1. Three series recognized by Bentham and Hooker under Gamopetalae are :
   (A) Thalmiflorae, Disciflorae and Inferae
   (B) Heteromerae, Calyciflorae and Bicarpellatae
   (C) Inferae, Calyciflorae, Disciflorae
   (D) Inferae, Heteromerae and Bicarpellatae

2. OTU stands for :
   (A) Operational Taxonomic Unit
   (B) Optional Taxonomic Unit
   (C) Observed Taxonomic Unit
   (D) Obvious Taxonomic Unit

3. Nothotaxa are :
   (A) Rare taxa (B) Fossil taxa
   (C) Hybrid taxa (D) Endemic taxa

4. The International Code of Botanical Nomenclature has :
   (A) Three Principles (B) Six Principles
   (C) Nine Principles (D) Twelve Principles

5. Hypanthium is a characteristic feature of :
   (A) Ranunculaceae (B) Brassicaceae
   (C) Rosaceae (D) Magnoliaceae

6. *Arabidopsis thaliana*, the extensively studied model plant in plant biology, belongs to :
   (A) Lamiaceae (B) Brassicaceae
   (C) Iridaceae (D) Rosaceae

7. The two leads of a couplet in a dichotomous key should be :
   (A) Mutually exclusive (B) Mutually inclusive
   (C) Overlapping (D) None of the above

8. Which of the following is not a characteristic of *Magnolia* ?

(A) Elongated floral axis bearing numerous spirally arranged stamens

(B) Fruit is an aggregate of follicles

(C) Monosulcate pollen grains

(D) Multicarpellary syncarpous gynoecium

9. Cells in the 'Quiescent Centre' of the root apical meristem have :

(A) High mitotic activity (B) Low mitotic activity

(C) Very high mitotic activity (D) All of the above

10. A xylem fibre usually with thick walls and simple pits is a :

(A) Libriform fibre (B) Fibre tracheid

(C) Sclerotic fibre (D) Bast fibre

11. Albuminous cells are associated with :

(A) Sieve-tube cells (B) Sieve-tube members

(C) Sieve cells (D) None of the above

12. A vascular bundle in which phloem occurs on either side of xylem is known as :

(A) Collateral vascular bundle

(B) Bicollateral vascular bundle

(C) Commissural vascular bundle

(D) Apotracheal vascular bundle

13. Male gametophytes (microspores) in *Ephedra* are dispersed at :

(A) 2-celled stage (B) 3-celled stage

(C) 4-celled stage (D) 5-celled stage

14. Each ovuliferous scale in *Pinus* mostly bears :

(A) One ovule (B) Two ovules

(C) Three ovules (D) Four ovules

15. Development of embryo in gymnosperms is generally :

(A) Meroblastic (B) Holoblastic

(C) Discoblastic (D) None of the above

16. A cell in root epidermis that gives rise to a root hair is called as :

(A) Idioblast (B) Trichoblast

(C) Sclereid (D) Laticifer

17. When pollen grains of a flower pollinate any other flower present on the same plant, it is called :

(A) Herkogamy (B) Dichogamy

(C) Porogamy (D) Geitonogamy

18. Endosperm in species with *Oenothera* type of embryo sac is :

(A) Hexaploid (B) Tetraploid

(C) Diploid (D) Haploid

19. Which of the following is a tetrasporic and 8-nucleate embryo sac ?

(A) Polygonum type (B) Fritillaria type

(C) Allium type (D) Pepromia type

20. The type of embryo development in which apical cell of the two-celled proembryo divides by a transverse wall and both basal and apical cells contribute to the embryo development is called as :

(A) Asterad type (B) Onagrad type

(C) Crucifer type (D) Chenopodiad type

21. When a turgid cell is placed in a sucrose solution that has water potential more negative than the water potential of the cell, water will move from :

(A) Turgid cell to the sucrose solution

(B) Sucrose solution to the turgid cell

(C) Either (A) or (B)

(D) Neither (A) nor (B)

22. Which of the following is called a second messenger for its role in various plant responses to environmental and hormonal signals ?

(A) Sulphur (B) Calcium

(C) Manganese (D) Phosphorus

23. Carbohydrates translocated in the phloem are mostly :

(A) Reducing sugars (B) Non-reducing sugars

(C) Both reducing and non-reducing sugars (D) Heteropolysaccharides

24. Water, due to extensive hydrogen bonding between its molecules, has :

(A) High specific heat and low latent heat of vaporization

(B) Low specific heat and high latent heat of vaporization

(C) High specific heat and high latent heat of vaporization

(D) Low specific heat and low latent heat of vaporization

25. Which of the following shuttles electrons between the cytochrome *b*6/cytochrome *f* complex and photosystem I (PSI) ?

(A) Plastocyanin (B) Plastoquinone

(C) Both (A) and (B) (D) Neither (A) nor (B)

26. The ion that plays a role in activation of Rubisco is :

(A) Ca^{2+} (B) Na^{+}

(C) Mg^{2+} (D) K^{+}

27. Which component of F_0F_1–ATP synthase contains the catalytic site for conversion of ADP and P_i into ATP ?

(A) F_0 component

(B) F_1 component

(C) Both F_0 and F_1 components have separate catalytic sites

(D) Neither F_0 nor F_1 component has catalytic site

28. The enzyme that participates in both the citric acid cycle (TCA cycle) and the electron transport chain in mitochondria is :

(A) Citrate synthase
(B) Isocitrate dehydrogenase
(C) Succinate dehydrogenase
(D) Malate dehydrogenase

29. The plant hormone that clearly shows polar transport is :

(A) Indole-3-acetic acid
(B) Ethylene
(C) Zeatin
(D) All of the above

30. Which of the following is a climacteric fruit ?

(A) Cherry
(B) Citrus
(C) Grape
(D) Banana

31. Flowering in short-day plants is inhibited by :

(A) P_R form of phytochrome
(B) P_{FR} form of phytochrome
(C) Both (A) and (B)
(D) Neither (A) nor (B)

32. The diagnostic feature of a non-competitive type of enzyme inhibition where the inhibitor reduces the activity of the enzyme by binding not to the active site on the enzyme but to a different site is that :

(A) K_m is unaffected, whereas V_{max} decreases in presence of increasing amounts of inhibitor
(B) K_m decreases in presence of increasing amounts of inhibitor, whereas V_{max} is unaffected
(C) Both K_m and V_{max} are unaffected
(D) Both K_m and V_{max} are decreased

33. Plants which are adapted to fire are called :

(A) Porophytes
(B) Pyrophytes
(C) Psychrophiles
(D) Glycophytes

34. Desiccation tolerant plants are known as :

(A) Poikilohydric (B) Homoiohydric

(C) Poikilothermic (D) None of the above

35. Which of the following letter combinations would be used to designate a transition horizon having distinct parts with properties of E horizon and other parts having properties of B horizon ?

(A) EB (B) BE

(C) E/B (D) None of the above

36. A group of individuals of same age in a population constitute a :

(A) Cohort (B) Sere

(C) Co-sere (D) Cohred

37. Serotinal aspect of a community refers to :

(A) Appearance of a community during spring

(B) Appearance of a community during summer

(C) Appearance of a community during autumn

(D) Appearance of a community during winter

38. Which of the following brings about oxidation of nitrite to nitrate ?

(A) *Nitrosomonas* (B) *Nitrosococcus*

(C) *Nitrosospira* (D) *Nitrobacter*

39. Botanical name of bread wheat is :

(A) *Triticum aestivum* (B) *Triticum monococcum*

(C) *Triticum durum* (D) *Triticum dicoccum*

40. The correct combination among the following is :

(A) *Corchorus capsularis*---Tosa jute

(B) *Corchorus olitorius*---White jute

(C) *Corchorus capsularis*---White jute

(D) *Corchorus olitorius*---Black jute

41. Based on capsid architecture, Tobacco Mosaic Virus (TMV) is a :

(A) Helical virus (B) Polyhedral virus

(C) Enveloped virus (D) Complex viruses

42. Hormogonia are specialized reproductive structures in :

(A) *Phytopthora* (B) *Alternaria*

(C) *Rhizopus* (D) *Nostoc*

43. *Puccinia* belongs to :

(A) Ascomycotina (B) Deuteromycotina

(C) Basidiomycotina (D) Zygomycotina

44. Nannandrous species of *Oedogonium* are :

(A) Monoecious

(B) Dioecious

(C) Either monoecious or dioecious

(D) Neither monoecious nor dioecious

45. Pseudoelators are found in the sporophyte of :

(A) *Marchantia* (B) *Riccia*

(C) *Polytrichum* (D) *Anthoceros*

46. Androcytes in *Polytrichum* mature into :

(A) Uniflagellate antherozoids

(B) Biflagellate antherozoids

(C) Quadriflagellate antherozoids

(D) Pentaflagellate antherozoids

47. A siphonostele with non-overlapping leaf gaps is known as ?

(A) Dictyostele (B) Actinostele

(C) Plectostele (D) Solenostele

48. Development of gametophyte directly from the vegetative cells of the sporophyte without the formation of spores is known as :

(A) Apospory (B) Apogamy

(C) Heterospory (D) Homospory

49. The correct sequence of various phases of cell cycle is :

(A) G_1, G_2, S and M (B) S, G_1, G_2 and M

(C) G_1, S, G_2 and M (D) G_1, G_2, M and S

50. The most common hemicellulose in the primary cell wall of dicotyledons is :

(A) Xyloglucan (B) Galactoglucomannan

(C) Glucuronoxylan (D) None of the above

51. 18S rRNA in eukaryotes is a component of which subunit of ribosomes ?

