of leaf lamina facilitate high water holding capacity of gametophores?
    (a) *Funaria* (b) *Porella* (c) *Pellia* (d) *Sphagnum*
14. Ventral row of comparatively smaller leaves in *Porella* is called
    (a) fronds (b) chloronema (c) retort cells (d) amphigastria
15. The main plant bodies in bryophytes and pteridophytes are
    (a) gametophytic in both
    (b) sporophytic in both
    (c) gametophytic in bryophytes and sporophytic in pteridophytes
    (d) sporophytic in bryophytes and gametophytic in pteridophytes
16. In the amphiphloic siphonostele
    (a) phloem is present only on the inner side of the xylem with central pith
    (b) phloem is present on inner as well as outer side of the xylem with central pith
    (c) phloem is present only on the outer side of the xylem with central pith
    (d) central solid core of the xylem is surrounded by phloem without any pith
17. Trilocular synangium having fused sporangia, each subtended by bifid leaf is found in
    (a) *Marsilea* (b) *Selaginella* (c) *Psilotum* (d) *Pteris*
18. Spores of *Equisetum* are unique in the sense that
    (a) elaters remain attached to spore surface and help in dispersal
    (b) microspores and megaspores remain together in the same sporangium
    (c) spores are not viable and never germinate
    (d) spores are necked and never enclosed in sporangium
19. Which one of the following statements is true regarding sporocarp of *Marsilea*?
    (a) It is a hook-like structure at the base of leaves that produce mucilage to repel the insect
    (b) It is homosporous
    (c) It is a globular nut- like structure enclosing microsporangia and megasporangia
    (d) It is a mean for asexual reproduction
20. Which of the following features indicate the incidence of seed habit in Pteridophytes?
    (a) Retention of female gametophyte within the sporangium till the formation of embryo
    (b) Retention of germinating microspores and release of sperms within the sporangium
    (c) Presence of male and female gametangia on separate gametophytes
    (d) Presence of male and female gametangia on the same gametophyte.

21. The position of microsporangia in the male cone of *Pinus* is
(a) adaxial (upper) surface of the sporophyll
(b) both (abaxial and adaxial) sides of the sporophyll
(c) tip of the sporophyll
(d) abaxial (lower) surface of the sporophyll

22. In *Pinus* the female gametophyte develops from the
(a) haploid megaspore (b) diploid megaspore
(c) haploid nucellus cells (d) haploid megaspore mother cell

23. Archegonia are absent in
(a) *Ephedra* (b) *Gnetum* (c) *Pinus* (d) *Cycas*

24. Which of the following species produces commercial edible seeds 'Chilgoza' (Neoza)?
(a) *Pinus gerardiana* (b) *Pinus roxburghii*
(c) *Ephedra gerardiana* (d) *Cycas revoluta*

25. A group that includes a common ancestor and some descendants is called
(a) monophyletic (b) paraphyletic (c) polyphyletic (d) allopatric

26. Which of the following patterns of placentation is observed in a bicarpellary, syncarpous, unilocular ovary becoming bilocular due to the development of a false septum?
(a) Axile placentation (b) Parietal placentation
(c) Basal placentation (d) Superficial placentation

27. Phylogeny is commonly represented in the form of a
(a) phenogram (b) cladogram (c) dendrogram (d) histogram

28. Pome is a false fruit which develops from a fleshy thalamus. Which of the following is not correct about pome?
(a) Seeds develop inside the locules
(b) Wall of the ovary is thin like paper
(c) True fruit remains inside the swollen thalamus
(d) Fruit develops from an apocarpous, superior ovary

29. In pitcher plant (*Nepenthes khasiana*), which part is modified to form pitcher?
(a) Stipule (b) Petiole (c) Leaf lamina (d) Bract

30. In cyathium, the male flowers are represented by
(a) a single stamen (b) two epipetalous stamens
(c) four staminodes (d) numerous spirally arranged stamens

