

Sr. No. ....841.....

**ENTRANCE TEST-2024**  
**SCHOOL OF BIOLOGICAL SCIENCES**  
**BOTANY**

**Total Questions : 60**  
**Time Allowed : 70 Minutes**

**Question Booklet Series** A

**Roll No. :**

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**Instructions for Candidates :**

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
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1. Which of the following statements regarding algae is *not* correct ?
  - (A) Red algae lack flagella
  - (B) The flagella of a brown algal cell are unequal
  - (C) The flagella of a green algal cell are equal
  - (D) The food reserves in brown algae are stored as starch
2. In majority of lichens the fungal partner is a member of:
  - (A) Zygomycota
  - (B) Ascomycota
  - (C) Basidiomycota
  - (D) Phycomycota
3. Transduction in bacteria is mediated by :
  - (A) Cosmids
  - (B) Plasmid vectors
  - (C) Phage vectors
  - (D) F-factors
4. The fungus *Alternaria solani* belongs to division :
  - (A) Ascomycota
  - (B) Deuteromycota
  - (C) Basidiomycota
  - (D) Phycomycota
5. The first alga having been grown in culture belongs to :
  - (A) *Chara*
  - (B) *Chlamydomonas*
  - (C) *Chlorella*
  - (D) *Cladophora*
6. Which of the following is the largest virus ?
  - (A) Herpes virus
  - (B) Arbovirus
  - (C) Mumps virus
  - (D) Pox virus
7. 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
8. The ability to fix atmospheric nitrogen is found in the species of :
  - (A) *Chlamydomonas*
  - (B) *Oedogonium*
  - (C) *Ectocarpus*
  - (D) *Nostoc*
9. Haploid gametophytic stage is dominant in the life-cycle of :
  - (A) Pteridophytes
  - (B) Bryophytes
  - (C) Gymnosperms
  - (D) Angiosperms
10. Parasexuality occurs in which of the following ?
  - (A) Bacteria
  - (B) Algae
  - (C) Fungi
  - (D) Bryophytes



11. Which of the following genera includes gram-negative bacteria ?
- (A) *Actinomyces*  
 (B) *Bacillus*  
 (C) *Clostridium*  
 (D) *Rhizobium*
12. *Equisetum* is commonly called :
- (A) Club moss  
 (B) Horse tail  
 (C) Quill wort  
 (D) Stone wort
13. The wood of *Pinus* is :
- (A) Manoxylic and heteroxylous  
 (B) Manoxylic and homoxylous  
 (C) Pycnoxylic and heteroxylous  
 (D) Pycnoxylic and homoxylous
14. The gametophytes of *Marchantia* are :
- (A) Unisexual  
 (B) Bisexual  
 (C) Monoecious  
 (D) All of the above
15. Species of which of the following genera exhibit heterospory ?
- (A) *Equisetum*  
 (B) *Selaginella*  
 (C) *Psilotum*  
 (D) *Dryopteris*
16. Xylem and phloem like structures present in some mosses are respectively called :
- (A) Steroids and transfusion tissue  
 (B) Hydroids and leptoids  
 (C) Leptoids and sieve cells  
 (D) Tracheids and hydroids
17. Which one of the following statements about *Cycas* is *not* correct ?
- (A) Roots contain some blue green algae  
 (B) Female cone is not well organised  
 (C) Leaves have circinate vernation  
 (D) Xylem is mainly composed of vessels
18. The sperms in bryophytes are :
- (A) Uniflagellate  
 (B) Biflagellate  
 (C) Multiflagellate  
 (D) Aflagellate
19. Classifying organisms in branching patterns of evolution is the basis of :
- (A) Phenetics  
 (B) Taxometrics  
 (C) Numerical taxonomy  
 (D) Cladistics
20. A plant or an animal specimen used by an author for original description and publication is called :
- (A) Lectotype  
 (B) Holotype  
 (C) Syntype  
 (D) Neotype
21. 'Duramen' refers to the :
- (A) Sap wood  
 (B) Porous wood  
 (C) Non-porous wood  
 (D) Heart wood