(A) 60S subunit (B) 50S subunit

(C) 40S subunit (D) 30S subunit

52. Which of the following is true about telomeres of chromosomes ?

(A) Initiate RNA synthesis

(B) Seal ends of chromosomes

(C) Help chromatids to move towards poles

(D) Mark the location of nucleolar organizer region on the chromosome

53. Histones are rich in :

(A) Arginine and Proline (B) Lysine and Trytophan

(C) Lysine and Arginine (D) Proline and Tryptophan

54. Which of the following describes the ability of a single gene to have multiple phenotypic effects ?

(A) Pleiotropy (B) Epistasis

(C) Incomplete Dominance (D) None of the above

55. The number of nitrogen atoms in guanine base of DNA is :

(A) 2 (B) 3

(C) 4 (D) 5

56. Processing of pre-mRNAs immediately after transcription in eukaryotes involves :

(A) Removal of introns

(B) Addition of cap to the 5′ end

(C) Addition of polyadenylated (poly-A) tail to the 3′ end

(D) All of the above

57. Denaturation of DNA duplex results in :

(A) Propeller twist (B) Hyperchromicity

(C) Hypochromicity (D) Polychromicity

58. Two amino acids, each specified by a single codon, are :

(A) Methionine and Arginine

(B) Methionine and Leucine

(C) Tryptophan and Methionine

(D) Proline and Methionine

59. The DNA sequence of TATA box found in the promoter region of many eukaryotic genes is :

(A) 5′–TATAAA–3′ (B) 5′–TATAAT–3′

(C) 5′–TAAATT–3′ (D) 5′–TTAAAT–3′

60. R-plasmid when present in a bacteria confers :

(A) Resistance to high temperature

(B) Resistance to antibiotics

(C) Resistance to cold temperature

(D) All of the above

Botany

1. Multiplication of a T-even bacteriophage in its host (*Escherichia coli*) cells is an example of:
   (a) Lysogenic cycle (b) Lytic cycle
   (c) Prophage cycle (d) All of the above

2. Zoospores in Vaucheria are:
   (a) Multinucleate and uniflagellate (b) Multinucleate and uninucleate
   (c) Multinucleate and multiflagellate (d) Uninucleate and uniflagellate

3. Mature uredospres of *Puccinia graminis* are:
   (a) Unicellular and binucleate (b) Bicellular and binucleate
   (c) Unicellular and Uninucleate (d) Bicellular and Uninucleate

4. The filaments of 'Chantransia' in *Bactrachospermum* produce:
   (a) Caropospores (b) Carpogonia
   (c) Gonimoblast initials (d) Monospores

5. Which of the following statements is correct about *Marchantia*?
   (a) Male and female sex organs are borne on sessile receptacles
   (b) Male and female sex organs are borne on stalked receptacles
   (c) Only male sex organs are borne on sessile receptacles
   (d) Only female sex organs are borne on sessile receptacles

6. The archesporium in *Anthoceros* differentiates into:
   (a) Spores only (b) Pseudoelators only
   (c) Both spores and pseudoelators (d) None of the above

7. Leptosporangiate development of sporangia occurs in:
   (a) *Marsilea* (b) *Lycopodium*
   (c) *Equisetum* (d) All of the above

8. A protostele in which more or less parallel plate-like regions of xylem surrounded by phloem tissue appear in transverse sections is known as:
   (a) Actinostele (b) Dictyostele
   (c) Solenostele (d) Plectostele

9. The site of light-independent reaction (dark reaction/phase) of photosynthesis is :

(a) Grana (b) Thylakoids

(c) Stroma (d) All of the above

10. Ribosomes are attached to cisternae at specific sites that are rich in :

(a) Ribophorin I and ribophorin II (b) Ribophorin I and lecithin

(c) Ribophorin II and lecithin (d) Lecithin only

11. Which of the following statements in not true about euchromatin ?

(a) It stains lightly

(b) It takes part in transcription

(c) It consists of uncoiled, extended and scattered chromatin fibres

(d) It inhibits crossing over

12. The occurrence of two identical sequences, one following the other, in a chromosome segment in called as :

(a) Tandem duplication (b) Reverse tandem duplication

(c) Displaced duplication (d) Intercalary duplication

13. Two independent pairs of non-allelic genes neither of which will produce its effect in the absence of the other are called as :

(a) Supplementary genes (b) Complementary genes

(c) Pleiotrophic genes (d) Lethal genes

14. Extranuclear genes are located in :

(a) Peroxisomes and ribosomes (b) Ribosomes and mitochondria

(c) Mitochondria and chloroplasts (d) Chloroplasts and Lysomes

15. An operon in which a regulatory repressor protein normally binds to the operator and prevents the transcription of the genes is called as :

(a) Negative inducible operon (b) Negative repressible operon

(c) Positive inducible operon (d) Positive repressible operon

16. The cofactor of DNA polymerase is :

(a) Sodium ion
(b) Potassium ion
(c) Calcium ion
(d) Magnesium ion

17. Alternative start codons, other than the most common start codon of AUG in prokaryotes, are :

(a) CUG and CUC
(b) GUG and UUG
(c) GAC and CCC
(d) ACA and GUG

18. Cohesive sticky ends (*COS* sites) are a characteristic feature of :

(a) F-plasmid
(b) R-plasmid
(c) Cryptic plasmid
(d) Cosmid

19. Which of the following is used as a 'Molecular scissor' in genetic engineering ?

(a) DNA ligase
(b) DNA polymerase
(c) Restriction endonuclease
(d) Helicase

20. The opines found in the plant crown gall tumors produced by the parasitic *Agrobacterium tumefaciens* are used by the bacterium :

(a) For virulence
(b) As sources of carbon and nitrogen
(c) For replication
(d) None of the above

21. The latest edition of the International Code of Botanical Nomenclature is called as :

(a) Vienna Code
(b) St Louis Code
(c) Tokyo Code
(d) New York Code

22. A specimen or illustration designated from the original material as the nomenclatural type if no holotype was indicated at the time of publication, or if it is missing, or if it is found to belong to more than one taxon is known as :

(a) Paratypes
(b) Isotype
(c) Syntype
(d) Lectotype

23. Gymnosperms in Bentham and Hooker's Classification are placed :

(a) Between dicots and monocots (b) Before dicots

(c) After monocots (d) None of the above

24. Each statement of couplet in a dichotomous key is called :

(a) A bracket (b) An indent

(c) A lead (d) A primary key character

25. Gynoecium in *Magnolia* is composed of :

(a) Numerous, spirally arranged fused carpels

(b) Numerous, spirally arranged free carpels

(c) Single unilocular carpel

(d) Single multilocular carpel

26. Capitulum inflorescence is found in the members of :

(a) Asteraceae (b) Brassicaceae

(c) Rosaceae (d) Poaceae

27. Similarity in species of different ancestry as a result of convergent evolution is called :

(a) Heteroplasy (b) Parsimony

(c) Homoplasy (d) All of the above

28. Perianth in Poaceae is represented by :

(a) Lemma (b) Palea

(c) Rachilla (d) Lodicules

29. Cells comprising the tunica zone of the shoot apical meritem characteristically undergo :

(a) Only anticlinal divisions

(b) Only periclinal divisions

(c) Both anticlinal and perclinal divisions

(d) Neither anticlinal nor perclinal divisions

30. Secondary wall thickenings of tracheary elements having a ladder-like appearance are called as :

(a) Annular thickenings (b) Spiral thickenings

(c) Scalariform thickenings (d) Reticulate thickenings

31. Addition of new fusiform initials by anticlinal divisions is characteristic of :

(a) Non-storied cambia
(b) Storied cambia
(c) Non-stratified cambia
(d) Stratified cambia