31. Concept of Lignosae and Herbaceae was given by
(a) Cronquist (b) Takhtajan (c) Hutchinson (d) Engler & Prantl

32. The one specimen or illustration upon which a name is based, originally used or designated at the time of publication, is called
(a) Holotype (b) Isotype (c) Neotype (d) Lectotype

33. Central National Herbarium is located at
(a) Dehra Dun (b) Howrah (c) Lucknow (d) Coimbatore

34. Similarity resulting from common ancestry is called
(a) homoplasy (b) homology (c) homonym (d) convergence

35. Which of the following is a vesselless most basal angiosperm?
(a) *Amborella* (b) *Nymphaea* (c) *Magnolia* (d) *Hibiscus*

36. In species where pollen matures and is released prior to the maturation and receptivity of the gynoecium, the condition is called
(a) protogyny (b) protandry (c) dichogamy (d) androdioecy

37. The process of associating an unknown entity with a known one is called
(a) classification (b) nomenclature (c) taxonomic key (d) hierarchy

38. Which one of the following statements is not correct?
(a) All taxonomic keys are dichotomous
(b) All keys comprise sequence of two contrasting statements, each statement is known as a lead
(c) In a taxonomic key, the two leads together comprise a couplet
(d) Keys are based on phylogeny only

39. Glucosinolates do not occur in
(a) Brassicaceae (b) Papaveraceae (c) Capparaceae (d) Fabaceae

40. A pollen grain with colpi occurring in the equatorial region is called
(a) zonocolpate (b) zonoporate (c) zonoaperturate (d) colporate

41. A binomial in which the genus name and specific epithet are identical in spelling is called
(a) tutonym (b) tautonym (c) synonym (d) basionym

42. Which of the following is not a member of Poaceae?
(a) *Hordeum vulgare* (b) *Triticum aestivum*
(c) *Cynodon dactylon* (d) *Secale cereale*

43. Which of the following statements is **not true** of viruses?
(a) Viruses have been successfully grown in pure cultures in test tubes
(b) All viruses are obligatory intracellular parasites
(c) All viruses have either DNA or RNA as their genetic material
(d) Viruses probably arose from small fragments of cellular chromosomes

44. Peptidoglycan accounts for _____ of the dry weight of cell wall in many gram positive bacteria
(a) 50% or more (b) About 10% (c) 11%+ 0.22% (d) About 20%

45. The cell walls of Gram positive bacteria contain two modified sugar, viz. Nacetylglucosamine (NAG) and N-acetylmuramic acid (NAM). They are covalently linked by
(a) α - 1,4-glycosidic bond (b) β -1,6-glycosidic bond
(c) α - 1,6-glycosidic bond (d) β - 1,4-glycosidic bond

46. In an oxygenic photosynthesis, the green and the purple bacteria do not use which of the following one as an electron source?
(a) H_2O (b) H_2 (c) H_2S (d) S (elemental sulphur)

47. The acquisition energy by glucose fermentation requires
(a) substrate-level phosphorylation (b) electron transport of electrons from NADH
(c) long-chain fatty acid oxidation (d) the enzyme formic-hydrogen lyase

48. The glyoxylate cycle is used by some microorganisms when_____ is the sole carbon source.
(a) Acetate (b) Nitrate (c) carbon dioxide (d) all of these

49. The term used for acquisition of naked DNA from its environment and its incorporation in its genome by a bacterium is
(a) Transformation (b) lysogenic conversion
(c) conjugation (d) transduction

50. Which spore is on a club and results from the fusion of two nuclei from different strains of the same fungi?
(a) Basidiospore (b) Ascospore (c) Conidiospore (d) Blastospore

51. Water molds belong to which division?
(a) Ascomycota (b) Basidiomycota (c) Plasmodiocarps (d) Oomycota

52. Select the statement that does not apply to the kingdom Fungi.
(a) Some fungi form beneficial interrelationships with plants
(b) the fungi are eukaryotic, multicellular, ingestive heterotrophs
(c) The fungal life cycle typically includes a spore stage
(d) Certain fungi are natural sources of antibiotic substances