22. The chief merit of Bentham and Hooker's system of classification is that :
- It is a natural system of classification of all groups of plants
  - It is a system of classification based on an evolutionary concept
  - It also takes into account the phylogenetic aspect of plants
  - Description of genera and species is based on study of actual specimens
23. The oldest layer of secondary phloem in a five-year old stem lies :
- Just inner to cambium
  - Just outside the cambium
  - Just inner to pericycle
  - Just outside the primary xylem
24. Dichotomous keys for identification of plants were first introduced by :
- C. Linnaeus in 1753
  - M. Adanson in 1763
  - J. P. Lamarck in 1778
  - A. P. de Candolle in 1778
25. Which of the following chemical ions plays an important role in the growth of pollen tube ?
- Chlorine
  - Calcium
  - Magnesium
  - Sulphate
26. Pollination by ants is formally called as :
- Cantharophily
  - Cheiropterophily
  - Myrmecophily
  - Psychophily
27. The classification of Carl Linnaeus represents :
- An artificial system of classification
  - Natural system of classification
  - Evolutionary system of classification
  - Cladistic system of classification
28. 'Quiescent Centre' of the root apical meristem is :
- Totally devoid of divisions
  - Relatively inactive in divisions
  - Very active in divisions
  - None of the above
29. The Angiosperm Phylogeny Group (APG) IV system of flowering plant classification was published in :
- 2009
  - 2016
  - 2003
  - 1998
30. Tunica-carpus type of cell organization occurs in the anatomy of :
- Roots
  - Shoots
  - Leaves
  - Flowers
31. The nature of the secondary nucleus of an angiosperm after fertilization is :
- x
  - 2x
  - 3x
  - 4x



32. *Polygonum* type of embryo sac is :
- 7-celled and 7-nucleate
  - 8-celled and 7-nucleate
  - 7-celled and 8-nucleate
  - 8-celled and 8-nucleate
33. Choose the one with *correct* taxonomic hierarchical sequence :
- Species—Series—Section—Genus—Family—Order
  - Species—Genus—Series—Section—Family—Order
  - Series—Section—Species—Genus—Order—Family
  - Species—Genus—Family—Series—Section—Order
34. That water, *not* carbon dioxide, is split in photosynthesis was first proposed by :
- J. Priestley
  - F. F. Blackman
  - C. B. van Niel
  - Van Helmont
35. The term 'taxon' in the following refers to :
- Family
  - Genus
  - Species
  - Oryza sativa*
36. Which of the following is a micronutrient ?
- Potassium
  - Magnesium
  - Zinc
  - Calcium
37. Which one of the following is a connecting link between Glycolysis and Krebs's cycle ?
- Succinic acid
  - Fumaric acid
  - Acetyl Co A
  - PGA
38. The first stable product formed in  $C_4$  carbon-fixation pathway is :
- Phosphoglycerate
  - Oxaloacetate
  - Transaldolase
  - Aspartate
39. The reactions of TCA cycle in eukaryotic cells occur within:
- Grana
  - Ribosomes
  - Mitochondria
  - Endoplasmic reticulum
40. In PSI, the reduced ferredoxin donates electrons to :
- $NADPH_2$
  - NADP
  - NADPH
  - NAD
41. The formation of ATP by direct transfer of a phosphoryl group from phosphoenol pyruvate is an example of :
- Oxidative phosphorylation
  - Substrate-level phosphorylation
  - Photo-respiration
  - None of the above

42. The modified Mendelian ratio 9:7 in  $F_2$  progeny signifies the presence of :
- Complementary genes
  - Duplicate genes
  - Epistatic genes
  - None of the above
43. Which of the following plant hormones was isolated by Kogl and his associates from human urine ?
- Gibberellin
  - Ethylene
  - Auxin
  - Abscissic acid
44. Which of the following statements is *not* correct ?
- Alleles occupy the same locus
  - The 2<sup>nd</sup> law of Mendel is the "Principle of Independent Assortment"
  - Chemicals which cause point mutations are called mutagens
  - Linkage and Crossing over were clarified by the studies of Gregor Mendel
45. In a trisomic individual, the number of chromosomes is :
- $2n-1$
  - $2n+2$
  - $2n+3$
  - $2n+1$
46. Nucleoli are the sites of formation of :
- Ribosomal RNA
  - Thylakoids
  - Cristae
  - None of the above
47. Which of the following is *not* a characteristic of t-RNA ?
- It contains an anticodon
  - It contains a codon
  - It can become attached covalently to an amino acid
  - It interacts with mRNA during transcription
48. In *lac* operon, lactose acts as :
- Inducer
  - Co-inducer
  - Repressor
  - Co-repressor
49. A couple has three daughters. The probability of their fourth child also to be a daughter is :
- 100 %
  - 75 %
  - 50 %
  - 25 %
50. Which of the following ecosystems has the lowest primary productivity per  $m^2$  ?
- Salt marsh
  - Grassland
  - Open ocean
  - Tropical rain forest
51. The microbes that bring about conversion of ammonium into nitrate during the process of nitrification are :
- Chemo-heterotrophic
  - Chemo-autotrophic
  - Photo-autotrophic
  - Photo-heterotrophic