32. A pit without a complimentary pit on the opposite cell wall is known as :

(a) *Simple pit*
(b) *Bordered pit*
(c) Half-bordered pit
(d) Blind pit

33. Categorisation of wood into porous and non-porous wood is based on the :

(a) Presence and absence of vessels
(b) Presence and absence of tracheids
(c) Presence and absence of sieve tubes
(d) Presence and absence of sieve cells

34. In an amphivasal vascular bundle of monocotyledons :

(a) Phloem is present on the outside of the xylem
(b) Xylem is present on the outside of the phloem
(c) Xylem completely encircles the phloem
(d) Phloem completely encircles the xylem

35. Cataphylls of *Pinus* are :

(a) Foliage leaves without a distinct midrib on the long shoots
(b) Scale leaves with a distinct midrib on the dwarf shoots
(c) Foliage leaves with a distinct midrib on the long shoots
(d) A group of foliage leaves on a dwarf shoot

36. In *Ephedra* :

(a) Both male and female strobili are compound
(b) Only male strobilus is compound
(c) Only female strobilus is compound
(d) Neither male nor female strobulus is compound

37. Part of the micropyle formed by the outer integument is known as :

(a) Hypostase
(b) Endostome
(c) Exostome
(d) Epistase

38. Which of the following is an example of a bisporic embryo sac ?

(a) Adoxa type
(b) Plumbago type
(c) Drusa type
(d) Allium type

39. The most common type of endosperm in angiosperms is :

(a) Cellular type
(b) Nuclear type
(c) Helobial type
(d) Endymion type

40. Pollenkitt is chiefly composed of :

(a) Lipid
(b) Protein
(c) Carbohydrate
(d) None of the above

41. Which of the following mineral elements plays an important role in biological nitrogen fixation ?

(a) Copper
(b) Manganese
(c) Molybdenum
(d) Zinc

42. From among the various components of biomembranes, transport processes are essentially mediated by :

(a) Lipids
(b) Proteins
(c) Carbohydrates
(d) All of the above

43. Conversion of starch to organic acids in stomatal guard cells results in :

(a) Stomatal opening
(b) Stomatal closure
(c) Stomatal growth
(d) None of the above

44. Seed dormancy could be due to :

(a) Impermeability of speed coat to water
(b) Impermeability of speed coat to gases
(c) Mechanically resistant seed coat
(d) All of the above

45. Cyclic photophosphorylation involves :

(a) Only Photosystem II
(b) Both Photosystem I and Photosystem II
(c) Only Photosystem I
(d) None of the above

46. The primary substrate utilized in photorespiration is :

(a) Carbohydrate (b) Glycolate

(c) Water and Carbon dioxide (d) Glycine

47. Respiratory Quotient of organic acids is mostly :

(a) More than one (b) Less than one

(c) Equal to one (d) All of the above

48. The reactions of EMP pathway (Glycolysis) take place in :

(a) Mitochondria (b) Nucleus

(c) Ribosomes (d) Cytoplasm

49. Which of the following is not an attribute of enzymes ?

(a) These are proteinaceous in nature

(b) These speed up the rate of biochemical reactions

(c) These are used up in reaction

(d) These are specific in nature

50. α-amylase synthesis is promoted by :

(a) IAA (b) Cytokinin

(c) NAA (d) GA

51. Photoperiodic stimulus is perceived by :

(a) Flowers (b) Leaves

(c) Roots (d) Buds

52. When the adaxial or morphologically upper side of an organ grows more rapidly than the abaxial side, the resulting curvature is termed as :

(a) Epinasty (b) Hyponasty

(c) Nyctinasty (d) Chemonasty

53. Which master horizon in a soil profile is characterized by excessive leaching of clay, iron, aluminum oxides etc ?

(a) O horizon (b) A horizon

(c) E horizon (d) B horizon

54. A phenomenon in biology characterized by a positive correlation between population density and the per capita population growth rate in very small populations is known as :

(a) Allee effect
(b) Suess effect
(c) Warburg effect
(d) None of the above

55. Cuticle is poorly developed in :

(a) Xerophytes
(b) Mesophytes
(c) Hydrophytes
(d) All of the above

56. An interaction in which two interacting populations of different species benefit from the relationship but the association is not obligatory is called as :

(a) Commensalism
(b) Protocoperation
(c) Amensalism
(d) Neutralism

57. Which among the following is not an analytic community characteristic ?

(a) Stratification
(b) Sociability
(c) Vitality
(d) Fidelity

58. *Artemesia* belongs to family :

(a) Berberidaceae
(b) Asteraceae
(c) Apiaceae
(d) Brassicaceae

59. An oil is hydrogenated to :

(a) Increase resistance to rancidity
(b) Decrease viscosity
(c) Decrease melting point
(d) All of the above

60. Hemp fibre is obtained from :

(a) *Gossipyium hirsutum*
(b) *Corchorus capsularis*
(c) *Cannabis sativa*
(d) *Cocos nucifera*

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M.Sc. Botany

1. The unique base present in the DNA of T-even phages is :
   (a) 5-hydroxymethyl adenine (b) 5-hydroxymethyl guanine
   (c) 5-hydroxymethyl cytosine (d) Uracil

2. The position of heterocysts in *Nostoc* is :
   (a) Intercalary (b) Terminal
   (c) Lateral (d) None of the above

3. Sexual reproduction in *Phytophthora* is :
   (a) Isogamous (b) Oogamous
   (c) Anisogamous (d) All of the above

4. Which of the following spore types are uninucleate in *Puccinia graminis* ?
   (a) Uredospores and Basidiospores
   (b) Teleutospores Pycnidiospores
   (c) Uredospores and Teleutospores
   (d) Basidiospores and Pycnidiospores

5. Siphonaceous habit is characteristic of :
   (a) *Volvox* (b) *Vaucheria*
   (c) *Oedogonium* (d) *Chara*

6. A pigment absent in Xanthophyceae is :
   (a) Chlorophyll (b) Xanthophyll
   (c) Carotene (d) Phycocyanin

7. Elators in *Marchantia* exhibit :
   (a) Hydrochasy (b) Xerochasy
   (c) Circumnutation (d) Nutation

8. Which of the following statements is true about *Anthoceros* ?
   (a) Tuberculate rhizoids are present on ventral surface of the thallus
   (b) Tuberculate rhizoids are present on dorsal surface of the thallus
   (c) Smooth-walled rhizoids are present on ventral surface of the thallus
   (d) Smooth-walled rhizoids are present on dorsal surface of the thallus

9. Sex organs in the prothallus of *Lycopodium* are :
   (a) Projected
   (b) Embedded
   (c) Either projected or embedded
   (d) Neither projected nor embedded

10. Presence of carinal canal at the base of vascular bundles is characteristics of :
   (a) *Rhynia*
   (b) *Lycopodium*
   (c) *Marsilea*
   (d) *Equisetum*

11. Lipids, proteins and carbohydrates are the main constituents of cell membrane. With respect to their relative proportions, which of the following statements is correct ?
   (a) All the three are present in equal proportions in a cell membrane
   (b) Lipids are present in least proportion in a cell membrane
   (c) Carbohydrates are present in least proportion in a cell membrane
   (d) Proteins are present in least proportion in a cell membrane

12. The telomeres of eukaryotic chromosomes consists of short sequences of :
   (a) Guanine rich repeats
   (b) Adenine rich repeats
   (c) Cytosine rich repeats
   (d) Thymine rich repeats

13. How many mitotic divisions are needed for a single cell to make 128 cells ?
   (a) 32
   (b) 28
   (c) 14
   (d) 7

14. Carrier molecules in the plasma membrane are required for :
   (a) Facilitated diffusion only
   (b) Active transport only
   (c) Both for facilitated diffusion and active transport
   (d) Osmosis

15. In mitochondria, cristae act as sites for :
   (a) Protein synthesis
   (b) Oxidation-reduction reactions
   (c) Breakdown of macromolecules
   (d) Phosphorylation of flavoproteins

16. How many different kinds of gametes would be produced by a plant having the genotype AABbCC?
   (a) Three
   (b) Four
   (c) Nine
   (d) Two