53. The organism that starts out as amoeboid, phagocytic cells and converts to a sluglike pseudoplasmodium that migrates prior to development of a sorocarp belongs to which division?
(a) Ascomycota (b) Chytridiomycota (c) Oomycota (d) Myxomycota

54. An organism in the Deuteromycota has all the following except
(a) asexual spores (b) absorptive nutrition
(c) ascospores, basidiospores or zygospores (d) a nucleus

55. Which of these spores are characteristic of the black bread mold *Rhizopus*?
(a) Arthrospore and Ascospore (b) Ascospore and Zygospore
(c) Arthrospore and Blastospore (d) Sporangiospore and Zygospore

56. A haustorium of a fungus is meant for
(a) Fixing up to the mycelium to the host (b) Increasing the spread of the disease
(c) Reproduction of the fungus (d) Absorbing nutrients from the host cell

57. The dikaryotic mycelium of heterothallic forms is characterized by having in each of its cells
(a) a single 2N nucleus
(b) two diploid nuclei belonging to opposite strains
(c) two haploid nuclei belonging to opposite strains
(d) two haploid nuclei of similar strains

58. Downy mildews are caused by the members of
(a) Erysiphales (b) Taphrinales (c) Ustilaginales (d) Peronosporales

59. In the life cycle of rust fungi *Puccinia graminis tritici*, karyogamy takes place in
(a) Urediniospore (b) Teliospore (c) Basidiospore (d) Aeciospore

60. Which one of the following is a bacterial disease?
(a) Early blight of potato (b) Late blight of potato
(c) Angular leaf spot of cotton (d) Black stem rust of wheat

61. Which of the following method is best suited to produce virus free plants?
(a) Ovule culture (b) Anther culture
(c) Meristem culture (d) Embryo culture

62. Which of the following is not a plant derived alkaloid?
(a) Codeine (b) Limonene (c) Morphine (d) Nicotine

63. Cybrids are
(a) cytoplasmic hybrids
(b) cytological hybrids
(c) hybrid plants from cross pollination
(d) nuclear hybrids

64. Artificial seeds are
(a) those seeds produced in laboratory conditions
(b) zygotic embryos encapsulated in gel
(c) somatic embryo encapsulated in gel
(d) none of the above

65. DNA fingerprinting relies on
(a) difference in the pattern of genes between individuals
(b) difference in the junk DNA patterns between individuals
(c) difference in mRNA between the individuals
(d) none of the above

66. *Pfu* and *Vent* polymerases are more efficient than *Taq* polymerase because of
(a) more efficient polymerase activity
(b) proof reading activity
(c) both a & b
(d) none of the above

67. Golden rice is a transgenic crop with the following improved trait.
(a) Herbicide resistance
(b) High vitamin A content
(c) High essential amino acids
(d) High protein content

68. Two most important bacteria in field of plant genetic engineering are
(a) *Escherichia* and *Azotobacter*
(b) *Escherichia* and *Agrobacterium*
(c) *Nitrobacter* and *Agrobacterium*
(d) *Azotobacter* and *Nitrobacter*

69. Which type of restriction enzymes are commonly used in recombinant DNA technology
(a) Type I (b) Type II (c) Type III (d) Type IV

70. Root nodules of legumes contain a pink pigment called as
(a) nodhaemoglobin (b) oxyhaemoglobin (c) leghaemoglobin (d) rhizohaemoglobin

71. In TCA/Kreb's cycle a six carbon compound is formed by the combination of acetyl CoA and
(a) malic acid (b) citric acid (c) oxaloacetic acid (d) gibberellic acid

72. EMP pathway is another name of
(a) Photosynthesis (b) TCA cycle (c) Glycolysis (d) Calvin cycle

73. Lycopene is an antioxidant present in high quantities in
(a) Spinach (b) Broccoli (c) Tomato (d) All the above

74. The term apoenzyme is applicable to
(a) simple enzyme
(b) protein part of conjugate enzyme
(c) organic cofactor of a conjugate enzyme
(d) inorganic cofactor of a conjugate enzyme