52. The average thickness of plasma membrane is :
- (A) 75 A°  
 (B) 125 A°  
 (C) 25 A°  
 (D) 35 A°
53. The sequence of energy flow through a food chain is:
- (A) Primary consumers-Producers-Higher order consumers  
 (B) Producers- Higher order consumers-Primary consumers  
 (C) Higher order consumers-Primary consumers-Producers  
 (D) Producers-Primary consumers-Higher order consumers
54. Which of the following types of DNA has left-handed helix ?
- (A) A-type  
 (B) B-type  
 (C) C-type  
 (D) Z-type
55. Plant parts useful for extraction of opium from *Papaver somniferum* are :
- (A) Young seedlings  
 (B) Old leaves  
 (C) Dried flowers  
 (D) Unripe fruits (seed capsules)
56. Saffron of commerce is obtained from which part of *Crocus sativus* ?
- (A) Sepals  
 (B) Petals  
 (C) Stigmas  
 (D) Anthers
57. One of the chief characters of xerophytes is the abundance of:
- (A) Parenchyma  
 (B) Aerenchyma  
 (C) Sclerenchyma  
 (D) Food materials
58. Species of which of the following genera yield cotton ?
- (A) *Gossypium*  
 (B) *Triticum*  
 (C) *Brassica*  
 (D) *Oryza*
59. How many genetically different types of gametes will be produced by a heterozygous plant with the genotype TTBbRr ?
- (A) Two  
 (B) Four  
 (C) Six  
 (D) Eight
60. *Brassica campestris* is :
- (A) A fibre plant  
 (B) A timber plant  
 (C) An oil plant  
 (D) A spice plant

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1. Hopanoids are found in:
  - (A) Viruses
  - (B) Archaea
  - (C) Bacteria
  - (D) Both (B) and (C)
2. The flexible spiral-shaped bacteria with unique internal flagellar arrangements are called as:
  - (A) Pleiomorphic
  - (B) Spirilla
  - (C) Spirochetes
  - (D) Both (B) and (C)
3. Reverse transcriptase in Retroviruses is an:
  - (A) RNA-dependent DNA Polymerase
  - (B) DNA-dependent DNA Polymerase
  - (C) RNA-dependent RNA Polymerase
  - (D) DNA-dependent RNA Polymerase
4. Endospore formation in bacteria mainly represents:
  - (A) Reproductive strategy
  - (B) Survival strategy
  - (C) Multiplication strategy
  - (D) Both (A) and (B)
5. The two water insoluble materials in fungal cell wall include:
  - (A) Alpha-glucans and Beta-glucans
  - (B) Alpha-glucans and chitin
  - (C) Beta-glucans and chitin
  - (D) All of the above
6. Aplanospores are characteristic of:
  - (A) Zygomycetes
  - (B) Ascomycetes
  - (C) Basidiomycetes
  - (D) Both (A) and (B)
7. *Venturia cerasi* causes scab in:
  - (A) Apple
  - (B) Cherry
  - (C) Pear
  - (D) Willow
8. Lichens growing on the bark of tree trunks are called as:
  - (A) Saxicolous
  - (B) Terricolous
  - (C) Corticolous
  - (D) Lignicolous
9. Flagella are absent in:
  - (A) Bacillariophyceae
  - (B) Dinophyceae
  - (C) Phaeophyceae
  - (D) Rhodophyceae
10. With reference to range of thallus structure, choose the correct match:
 