17. The enzyme that breaks hydorgen bonds in DNA is :
    (a) Helicase (b) Ligase
    (c) Kinase (d) Topoisomerase

18. In which phase of mitosis the chromatids of chromosomes separate from each other ?
    (a) Prophase (b) Metaphase
    (c) Anaphase (d) Telophase

19. Which of the following are degenerate codons :
    (a) GUA, GUG, GCA, GCG and GAA
    (b) UUG, UUC, CCU, CAA and CUA
    (c) UAA, UAG and UGA
    (d) UUA, UUG, CUU, CUC, CUA and CUG

20. Synthesis of RNA molecule in some organisms is terminated by a signal recognized by :
    (a) Alpha factor (b) Gamma factor
    (c) Rho factor (d) None of the above

21. Sex organs in *Ephedra* are borne on :
    (a) Bisexual compound strobili (b) Unisexual compound strobili
    (c) Bisexual simple strobili (d) Unisexual simple strobili

22. Which of the following is true about *Cycas* ?
    (a) Male strobilus and megasporophylls occur on separate individuals
    (b) Male strobilus and megasporophylls occur on same individual
    (c) Neither (a) nor (b)
    (d) Either (a) or (b)

23. Wings in *Pinus* seeds develop from :
    (a) Bract scales (b) Cone axis
    (c) Ovuliferous scale (d) Seed coat

24. Takhtajan divided angiosperms into which of the following two classes ?
    (a) Lignosae and Herbaceae
    (b) Magnoliopsida and Liliopsida
    (c) Archichlamydeae and Metachlamydeae
    (d) Choripetalae and Sympetalae

25. Which of the following is not a principle of International Code of Botanical Nomenclature ?

(a) Botanical Nomenclature is independent of Zoological Nomenclature

(b) Nomenclature of a taxonomic group is based upon priority of publication

(c) The application of names of taxonomic groups is not determined by means of nomenclatural types

(d) Each taxonomic group with a particular circumscription, position and rank can bear only one correct name, the earliest that is in accordance with the rules

26. A binomial name in which the generic name and the specific epithet are identical (have same spellings) is called as :

(a) Tautonym (b) Homonym

(c) Autonym (d) Synonym

27. A specimen which is a duplicate of the holotype, collected from the same place, at the same time and by the same person is designated as :

(a) Holotype (b) Isotype

(c) Syntype (d) Lectotype

28. Syngenesious condition of stamens is found in :

(a) Lamiaceae (b) Solanaceae

(c) Fabaceae (d) Asteraceae

29. As per the rules of the Botanical Nomenclature Code, the names of two or more authors who publish a new species or propose a new name are linked by :

(a) *et* (b) *ex*

(c) *in* (d) None of the above

30. "*Odines Anomali*" of Bentham and Hooker includes :

(a) Plants represented only in fossil state

(b) Plants showing abnormal growth and development

(c) A few orders which could not be placed satisfactorily in classification

(d) All of the above

31. Quiescent centre occurs in :

(a) Shoot apex (b) Root apex

(c) Both (a) or (b) (d) Neither (a) nor (b)

32. Casparian strips contain :

(a) Cutin (b) Pectin

(c) Suberin (d) Wax

33. A raphide is a deposit of :

(a) Calcium oxalate (b) Silica

(c) Starch (d) Calcium carbonate

34. Two distinct zones of tunica and corpus in the shoot apex of angiosperms are distinguished on the basis of :

(a) Meristematic activity of cells

(b) Cytological characteristics of cells

(c) Histological characteristics of cells

(d) Plane of cell division

35. A vascular bundle in which xylem encircles the phloem tissue is called as :

(a) Amphicribal bundle (b) Amphivasal bundle

(c) Collateral bundle (d) Bicollateral bundle

36. The most probable function of P-proteins in sieve elements is :

(a) Deposition of callose on sieve plates

(b) Providing energy for active translocation

(c) Sealing of pores after wounding

(d) None of the above

37. Sieve tubes differ from sieve cells in :

(a) Having sieve plates at end walls (b) Lacking nuclei

(c) Being shorter (d) Being dead

38. When the paratracheal parenchyma surrounds the vessels in such a way that wing-like lateral projections are formed, it is termed as :

(a) Vasicentric (b) Apotracheal

(c) Diffuse-in-aggregate (d) Aliform

39. Bulliform cells present in the epidermis of certain grasses help in :

(a) Rolling of leaves in dry weather (b) Tracking the sun

(c) Providing strength (d) All of the above

40. Ubisch bodies are secreted by :
(a) Endosperm (b) Nucellus
(c) Tapetum (d) Synergids

41. Which of the following phytohormones plays a role in the opening and closing of stomata ?
(a) Indole acetic acid (b) Abscisic acid
(c) Gibberellic acid (d) All of the above

42. Chlorosis in nitrogen deficient plants appears :
(a) In young leaves only
(b) In mature leaves only
(c) First in young leaves and then in mature leaves
(d) First in mature leaves and then in young leaves

43. CO_2 compensation point is high in :
(a) C_3 plants (b) C_4 plants
(c) C_2 plants (d) None of the above

44. The phenomenon of sharp decrease in the quantum yield of photosynthesis in organisms such as *Chlorella* upon using monochromatic light of wavelength greater than 680 nm is called as :
(a) Warburg effect (b) Emerson effect
(c) Red drop (d) Richmond Lang effect

45. Movements in plants that occur in response to touch are known as :
(a) Epinasty (b) Haptonasty
(c) Thermonasty (d) Seismonasty

46. Single turn of citirc acid cycle yields :
(a) $2FADH_2$, $2NADH_2$, 2GTP (b) $1FADH_2$, $3NADH_2$, 1GTP
(c) $1FADH_2$, $2NADH_2$, 1GTP (d) $1FADH_2$, $1NADH_2$, 2GTP

47. Which of the following is responsible for apical dominance ?
(a) IAA (b) GA_3
(c) ABA (d) Florigen

48. The catalytic efficiency of two different enzymes can be compared in terms of :
(a) Formation of the products (b) Optimum pH of the enzymes
(c) The Km value of enzymes (d) Molecular size of the enzymes

49. Which of the following plant growth regulators is used to induce rooting in the stem cuttings of plants ?

(a) Cytokinin
(b) Auxin
(c) Gibberellin
(d) Abscisic acid

50. Growth curve in most annual plants is :

(a) Linear
(b) Bell shaped
(c) Sigmoid
(d) None of the above

51. Occurrence of *Zoochlorellae* in the body wall of *Hydra* is an example of :

(a) Predation
(b) Parasitism
(c) Commensalism
(d) Mutualism

52. Diurnal temperature of soil surface varies most in a :

(a) Desert
(b) Forest
(c) Grassland
(d) Shrub land

53. Ecotone refers to :

(a) Interaction between two populations
(b) Ecotypes of a species
(c) Transitional zone between two communities
(d) Ecads of a species

54. Which one of the following ecosystem types has the highest annual net primary productivity ?

(a) Tropical deciduous forest
(b) Temperate evergreen forest
(c) Temperate deciduous forest
(d) Tropical rain forest

55. Freshwater ecosystems with continuous flow of water are called as :

(a) Lotic ecosystems
(b) Lentic ecosystems
(c) Eutrophic ecosystems
(d) Oligotrophic ecosystems

56. cDNA is :

(a) Circular DNA
(b) Complimentary DNA
(c) Coiled DNA
(d) Cytoplasmic DNA

57. Fragments of DNA formed after treatment with endonucleases are separated by :

(a) Polymerase chain reaction
(b) Colony hybridization
(c) Electrophoresis
(d) All of the above

58. The medicinal plant *Saussurea* belongs to family :

(a) Asteraceae (b) Solanaceae

(c) Malvaceae (d) Rosaceae

59. Groundnut oil is good for health because it contains:

(a) Polyunsaturated Fatty Acids (PUFA)

(b) Monounsaturated Fatty Acids (MUFA)

(c) Saturated fats

(d) All of the above

60. Which of the following combinations is correct ?

(a) Tossa jute *Corchorus capsularis*

(b) White jute *Corchorus olitorius*

(c) Tossa jute *Corchorus indica*

(d) White jute *Corchorus capsularis*

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1. Exploitation and analy i of variability of genetic resources for improvement of existing crops under cultivation is referred to as :
(a) Primary introduction
(b) secondary introduction
(c) Domestication
(d) Acclimatization cum introduction

2. Compilation of the historical *"De Materia Medica"* was carried out by:
(a) Bentham
(b) Bentham and Hooker
(c) Theophrastus
(d) Theophrastus and Aristotle