75. Which of the following is ***not*** a reducing sugar?
(a) Glucose (b) Fructose (c) Glyceraldehyde (d) Sucrose

76. Zymogen is an
(a) enzyme inhibitor (b) enzyme poison (c) enzyme modulator (d) enzyme precursor

77. Hydrolysis of fats by alkalies into fatty acids and glycerol is called as
(a) suspension (b) colloidal (c) coagulation (d) saponification

78. β -oxidation takes place in
(a) chloroplast (b) cytoplasm (c) mitochondria (d) ribosomes

79. Occurrence of anthers and the stigma at different levels in a flower is referred as
(a) Herkogamy (b) Dichogamy (c) Flower constancy (d) Protandry

80. Malacophily refers to pollination by
(a) Snails and slugs (b) Sphinx moths (c) Honeybees (d) Spiders

81. Growth pattern in pollen tube is similar to that of fungal hyphae or root hairs in exhibiting
(a) oscillated elongation of tube (b) tip-oriented growth
(c) multiple-oriented growth (d) predetermined path of growth

82. Pollen tube attraction towards the embryo sac is mediated by small peptides produced from the
(a) synergids (b) egg cell (c) central cell (d) hypostase

83. One of the essential prerequisites for normal microgametogenesis to proceed, is
(a) formation of two sperm cells before the release of pollen grains
(b) vacuole formation and asymmetric division in the microspores
(c) physical association of sperm cells with the vegetative nucleus
(d) the attainment of stigma receptivity before anther dehiscence

84. Choose the **incorrect statement** about 3-celled pollen grains
(a) They are generally long-lived
(b) They are the general feature of sporophytic self-incompatible species
(c) They are usually difficult to germinate in vitro
(d) They exhibit high rate of respiration

85. RNase mediated inhibition of pollen tube leading to its inhibition in the pistil conforms to
(a) gametophytic self-incompatibility (b) late-acting self-incompatibility
(c) sporophytic self-incompatibility (d) stylar incompatibility

86. Cellular endosperm formation is characterized by
(a) absence of free nuclear division
(b) nuclear divisions are not accompanied by cell wall formation
(c) primary endosperm nucleus divides to form a large micropylar chamber and a small chalazal chamber
(d) autonomous development of endosperm without fertilization

87. Transfer cells are involved in
(a) short distance transport of assimilates (b) secretion of hormones
(c) movement of water across endodermis (d) long distance transport of assimilates

88. A central, thicker part of a bordered pit membrane is called
(a) Tracheid (b) Torus (c) Trichoblast (d) Tunica

89. Stomata in which the common wall of the two subsidiary cells is at right angle to the guard cells, is a

(a) tetracytic type (b) cyclocytic type (c) anisocytic type (d) diacytic type

90. Cork cells are impervious to water and air because their walls are impregnated with

(a) Lignin (b) Suberin (c) Callose (d) Cutin

91. Tree's growth in uniform environmental conditions such as those which grow near the equator throughout the year will

(a) not show secondary growth

(b) not reveal annual rings with distinct spring and autumn wood

(c) have annual rings which can be used to date the tree

(d) have only phloem formed by the activity of the cambium

92. A monocot root differs from a dicot root in having one of the following

(a) piliferous layer (b) radial vascular bundles

(c) absence of endodermis (d) presence of pith

93. Balloon like outgrowth from axial parenchyma cells that extends through a pit cavity in a vessel wall that enters into a vessel element blocking the vessel lumen is called

(a) phellogen (b) histogen (c) tyloses (d) tunica

94. The healing of wounds in plant body takes place with the activity of which of the following?

(a) Apical meristem (b) Lateral meristem

(c) Secondary meristem (d) Intercalary meristem

95. If root cap is damaged or removed, it is replaced by the activity of

(a) periblem (b) quiscent centre (c) plerome (d) rhizodermis

96. Successive cambia are seen in stem of

(a) *Boerhavia* (b) *Salvadora* (c) *Bignonia* (d) *Aristolochia*

97. A newly isolated bacterium was found to have a double stranded DNA molecule containing 16% T (thymine). What will be the expected % G (guanosine) in the bacterial genome?