<u>Column-I</u>	<u>Column-II</u>
i. Unbranched	a. <i>Cladophora</i>
ii. Branched	b. <i>Ulva</i>
iii. Dendroid	c. <i>Zygnema</i>
iv. Parenchymatous	d. <i>Ecballocystopsis</i>
(A) i-d, ii-a, iii-b, iv-c	
(B) i-d, ii-c, iii-b, iv-a	
(C) i-a, ii-d, iii-b, iv-c	
(D) i-c, ii-a, iii-d, iv-b	
11. A single pyrenoid occurs in:
  - (A) *Oedogonium*
  - (B) *Chlamydomonas*
  - (C) *Nostoc*
  - (D) Both (B) and (C)

12. Agar is derived from:
- Gracilaria*
  - Gonium*
  - Gloeocapsa*
  - All of the above
13. The type of embryogeny found in bryophytes is:
- Endoscopic
  - Exoscopic
  - Entropic
  - Both (A) and (C)
14. Which one of the following statements is incorrect for *Marchantia*?
- The scales are arranged in a single row
  - The rhizoids are of two kinds
  - The upper surface of the thallus possesses air pores
  - The gametophores are unisexual
15. The protonema stage in *Funaria* is:
- Non-filamentous
  - Non-vegetative
  - Transitory
  - All of the above
16. In bryophytes, apospory involves development of a:
- Sporophyte from the sporophyte without meiosis
  - Sporophyte from the gametophyte without union of male and female gametes
  - Gametophyte from the gametophyte without union of gametes
  - None of the above
17. Which one of the following is correct for *Rhynia*?
- Adventitious branches are present
  - The sporangia are axillary
  - Rhizoids are present
  - Both (A) and (B)
18. Siphonostele is found in:
- Selaginella*
  - Rhynia*
  - Equisetum*
  - Both (B) and (C)
19. In Christenhusz *et al.* (2011) classification, extant gymnosperms are divided into four:
- Phyla
  - Subphyla
  - Classes
  - Subclasses
20. Gymnosperms lack:
- Herbaceous habit
  - Circinate venation
  - Microphyllous leaves
  - All of the above
21. Which one of the following statements is incorrect for the Bentham and Hooker system of classification:
- It was published in *Species Plantarum*
  - It deals with phanerogams
  - Gymnosperms were placed between dicots and monocots
  - All of the above

22. Classification based on a single or few easily observable characters without character weighing is:
- (A) Artificial system of classification
  - (B) Phenetic system of classification
  - (C) Evolutionary system of classification
  - (D) Phyletic system of classification
23. Phenograms are the:
- (A) Dendrograms showing evolutionary relationship between taxa
  - (B) Dendrograms showing overall similarity relationship between taxa
  - (C) Dendrograms showing comparative relationship between taxa
  - (D) Both (B) and (C)
24. APG classification deals with:
- (A) Archaeobacteria
  - (B) Algae
  - (C) Angiosperms
  - (D) All of the above
25. Nomenclature refers to:
- (A) Identifying a taxon by its scientific name
  - (B) Rules for scientific naming of a taxon
  - (C) Classifying a taxon
  - (D) Diagnosis of a taxon
26. As per the Principle of Priority, the valid scientific name is the:
- (A) Oldest name
  - (B) Most recent name
  - (C) Earliest correct name
  - (D) Most recent correct name
27. Dichotomous keys are a type of:
- (A) Polyclave keys
  - (B) Punched card keys
  - (C) Multi access keys
  - (D) Sequential keys
28. ICN stands for:
- (A) International Code of Nomenclature for algae and plants
  - (B) International Code of Nomenclature for plants and fungi
  - (C) International Code of Nomenclature for algae, fungi, and plants
  - (D) International Code of Nomenclature for algae, plants, and fungi
29. In grasses, intercalary meristems are located at the:
- (A) Apex of the leaves
  - (B) Margin of the leaves
  - (C) Middle of the internodes
  - (D) Base of the internodes
30. In orchid aerial roots, the velamen is basically:
- (A) Hypodermis
  - (B) Uniseriate epidermis
  - (C) Multiseriate epidermis
  - (D) None of the above
31. The cambium arising within bundles of primary vascular tissue of stem is called as:
- (A) Procambium
  - (B) Fascicular cambium
  - (C) Interfascicular cambium
  - (D) Both (B) and (C)