3. Aplanogamic type of sexual reproduction occurs in
(a) *Oedogonium*
(b) *Chara*
(c) *Volvox*
(d) *Zygnema*

4. The zoospores of *Vaucheria* are
(a) Aflagellate
(b) Uniflagella te
(c) Multiflagellate
(d) Biflagella te

5. The most primitive type of life cycle in algae is
(a) Haplontic
(b) Diplontic
(c) Haplobiontic
(d) Diplobiontic

6. Cleistothecia of which of the following fungus contains coiled appendages on the periderm:
(a) *Uncinula*
(b) *Erysiphe*
(c) *Colletotrichum*
(d) *Venturia*

7. Key membrane sterol in most of the fungi is
(a) Cholesterol
(b) Ergosterol
(c) Mannitol
(d) None of the above

8. Nutrition in slime fungi is
(a) Absorptive
(b) Phagotrophic
(c) Necrotrophic
(d) Autotrophic

9. Which among the following is used as a biocontrol agent?
(a) *Trichoderma viridae*
(b) *Pythium debaryanum*
(c) *Phytophthora infestans*
(d) *Erysiphe polygoni*

10. Phialidic type of conidia are found in
(a) *Asperigillus*
(b) *Albugo*
(c) *Phytophthora*
(d) *Pythium*

11. When the tissue close to vein turns yellow and the remaining surface o~ stays green; the condition is known as
(a) Vein bending
(b) Vein clearing
(c) Variegation
(d) Vennation

12. When archegonia are borne at the apex of main axis or its branches, the condition is known a
(a) Acrocarpous
(b) Pleurocarpou
(c) Stigmatocarpous
(d) Cleistocarpous

13. Conducting tissue in mosses is made up of:
(a) Xylem
(b) Collenchyma
(c) Phloem
(d) Parenchyma

14. Green plastids are present in the cells of young antheridium of:
(a) *Riccia*
(b) *Funaria*
(c) *Pellia*
(d) *Anthoceros*

15. A group of fused sporangia with distinct partition walls is known as
(a) Sorus
(b) Synangium

(c) Both (a) and (b)
(d) None of the above

16. Which of the following can induce apogamy in fern gametophytes?
(a) Low concentration of sucrose'
(b) Medium concentration of sucrose
(c) High concentration of sucrose
(d) All of the above

17. Which of the following is richly found m functional megasporophyte of *Selaginella* ?
(a) Vacuoles
(b) Starch
(c) Cytoplasm
(d) Cytoplasmic RNA

18. Which of the following genera lacks a female cone?
(a) *Cycas*
(b) *Cedrus*
(c) *Ephedra*
(d) None of the above

19. The form genus *Caytonia* was first discovered by
(a) H. H. Thomas
(b) T. M. Harris
(c) K. R. Sporne
(d) B. Sahni

20. **In** which. geological period flowering plants first appeared?
(a) Ordovician
(b) Cambrian
(c) Devonian
(d) Cretaceous

21. Girdling leaf-traces are the characteristic feature of the stem of:
(a) *Ephedra*
(b) *Cycas*
(c) *Cedrus*
(d) *Pinus*

22. Which of the following living pteriodophytic order shows more resemblances with Rhyniaceae?
(a) Psilotales
(b) Lycopodiales
(c) Ophioglossales
(d) Equisetales

23. The International Code for Botanical Nomenclature (ICBN) governs the nomenclature of:

(a) Plants alone
(b) Plants and fungi
(c) Plants and bacteria
(d) Plan and viruses

24. The mo t primitive group in dicots as per Engler a Prantl is
(a) Ranales
(b) A teraceae
(c) Amentiferae
(d) Iagnoliaceae

25. An inventory of the plants of a defined geographical region is known as
(a) Conspectus
(b) Revision
(c) Monograph
(d) Flora

26. which of the following families are the stamens syngenesious ?
(a) Apiaceae
(b) Asteraceae
(c) Ranunculaceae
(d) Rosaceae

27. When the guard cells are surrounded by unspecialised epidermal cells; the type of stomata is
(a) Anomocytic
(b) Anisocytic
(c) Diacytic
(d) Paracytic

28. Root endodermis is generally regarded as
(a) Outer most layer of cortex
(b) Inner most layer of cortex
(c) Both of the above
(d) Either (a) or (b)

29. Cambium and cork cambium are examples of:
(a) Apical meristem
(b) Intercalary meristem
(c) Lateral meristem
(d) Primary meristem

30. Pollination occurring between two flowers on the same plant IS termed as:
(a) Autogamy
(b) Xenogamy
(c) Chasmogarny
(d) Geitonogamy

31. The first division of the zygote in Piperad type of the embryogeny
(a) Vertical
(b) Transverse

(c) Oblique
(d) Either (b) or (c)

32. Synthetic seeds are:
(a) Encapsulated zygotic embryos
(b) Encapsulated somatic embryos
(c) Genetically engineered seeds
(d) None of the above

33. When the aperture is on the proximal face, the pollen grains are designated as:
(a) Zonotreme
(b) Anatreme
(c) Pantotreme
(d) Catatreme

34. When the exposed pollen wall shows rod-like elements with swollen tips, the sculpturing is called as
(a) Psilate
(b) Fossulate
(c) Pilate
(d) Baculate

35. The fluidity of biomembranes is ascribed mainly to
(a) The protein component
(b) The lipid component
(c) Both protein and lipid components
(d) Neither protein nor lipid component

36. Which one of the following is the acyl group carrier in the B oxidation of fatty acids?
(a) Coenzyme A
(b) Acyl carrier protein
(c) Both (a) and (b)
(d) Neither (a) nor (b)

37. During photorespiration which of the following reactions takes place in the mitochondrion:
(a) Conversion of glycine to serme
(b) Conversion of serine to CO_2 and NH_3
(c) Both (a) and (b)
(d) None of the above

38. The receptor in plants that perceives the photoperiodic signal is a
(a) Conjugated protein
(b) Hormone
(c) Non-protein pigment
(d) None of the above

39. Gibberellins produced In the apical portions of both stems and roots cause:

(a) Stem elongation
(b) Growth of lateral branches
(c) Abscission of leaves and fruits
(d) Stem thickening

40. The sterol: phospholipid ratio of membranes is high in
(a) Glycophytes
(b) Halophytes
(c) Psamophytes
(d) Hydrophytes

41.Percentage of phanerophytes in the normal biological spectrum Raunkiaer (1934) is ?
(a) 13
(b) 26
(c) 46
(d) 62

42. Most of the energy in a temperate coniferous forest flows through:
(a) Detritus food chain
(b) Grazing food chain
(c) Auxiliary food chain
(d) All of the above

43. Maximum number of trophic levels in most food webs is about:
(a or 9
(b) 2 or 3
c) 1 or 2
d) 4 or 5

44. Which among the following accounts for much of the biome differences in Net Primary Productivity (NPP)?
a) Length of growing season
b) Leaf area
c) Soil fertility
d) None of the above

45. Pyrramid of number of a parasitic food chain would be always
a) Upright
b) In 'erted
c) Either upright or inverted
d) Neither upright nor inverted

46. Bacteria that use light as energy source and organic substances as carbon source are called as:
(a) Photoautotrophs
(b) Chemoautotrophs
(c) Photoherotrophs
(d) Chemoheterotrophs

47. Archaeobacteria differ from both eubacteria and eukaryotes in

(a) Nature of membrane lipids
(b) RNA polymerase structure
(c) Composition' of their cell walls
(d) All of the above

48. Genetic material in plant viruses is mostly:
(a) DNA
(b) RNA
(c) Both DNA and RNA
(d) None of the above

49. Which one of the following is true for spontaneous reactions?
(a) +S and -H
(b) -S and +H
(c) Both (a) and (b)
(d) Neither (a) nor (b)

50. The most abundant non-reducing soluble sugar in plants is
(a) Lactose
(b) Maltose
(c) Sucrose
(d) Cellobiose

51. The true substrate in most enzymatic reactions that involve ATIL
phoryl donor is
(a) MgATp2-
(b) Mg2+
(c) Mg ADP-
(d) None of the above

52. Which of the following is not formed when yeast is producing wine?
(a) Pyruvic acid
(b) . Ethanol
(c) CO2
(d) Acetyl Co A

53. In feedback inhibition, a metabolic pathway is switched off by:
(a) A rise in temperature
(b) Lack of substrate
(c) Accumulation of end product
(d) Competitive inhibition