(a) 16% (b) 32% (c) 34% (d) 68%

98. Prokaryotic transcription

(a) occurs along a 3' to 5' DNA template

(b) results in formation of an mRNA in 3' to 5' direction

(c) occurs along a 5' to 3' template

(d) utilizes the sense strand of DNA as template

99. Frameshift mutations

(i) can occur when one or more nucleotides are inserted into a DNA sequence.

(ii) can result in a completely new codon sequence.

(iii) can occur when one or more nucleotides is deleted from a DNA sequence.

Which of the above options are true?

(a) only (i) and (ii) (b) only (ii) and (iii)

(c) only (i) and (iii) (d) all of them ((i), (ii) and (iii))

100. The process of segregation in meiosis results from
(a) separation of the two homologous chromosomes in Anaphase II
(b) separation of the two homologous chromosomes in Anaphase I
(c) separation of the sister chromatids in Anaphase I
(d) separation of the sister chromatids in Anaphase II

101. Which of the following statements for the Southern Hybridization technique ***is not correct***?
(a) It can be used for DNA fingerprinting
(b) The technique is based on DNA-RNA hybridization
(c) Can be used to identify a specific DNA sequence
(d) It can be used to identify the number of copies of a gene

102. A cell with 32 chromosomes undergoes meiosis. The number of chromosomes in each daughter cell at the end of meiosis I and meiosis II would be
(a) 16 & 16 (b) 32 & 16 (c) 32 & 32 (d) 64 & 32

103. Which of the following statements is ***not true*** for a cross between a homozygous recessive and a heterozygote?
(a) It will result in one half of the offspring as homozygous recessive
(b) It will result in one half offspring as homozygous dominant
(c) It is termed as a test cross
(d) Both (a) and (c)

104. A mutant *E. coli* strain synthesizes the enzymes permease and â-galactosidase irrespective of the presence of the inducer (allolactose). This can result from
(i) mutations in the operator region (ii) mutations in the repressor gene
(iii) mutations in the structural genes (iv) mutations in the promoter region
Which of the above options are correct?
(a) Both (ii) and (iv) (b) Both (ii) and (iii) (c) Both (i) and (ii) (d) All the above

105. A bacterial chromosome can acquire new DNA due to
(i) F factor mediated conjugation (ii) Hfr mediated conjugation
(iii) specialized transduction (iv) generalized transduction
Which of the above options are correct?
(a) Both (i) and (ii) (b) Both (ii) and (iii)
(c) All the above (d) Only (ii), (iii) and (iv)

106. Two genes 'Z' and 'Y' are linked and are 30 map units apart. In a cross between Zy/zY and zy/zy, the fraction of progeny with genotype ZY/zy will be
(a) 30% (b) 15% (c) 35% (d) 10%

107. Which of the following is not a sequence alignment tool?
(a) BLAST (b) CLUSTALW (c) MSA (d) SWISS PROT

108. Sequences related by common descent in different organisms are called
(a) Paralogs (b) Orthologs (c) Homologs (d) Analogs

109. A DNA sequence codes for a protein with a mass of 61,650 daltons. Assuming that the average mass of the 20 amino acids is about 137 daltons, estimate the nucleotide pairs present in the coding region of the DNA sequence.
(a) 1500 (b) 1350 (c) 675 (d) 2000

110. In an experiment bacterial cells were grown over several generations in a medium containing the heavy isotope of nitrogen (15N) as the only nitrogen source. The cells were then transferred to a medium containing 14N. After two generations of growth the cells were harvested and transferred to 15N-containing medium and grown for one generation. The cells were then harvested and the DNA analysed by CsCl equilibrium density-gradient centrifugation. The expected percentage of hybrid DNA (14N on one strand and 15N on other) when cells were harvested from 14N medium and at the end of the experiment is

(a) 25 and 50 (b) 50 and 75 (c) 75 and 100 (d) 40 and 75

111. The coding sequence of the non-template strand of a gene has the following sequence 5'-GCCATGCTTCAT-3'. What are the sequences of the sense strand of DNA and the m-RNA after transcription?