54. Covalently bound non-protein component of an enzyme is its
(a) Coenzyme
(b) Cofactor
(c) Apoenzyme
(d) Prosthetic group

55. The rainfall in a district for four (04) months was 50, 40, 15 and 15 millimeters. The mean deviation of rainfall about mean for the given four months is
(a) 30
(b) 15
(c _?_?.*u*-
(d 0

The extent of correlation between two related variables decreases, the value of co relation coefficient *(r)* approaches
(a) +1
(b) −1
(c) Zero
(d) None of the above

57. The arithmetic mean of a distribution, in which there are some.extremely high or low values, will either over estimate or under estimate the average position and hence is not a best representative value. The measure of **Central**
Tendency in such a situation is
(a) Median
(b) Mode
(c) Standard deviation
(d) None of the above

58. How many progeny genotypes are expected after selfing of the parent having the genotype 'AABbCC' : '
(a) . Two
(b) Three
(c) Four
(d) Five

59. The epistatic gene differs from dominant gene in that the
(a) Epistatic gene is non-allelic
(b) Epistatic and dominant genes are present at different loci
(c) Both (a) and (b) are false
(d) Both (a) and (b) are true

60. Dominant genes 'A' and 'B' are required for normal hearing. A deaf couple has all children with normal hearing. The probable genotype of the couple IS :
(a) AAbb x aaBB
(b) AaBB x AABb
(c) AaBb x AaBb.
(d) aabb x aabb

61. An allele 'A' after segregation from 'Aa' genotype produces a rm
notype; the condition is called
(a) Point mutation

(b) Paramutation
(c) Frameshift mutation
(d) None of the above

62. A larkspur plant has 16 chromosomes. How many linkage groups does it have?
(a) 4
(b) '8
(c) 16
(d) 20

63. **In** a DNA molecule the percentage of adenine is 18%; the percentage of cytosine is expected to be
(a) 18%
(b) 36%
(c) 27%
(d) 54%

64. The products of one gene required to activate another gene are called
(a) Repressor elements
(b) Co-enzymes
(c) Transcription factors
(d) None of the above

65. Restriction endonucleases cut DNA at :
(a) Palindromic sequences
(b) Methylated sequences
(c) ear exons
(d) Any site

66. The sum total of deleterious genes in a population at a particular time is
(a) Gene pool
(b) Genetic drift
(c) Genetic load
(d) Genetic imbalance

67. The chain initiation and termination codons during protein synthesis respectively are :
(a) AUG and UGA
(b) GUG and UAA
(c) Neither (a) nor (b)
(d) Both (a) and (b)

68. Which of the following commonly known medicinal herb IS used for the treatment of hair fall?
(a) Bunafsha
(b) Kahzaban
(c) Van Wangun
(d) Burza

69. The commercially important active principal "Quercetin" is obtained from:

(a) *Podophyllum hexandrum*
(b) *Atropa belladonna*
(c) *Arnebia benthamii*
(d) *Viola odorata*

70. Which of the following is essential for germplasm exchange ?
(a) Plant introduction
(b) Plant assessment
(c) Plant quarantine
(d) Plant adaptability

BOTANY 2007

1. "Little leaf' disease of brinjal is caused by:
(a) viruses
(b) mycoplasma
(c) bacteria
(d) phytophthora

2. Adenoviruses are:
(a) DNA containing plant viruses, spheroidal in shape with projecting fibres
(b) RNA containing plant viruses, spheroidal in shape and enveloped
(c) DNA containing animal viruses, spheroidal in shape with projecting fibers
(d) RNA containing animal viruses, spheroidal in shape and enveloped

3. Cell walls of Deuteromycetes contain
(a) chitin-glucan
(b) mannan-glucan
(c) cellulose-glucan
(d) pectin-glucan

4. Morchella is a:
(a) Parasitic hymenomycete .
(b) Mycorrhizal gasteromycete
(c): Symbiotic plectomycete
(d) Saprobic discomycete

5. In some plants of *Oedogonium,* the androsporangia are produced on filaments which do not bear oogonia. Such plants are said to be :
(a) Gynandrosporous

(b) Idioandrosporous
(c) Androsporous
(d) Gynosporous

6. Select the odd one out in respect of the nature of sexual reproduction
(a) *Chlamydomonas debaryana*
(b) *Chlamydomonas media*
(c) *Chlamydomonas coccifera*
(d) *Chlamydomonas eugametos*

7. In which of the following species of *Anthoceros* the whole plant is covered with hair like outgrowths forming water-holding chambers?
(a) *A. arachnoides*
(bl *A. giganteus*
(c) *A. fusiformis*
(d) *A. laevis*

8. In the stem of Polytrichum one or two layers of cells consist of dark brown suberized walls and contain copious starchy contents. This tissue is called:
(a) Hydrom mantle
(b). Hydrom sheath
(c) Leptom mantle
(d) Piliferous layer

9. Rhynia belongs to :
(a) upper Silurian
(b) lower Devonian
(c) middle Devonian
(d} upper Devonian

10. Steles in which leaf gaps occur less frequently and are distantly placed are called:
(a) dictyosteles
(b) medullated steles
(c) perforated steles
(d). solenosteles

11. Which of the following is a single pass, single helix transmembrane protein?
(a) Glycophorin
(b) Spectrin
(c) Band 3 protein
(d) Integrin

12. Which of the following ions facilitates assemblage of subunits into a complete ribosome?
(a) Na+
(b) Ca++
(c}, . Mg++
(d) Mn+

13. A plant carrying a duplicated chromosome segment is said to be
(a) Hemizygous
(b) Hyperploid
(c) Disomic haploid
(d), Addition haploid

14. Select the odd one out in terms of the genome constitution
(a) *Gossypium hirsutum*
(b) *Nicotiana tabacum*
(c) *Musa esculentum*
(d). *Brassica juncea*

15. The F2 progeny of "green-round" and "white-wrinkled" seeded parents contains 4 types of plants: *(i)* green-round seeded 10; *(ii)* "green-wrinkled" seeded *69; (iii)* "white-round" seeded 85 and *(iv) "white*-wrinkled" seeded 15. This suggests:
(a) duplicate gene inheritance
(b) linkage in repulsion phase
(c) independent assortment
(d) linkage in coupling phase

16. Which of the following enzymes has both exonuclease 3' ---+ 5' and exonuclease 5' ---+ 3' activities?
(a) cannot reeognise codons GCU, GCC and GCA
(b) can reeognise only codon GCU
(c) can reeognise only codon GCA
(d) can recogmse all the three codons

17. The anticodon IGC :
(a) Prokayotic DNA polymerase I
(b} Prokaryotic DNA polymerase II
(c) Prokaryotic DNA polymerase **III**
(d) Eukaryotic DNA polymerase p

18. Which of the following mutations are likely to occur if DNA is exposed to proflavin dyes ?
(a) Suppressor mutations
(b) Frame shift mutations
(c) Transition mutations
(d) Transversions

19; Isopropyl thiogalactoside is
(a) an inducer
(b) a repressor
(c) a gratuitous inducer
(d) a co-repressor

20. When shed from the sporangium, the microspores have :

(a) one prothallial cell in *Cycas* and two in *Ephedra*
(b) two prothallial cells in *Cycas* and one in *Ephedra*
(c) one prothallial cell in both
(d) two prothallial cells in both

2. Select the odd one out
a) coralloid roots
b) loosely arranged megasporophylis
c) absence of neck canal cells .
(d) gametophytic endosperm.

22. Paleontological evidences reveal that the flowering plants had attained high degree of morphological specialisation during:
(a) Triassic
(b) Jurassic
(c) Cretaceous
(d) Palaeocene

23. On the basis of carpel and stamen morphology and structure of wood which of the following plants seems to be primitive?
(a) *Cucurbita* spp.
(b) *Solanum* spp.
(c) *Convolvulus* spp.
(d) *Degeneria* spp.

24. +ffi, 1\5' C 5~~5 G(2) is the floral formula of :
(a) *Helianthus annuus*
(b) *Brassica campestris*
(c) *Lathyrus odoratus*
(d) *Solanum nigrum*

25. A small cup shaped inflorescence con i ting of a single pistillate flower in the centre surrounded by numerous staminate flowers is called
(a) Glomerule
(b) Cyathium
(c). Hypanthodium
(d) Verticillaster

26. Which one of the following is considered equivalent to perianth ?
(a) Glumes
(b) Lodicules
(c) Superior palea
(d) Inferior palea

27. The process of grouping of organisms into taxa on the basis of overall similarities is called
(a) phenetics
(b)- cladistics
(c) alpha taxonomy

(d) beta taxonomy

28. "Systema Naturae" was written by:
(a) Charles Robert Darwin
(b) George Bentham
(c) Jean Baptiste Lamarck
(d) Carolus Linnaeus

29. According to Bentham and Hooker's classification system the order Rosales falls in which of the following series?
(a) Thalamiflorae
(b)Bicarpillatae
(c) Calyciflorae
(d) Inferae

30. Which of the following plants is perennial and monocarpic ?
(a) *Agave americana*
(b) *Cocos nucifera*
(c) *Phoenix dactylifera*
(d) ,; *Hevea brasiliensis*
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31. Which one of the following is different from others in respect of the nature of its roots?
(a) *Sonneratia* sp.
(b) *Avicinnia* sp.
(c) *Heritiera* sp.
(d) *Pandanus* sp.

32. In some plants the leaves occur along a straight vertical line. This condition is called:
(a) Distichous
(b) Parastichous
(c) Orthostichous
(d)- Unistichous

33. Alburnum and Duramen respectively are alternate names of :
(a) heartwood and sapwood
(b) sapwood and heartwood
(c) -porous wood and ring-porous wood
(d) ring-porous wood and diffuse-porous wood

34. The sclerenchyma of cortex originates from:
(a) Ra initials
(b) Fusiform initials
(c) Protoderm
(d) Periblem

35. The first lower most leaves of a plant's side branch are called
(a) cataphylls
(b) prophylls
(c) hypsophylls
(d) platyclades

36. The book entitled "Plant Embryology" was written by
(a) Karl Schnarf
(b) P. Maheshwari
(c) D.A. Johansen
(d) G. Davis

37. In respect of chromosome number which one of the following is different?
(a) Embryo sac
(b) Archesporium
'(c) Sporogenous tissue
(d). Spore mother cells

38. In *Dianthus* the style is much longer than the stamens. This condition is called:
(a) Dichogamy
(b) Herkogamy
(c)." Heterostyly
(d) None of the above

39. \ψ W of a living plant cell is the sum of :
(a) wall pressure and pressure potential
(b) wall pressure and matric potential
(c) osmotic potential and pressure potential
(d).. osmotic potential and solute potential

40. Which of the following diseases is caused in plants due to deficiency of Zn ?
(a) Heart rot of beats
(b) Whiptail of cauliflower
(c). Grey speck of oats
(d) Little leaf of apples

41. Which of the following compounds is a prosthetic group?
(a) FAD
(b) Biotin
(c) LDH
(d) NAD

42. A substrate fails to join the enzyme because its active site is deformed by an analogue of the substrate. This process is called
(a) Allosteric inhibition
(b). Competitive inhibition
(c), E.nd product inhibition
(d) Feedback inhibition

43. Which of the following compounds serves as the electron donor during biological nitrogen fixation ?
(a) 6-Phosphogluconic acid
(b) Acetyl phosphate
(c) Dinitrogeri reductase
(d).Pyruvic acid

44. For carbon fixation during "dark reaction" the three carbon atoms of each
PGA molecules are derived from:
(a) RuBP
(b) CO_2
(c) RuBP + CO_2
(d), RuBP + CO_2 + PEP

45. Which one of the following facts explains "Warburg Effect" ?
(a)" Rate of photosynthesis decreases at low 02 concentration
(b) Rate of photosynthesis increases at low 02 concentration
(c) Rate of photosynthesis decreases at high 02 concentration
(d) Rate of photosynthesis increases at high 02 concentration

46"" The seeds of lettuce are
(a) non-photoblastic
(b) positively photoblastic
(c) negatively photoblastic
(d) ABA induced

47. Plant leaves are:
(a) . Plageotropic
(b) "Diageotropic
(c) Ageotropic
(d) Negatively geotropic

48. Which one of the following compounds shows "Richmond-Lang" effect?
(a) IAA
(b) ABA
(c) GA_3
(d) Kinetin

49. The correct sequence of electron acceptors in ATP synthesis" is :
(a) Cytochrome *a, a3' b,* c
(b) Cytochrome *b,* c, *a, a3*
(c) Cytochrome *b,* c, *a3' a*
(d)." Cytochrome c, *b, a, a3*

50. Who amongst the following has contributed extensively to the study of Indian grass-land ecology?
(a) R Misra
(b) G.S. Puri
(c) J.S. Singh
(d) RR. Das

51. Which of the following statements is *true?*
(a) The ecological pyramid of numbers is inverted in a tree ecosystem
(b) The ecological pyramid of numbers is upright in a tree ecosystem
(c) The ecological pyramid of numbers is inverted in herbaceous ecosystem
(d) The ecological pyramid of biomass is upright in an aquatic ecosystem

52. The plant species that thrive well in narrow salinity and narrow temperature ranges are called respectively as :
(a) Euryhaline and Eurythermal
(b) Stenohaline and Stenothermal
(c) Steno1'r'aJ/ne and Eurythermal
(d) Euryhaline and Stenothermal

53. Acacia senegal and *Rhizophora* sp. respectively are
(a) Psammophyte-Lithophyte
(b) Lithophyte-Psychrophyte
(c) Psychrophyte-Halophyte
(d) Psammophyte-Halophyte

54. Morphologically different populations when grown in an identical habitat become uniform and the variations disappear. Such populations are called:
(a)' Ecotones
(b) Ecoclines
(c) Ecads
(d) Ecotypes

55. A climax community represented by a single dominant species is called
(a)" Society
(b) Lociation
(C) Consociation

(d) Association

56. Which of the following plants produces a caryopsis ?
(a) *Triticum aestivum*
(b) *Artemisia annua*
(c).. *Solanum tuberosum*
(d) *Lathyrus odoratus*

57. The famous timber "Saguan" is obtained from
(a)*Eucalyptus globosus*
(b) *Tectona grandis*
(c)*Shorea robusta*
(d) *Dalbergia sissoo*

58. The common gunny bag fibre is obtained from
(a) *Crotolaria juncea*
(b) *Cocos nucifera* .
(c) *Corchorus capsularis*
(d) *Quercus superba*

59. pBR327 is :
(a) yeast plasmid vector
(b) phagemid pBluescript vector
(c) pUC vector
(d) *E. coli* plasmid vector

60. Which of the following properties of Ti plasmids of*Agrobacterium* made them a suitable choice for use as vectors ?
(a) Large size
(b) Absence of unique restriction sites
(c) Tumour induction properties
(d) Presence of *vir* gene.

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1. Bacteria cann*ot* survive in a highly salted pickle because
(A) Salt inhibits reproduction
(B) Pickle, does not contain nutrients necessary for bacterial growth
(C) Bacteria do not get enough light for photosynthesis
(D) Bacterial cells become plasmolysed and consequently killed

2. In which of the following conditions transpiration would be the most rapid?
(A) High humidity

(B) Excess of water in the soil
(C) Low humidity and high temperature
(D) Low wind velocity

3. Which of the following denotes the covalently bound non-protein component of an enzyme?
(A) Coenzyme
(B) Cofactor
(C) Apoenzyme
(D) Prosthetic group

4. Majority of the higher plants growing in well-aerated soils rich in organic matter preferably utilize:
(A) NH_4+
(B) $N0_2$
(C) $N0_3$
(D) Organic nitrogen

5. In most of the enzymatic reactions that involve ATP as the phosphoryl donor, the *true* substrate is
(A) Mg ATP2-
(B) Mn ATP2-
(C) Ca ATP2-
(D) None of the above

6. During photorespiration, the conversion of glycine to serine, and of serine to CO_2 and NH_3 takes place in :
(A) Chloroplasts
(B) Mitochondria
(C) Peroxisomes
(D) None of the above

7. Which of the following enzymes is/are synthesized *de novo* during the germination of lipid-storing seeds?
(A) Isocitrate lyase
(B) Malate synthetase
(C) Both of the above
(D) None of the above

8. Which of the following plant hormones delay senescence?
(A) Cytokinins
(B) Auxins
(C) Gibberellins
(D) Ethylene

9. The photosynthetically active radiation (PAR) is
(A) < 400 nm
(B) Between 400 to 700 nm
(C) >740 nm

(D) None of the above

10. Sleep movement of beans is an example of:
(A) Epinasty
(B) Nyctinasty
(C) Thigmonasty
(1) Seismonasty

11. In the hydrological cycle, precipitation exceeds evaporation and transpiration over the:
(A) Land surfaces
(B) Oceans
(C) Both of the above
(D) None of the above