(a) 3'-CGGTACGAAGTA-5' and 5'-GCCAUGCUUCAU-3'

(b) 5'-GCCATGCTTCAT-3' and 5'-GCCAUGCUUCAU-3'

(c) 3'-CGGTACGAAGTA-5' and 5'-GCCAUGCUUCAU-3'

(d) 5'-GCCATGCTTCAT-3' and 5'-CGGUACGAAGUA-3'

112. Which of the following will hinder the equilibrium of allele frequencies in a population?

(a) Absence of new mutation (b) Absence of natural selection

(c) Large population size (d) Genetic drift

113. Which of the following statements is ***not true*** for RNA interference (RNAi)?

(a) Can result in a phenotype similar to a loss-of-function mutation

(b) Involves post-transcriptional gene regulation

(c) Is a mechanism to interrupt virus infections in plants

(d) It cannot be used as tool for reverse genetics

114. Which of the following ***doesn't hold true*** for quantitative traits?

(a) Are governed by several genes

(b) Genes governing the trait do not follow Mendelian laws

(c) Are influenced by the environment

(d) If polygenic, several genotypes may produce the same phenotype

115. Sap-feeding aphids are exposed to which of the following plant hormones?

(a) Auxin (b) Cytokinin (c) Gibberellic acid (d) Jasmonic acid

116. Ripening and abscission of an apple from the tree is an example of PCD triggered by

(a) auxin (b) cytokinin (c) ethylene (d) abscisic acid

117. Exocytosis is an energetically expensive process because

(a) the plant cytoskeleton is rearranged (b) the nuclear membrane degenerates

(c) vesicles travel across the plasmodesmata (d) all the above

118. Chaperones are

(a) proteins that bind to nascent polypeptides and accelerate the rate of protein folding

(b) proteins that facilitate thermodynamically favorable protein-protein interactions

(c) proteins that occur as multi-meric, quarternary complexes

(d) All the above

119. Nucleoplasm is a complex association of

(a) DNA, and several types of RNA

(b) histone proteins that support and interact with DNA

(c) water and enzymes

(d) all the above

120. Older plant cells have

(a) several small vacuoles interspersed in the cytoplasm

(b) few vacuoles as metabolism is slow

(c) a large central vacuole

(d) a small central vacuole

121. During ripening, apples and tomatoes turn from green to red because

(a) grana are rapidly degraded within plastids (b) lipid synthesis increases in plastids

(c) chlorophyll b is converted into chlorophyll a (d) all the above

122. Protein folding and maturation occurs in the reducing environment found in lumen of

(a) endoplasmic Reticulum (b) golgi complex

(c) dictyosomes (d) all the above

123. Senescing plant tissues are rich in:

(a) Dictyosomes (b) Glyoxysomes (c) Ribosomes (d) Chloroplasts

124. In a car battery, the flow of electrons through wires has enough power to turn the starter. In chloroplasts, the flow of which particles through ATP synthetase channels has enough power to phosphorylate ADP to ATP?

(a) Photons (b) Electrons (c) Protons (d) Neutrons

125. In C4 plants, which enzyme performs the critical reaction of converting carbon dioxide to 3-phosphoglycerate?

(a) RuBP carboxylase (b) PEP carboxylase

(c) RuBP decarboxylase (d) PEP decarboxylase

126. A theoretical Michaelis-Menten plot for the Km and Velocity of any enzymatic reaction is a

(a) normal bell curve (b) sigmoidal curve

(c) rectangular hyperbola (d) inverted hyperbola

127. Which of the following proteins is NOT a component of the plant cytoskeleton?

(a) Myelin (b) Myosin (c) Microtubule (d) Motor protein

128. Which of the following membrane proteins is associated with vesicles that move towards the endoplasmic reticulum?

(a) Clathrin (b) COP I (c) COP II (d) None of the above

129. Nitrogenase reduces Nitrogen (N_2) from the 0+ oxidation state to the -3 oxidation state in Ammonia (NH_3). Ammonium (NH_4^+) is formed when ammonia dissolves in water and picks up a proton. The oxidation state of ammonium is:

(a) -1 (b) -2 (c) -3 (d) -4

130. Assimilated nitrogen is transported from the roots to the shoots via the phloem as

(a) Allantoic acid (b) Glutamine (c) Citrulline (d) all the above

131. Embryos of germinating rice seeds that grow under flooded conditions perform
(a) facultative aerobic respiration (b) obligate aerobic respiration
(c) facultative anaerobic respiration (d) obligate anaerobic respiration

132. The synthesis of ATP by chemi-osmotic phosphorylation occurs when protons flow from
(a) mitochondrial lumen to cytoplasm
(b) crista lumen to mitochondrial matrix
(c) mitochondrial matrix to crista membrane
(d) various electron carriers in the mitochondrial matrix

133. Ecotype is
(a) genetically different but phenotypically similar individuals
(b) genetically similar but ecologically different individuals
(c) genetically adapted ecological race
(d) genetically and phenotypically dissimilar members of different species ecologically adapted to an area

134. The factors involved in formation of new species are
(a) competition and variations (b) isolation and competition
(c) competition and mutations (d) isolation and mutations

135. Migration is
(a) outward movement of individuals of a population
(b) inward movement of individuals of a population
(c) two way departure and return of all the individuals of a population
(d) mortality of individuals of a population due to starvation

136. The study of interrelationships between organism and their environment is
(a) ecology (b) ecosystem (c) phytogeography (d) ethology

137. Competition is the most severe between two
(a) closely related species growing in different niches
(b) closely related species growing in the same habitat
(c) distantly related species growing in the same habitat
(d) distantly related species growing in different niches

138. The force operating in an ecosystem which controls the unchecked growth of population is
(a) fecundity (b) mortality
(c) biotic control (d) environmental resistance

139. Mutualism and proto-cooperation are
(a) positive interactions (b) negative interactions
(c) both of these (d) none of these

140. Succession is
(a) series of physical changes that occur in an area
(b) development of biotic communities on a bare area
(c) series of biotic communities that appear in a previously bare area
(d) replacement of old individuals by new individuals of a species

141. Lichens and mosses occur during succession in
(a) psammosere (b) hydrosere (c) xerosere (d) hydrarch

142. Organisms living in a particular area constitute
(a) biome (b) community (c) ecosystem (d) ecology

143. Insectivorous plants are adapted to soils
(a) rich in water (b) deficient in water
(c) deficient in nitrogenous compounds (d) deficient in trace elements

144. Energy flow in an ecosystem is
(a) unidirectional (b) bidirectional (c) multidirectional (d) all the above

145. The increased productivity of lakes and streams brought about by nutrient enrichment is known as
(a) greenhouse effect (b) eutrophication (c) biomagnifications (d) bioaugmentation

146. Which ecosystem does not show variations dependent upon geographic location and rainfall?
(a) Marine ecosystem (b) Fresh water ecosystem
(c) Desert ecosystem (d) Tropical ecosystem

147. Pyramid of numbers deals with number of
(a) species in an area (b) individuals in a community
(c) individuals in a trophic level (d) subspecies in a community

148. Desert biome does not support much vegetation as it lacks
(a) sufficient light (b) favourable temperature
(c) sufficient water (d) sufficient nutrients

149. Ozone layer is found in
(a) thermosphere (b) stratosphere (c) mesosphere (d) lithosphere

150. A secondary pollutant is
(a) O_3 (b) CO (c) CH_4 (d) Pb

Section B

1. (a) Why Cyanophyeae are considered to be included in bacteria? (3 marks)

   (b) Describe Palmella stage (2 marks)

2. (a) Write three morphological innovations in bryophytes for adaptation to land habit (3 marks)

   (b) Define Aspopory (2 marks)