12. The length of the food chains is limited by :
(A) Less energy available to support more trophic levels
(B) Less ecological efficiency of different trophic levels
(C) Both of the above
(D) High energy available to disrupt trophic levels

13. The pioneer plants in the secondary succession are usually:
(A) Lichens
B) Weeds
(C) Ferns
(D) All of the above

14. Aerial roots, vivipary and succulence are the common adaptations of:
(A) Xerophytes
(B) Hydrophytes
(C) Mesophytes
(D) Halophytes

15. Kashmir Valley falls within the Indian biogeographic region of:
(A) Trans-Himalaya
(B) Eastern Himalaya
(C) Northwestern Himalaya
(D) Central Himalaya

16. Ecologically, a population is defined as :
(A) A single group of interbreeding individuals of the same species
(B) A single group of interbreeding individuals of different species
(C) A single group of interbreeding individuals of a few species
(D) A single group. of interbreeding individuals of many species

17. Which of the following genera includes fibre plants?
A) *Oryza*
B) *Brassica*

(C) *Atropa*
(D) *Gossypium*

18. The drugs extracted from *Podophyllum hexandrum* are
(A) Anti-carcinogenic
(B) Sedative
(C) Diuretic
(D) Aphrodisiac

19. Which of the following is used as a cloning vector in plants?
(A) Cosmid
(B) Phagemid
(C) Ti Plasmid
(D) YAC

20. When a mature cell reverts back to meristematic state and forms an undifferentiated callus tissue, the process is termed as
(A) Postdifferentiation
(B) Redifferentiation
(C) Dedifferentiation
(D) Predifferentiation

21. In diploid organisms, the formation of multivalents at meiosis is due to
(A) Monosomy
(B) Inversion
(C) Duplication
(D) Reciprocal translocation

22. An anticodon of *tRNA* recognizes more than one codon of *mRNA*. This explains:
(A) Wobble hypothesis
(B) Degeneracy of genetic code
(C) Universality of genetic code
(D) Triplet nature of genetic code

23. How many Trisomies are possible in an individual with $2n = 20$
(A) 5
(B) 10
(C) 15
(D) 20

24. A wild allele 'A' after segregation from 'Aa' genotype gives a mutant phenotype; the condition is called as
(A) Point mutation
(B) Paramutation
(C) Frameshift mutation
(D) Back mutation

25. PBR-322 is :
(A) An artificially constructed plasmid
(B) A natural plasmid
(C) A cosrnid
CD) A phagemid

26. In a DNA molecule with percentage of Guanine as 24, Adenine is expected to be:
(A) 52%
(B) 48%
(C) 26%
(D) ''24%

27. The ~fatty acid tail in a phospholipid molecule is
(A) Hydrophobic
(B) Hydrophilic
(C) Amphipathic
(D) None of the above

28. Which DNA sequences are functional even at a great distance from either side of the transcriptional initiation site of a gene?
(A) Response elements
(B) Promoters
(C) Enhancers
(D) Operators

29. Brown eye is dominant over blue eye. A brown-eyed couple has a blue-eyed child. The genotype of the couple would be
(A) BB x bb
(B) bb x bb
(C) BB x Bb
(D) Bb x Bb

30. Which mutation of the sequence GATCCT is a transition?
(A) GGTCCT
(B) GTTCCT
(C) GTATCCT
(D) GTCCT

31. A motile flagellated asexual cell is called:
(A) Sperm
(B) Zoospore
(C) Oospore
CD) Androspore

32. Algae are classified into major groups on the basis of:
(A) Nature of the reserve food product
(B) Chemical composition of the cell wall

(C) The type of pigment
(D) 'Vegetative characters

33. The conjugating gametangia of *Rhizopus* are
(A). Physiologically similar but morphologically dissimilar
(B) Physiologically dissimilar but morphologically similar
(C) Physiologically similar and morphologically similar
(D) Physiologically dissimilar and morphologically dissimilar

34. All fungi lack :
(A) Centrioles
(B) Cell wall
(C) Rhizoids
(D) Haustoria

35. The capsule of the sporophyte in *Polytrichum* lacks:
(A) Operculum
(B) Peristome
(C) Columella
(D) None of the above

36. Equisetum is :
(A) Incipiently heterosporous
(B) Distinctly heterosporous
(C) Homosporous
(D) Asporous

37. The form genus *Rhynia* was discovered by:
(A) Kidston and Lang
(B) Arnold
(C) Birbal Sahni
(D) Campbell

38.The simplest known sporophyte among Bryophyta occurs in
(A) Funaria
(B) Anthoceros
(C) Marchantia
(D) Riccia

39. One of the main reasons for including Cyanophyceae in Procaryota is:
(A) Absence of sexual reproduction
(B) Absence of flagellated spores
(C)Absence of nuclear membrane
(D) Presence of mucilaginous sheath

40. The genome of plant viruses is mostly:

(A) ssDNA
(B) ssRNA
(C) dsDNA
(D) dsRNA

41. Which of the following is *not* a characteristic feature of *Cycas?*
(A) Circinate vernation of foliage leaves
(B) Armed parenchyma
(C) Motile sperms
(D) Vessels in the xylem

42. K.R Sporne (1974) has placed ~ the order Cordaitales in the group:
(A)Coniferopsida
(B)Cycadopsida
(C)Gnetopsida
(D)Cordaitopsida

43. The form genus *Caytonia* represents
(A) Microsporophyll
(B) Megasporophyll
(C) Foliage leaf
(D) All of the above

44. Which of the following statements in *not* correct?
(A) All seed plants are heterosporous
(B) *Selaginella* shows incipient seed habit
(C) All vascular plants bear seeds
(D) The seeds have survival value

45. Amongst the following attributes of a flower, which one is considered to be the primitive?
(A) Floral parts fused
(B) Ovary superior
(C) Symmetry bilateral
(D) Floral parts reduced to less than four
(A)

46. In tetradynamous condition, the stamens are arranged in two whorls of:
(A) 2 (short) + 2 (long)
(B) 2 (long) + 4 (short)
(C) 4 (short) + 4 (long)
(D) 4 (long) + 2 (short)

47. In a dichotomous taxonomic key, the statement "Flowers red" would be called:
(A) A lead
(B) A couplet
(C) A triplet

(D) A character

48. The Pome type of fruit occurs in
A) Pomegranate
(B) Peach
(C) Plum
(D) Pear

49. In a descending order, the correct sequence of the following categories in the taxonomic hierarchy would be :
(A) Class, Division, Order, Family, Genus, Species
(B) Order, Division, Class, Family, Genus, Species
(C) Division, Class, Order, Family, Genus, Species
(D) Division, Order, Class, Family, Genus, Species

50. Bentham and Hooker's system of classification of plants was published in the
(A) Genera Plantarum
(B) Species Plantarum
(C) Historia Plantarum
(D) Systema Naturae

51. The first pollinating agents in angiosperms were probably
(A) Beetles
(B) Birds
(C) Bats
D) Butterflies

52. The Quiescent Center is a reservoir of cells showing
(A) High meristematic activity
(B) Occasional meristematic activity
(C) No meristematic activity
(D) Annual meristematic activity

53. The companion cells are absent in :
(A) Halophytes
(B) Xerophytes
(C) Monocots
(D) Gymnosperms

54. Which of the following structures is *not* found in an angiosperm leaf?
(A) Periderm
(B) Guard cell
(C) Chloroplast
(D) Phloem

55. The structural arrangement of wood components is called as

(A) Texture of wood
(B). Figure of wood
(C) Grain of wood
(D) Gravity of wood

56. The annual growth rings are distinct in plants growing in the:
(A) Tropical regions
(B) Arctic regions
(C). Grasslands
(D) Temperate regions

57. The Tunica and Corpus regions of the shoot apex are usually distinguished by the:
(A) Numbers of cell division
(B) Rates of cell division
(C) Planes of cell division
(D) None of the above

58: The female gametophyte of a typical dicot at the time of fertilization is
(A) 8-nucleate, 8-celled
(B) 8-nucleate, 7-celled
(C) 7-nucleate,7-celled
(D) 7-nucleate, 8-celled

59. The function of the tapetum in an anther is related to:
(A) Dehiscence
(B) Division"
(C) Protection
(D) Nutrition

60. The single cotyledon in grass embryo is called
(A) Scutellum
B) Coleorhiza
(C) Coleoptile
(D) Endothelium