3. (a) Differentiate between taxonomic, biological and evolutionary species concept (3 marks)

   (b) Distinguish between flora and manual (2 marks)

4. (a) Draw a well-labeled, dehisced sporangiophore of *Rhizopus* (3 marks)

   (b) Differentiate between ascospore and basidiospore (2 marks)

5. (a) Draw schematic diagram of Tri carboxylic acid (TCA) cycle. (3 marks)

   (b) What are the various parts of a binary vector? (2 marks)

6. (a) Define apomixis? Differentiate between apospory and diplospory? (3 marks)

   (b) Explain the process of polyembryony with an example (2 marks)

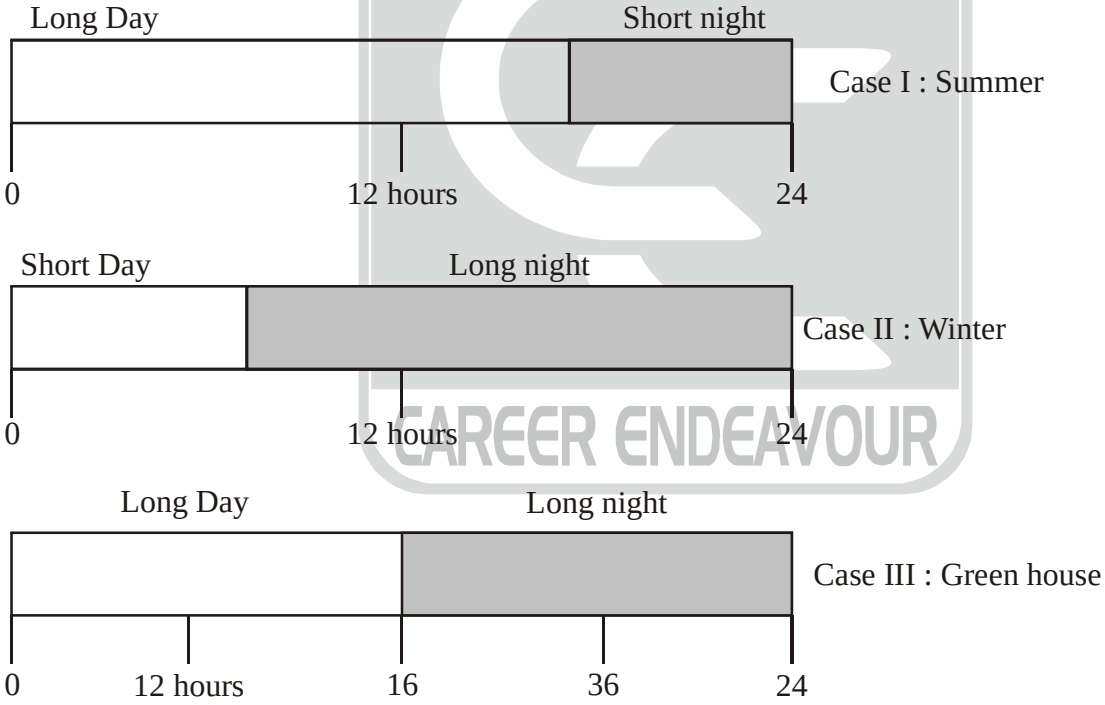
7. (a) Differentiate between Asterad and Crucifer types of embryogeny (3 marks)

   (b) Explain the functions of suspensor during embryo development (2 marks)

8. (a) Differentiate between Euchromatin and Heterochromatin (3 marks)

   (b) Differentiate between translation in Eukaryotes and Prokaryotes (2 marks)

9. (a) (3 marks)



Which of the following plants will flower in Case I, Case II and Case III as shown above?

(i) Poinsettia (*Euphorbia pulcherrima*) a short-day plant.

(ii) Clover (*Trifolium pretense*) a long-day plant.

(iii) Corn (*Zea mays*), a day-neutral plant.

(b) Give reasons to explain your answer? (2 marks)

10. (a) Define biosphere (3 marks)

    (b) Define ecological niche (2 marks)