32. Vascular bundles in stem of Sunflower are:
- Conjoint, bicollateral, open and endarch
  - Conjoint, collateral, open and mesarch
  - Conjoint, collateral, open and endarch
  - None of the above
33. In which pathway, casparian strip obstructs the movement of water in plants ?
- Symplast at hypodermis
  - Symplast at endodermis
  - Apoplast at endodermis
  - Both (B) and (C)
34. Die-back of citrus is caused by the deficiency of:
- Boron
  - Copper
  - Iron
  - Zinc
35. Which of the following is true about Vacuolar H<sup>+</sup> -ATPases:
- Differ from plasma membrane H<sup>+</sup> -ATPases structurally
  - Differ from plasma membrane H<sup>+</sup> -ATPases functionally
  - Are specifically inhibited by the antibiotic bafilomycin
  - All of the above
36. In photosystem second (PS II), the first acceptor of electron is:
- Plastocyanin
  - Pheophytin
  - Plastoquinone
  - Cytochrome b<sub>6</sub>f complex
37. Which of the following is not true about TCA cycle ?
- Acts as a metabolic sink which plays a central role in intermediary metabolism
  - CO<sub>2</sub> is released during the formation of succinic acid from succinyl-CoA
  - Three regulatory enzymes include citrate synthase, isocitrate dehydrogenase and \* - Ketoglutarate dehydrogenase
  - Succinate dehydrogenase contains FAD as a cofactor
38. Match the related features of the following columns and choose the correct pairing below:
- | <u>Column-I</u>         | <u>Column-II</u>      |
|-------------------------|-----------------------|
| i. Sugarcane            | a. <i>Anabaena</i>    |
| ii. <i>Gunnera</i>      | b. <i>Frankia</i>     |
| iii. <i>Azolla</i>      | c. <i>Nostoc</i>      |
| iv. Actinorhizal plants | d. <i>Acetobacter</i> |
- i-b, ii-c, iii-d, iv-a
  - i-d, ii-c, iii-a, iv-b
  - i-d, ii-b, iii-a, iv-c
  - i-a, ii-b, iii-c, iv-d
39. The physiologically active form of phytochrome is:
- Pr
  - Pfr
  - Both (A) and (B)
  - None of the above
40. Which of the following statement is incorrect about Indole-3-acetic acid (IAA) ?
- It is the main natural auxin.
  - It is synthesized in meristems and young dividing tissues.
  - Polar transport of IAA requires energy and is dependent of gravity.
  - Both (A) and (C)

41. Recessive lethal alleles are lethal when present in:
- (A) Homozygous condition
  - (B) Heterozygous condition
  - (C) Both (A) and (B)
  - (D) None of the above
42. A heterozygous pea plant that is tall with yellow seeds, TtYy, is allowed to self-fertilize. What is the probability of off-springs with tall and yellow seeds, tall and green seeds, and dwarf and yellow seeds?
- (A) 74%
  - (B) 65%
  - (C) 94%
  - (D) 50%
43. Inversions spanning the centromere are known as:
- (A) Pericentric
  - (B) Paracentric
  - (C) Acentric
  - (D) Metacentric
44. Bar eye phenotype in *Drosophila* occurs due to:
- (A) Deletion of 16A locus of the X-chromosome
  - (B) Duplication of 16A locus of the X-chromosome
  - (C) Translocation of 16A locus of the X-chromosome
  - (D) Deletion of 16A locus of the Y-chromosome
45. The “distribution and shipping department of cell’s chemical products” is:
- (A) Endoplasmic reticulum
  - (B) Lysosomes
  - (C) Peroxisomes
  - (D) Golgi apparatus
46. Choose the correct combination:
- (A) Bouquet stage: Zygotene
  - (B) Spirene stage: Anaphase
  - (C) Congression: Metaphase
  - (D) Synzetic knot: Diplotene
47. Nuclear localization signal present on the proteins transported to nucleus is:
- (A) Lysine rich identified by Exportin
  - (B) Leucine rich identified by Importin
  - (C) Lysine rich identified by Importin
  - (D) Leucine rich identified by Exportin
48. Tryptophan operon in *E. coli* is an example of:
- (A) Positively controlled inducible operon
  - (B) Positively controlled repressible operon
  - (C) Negatively controlled repressible operon
  - (D) None of the above
49. Pollination by ants is known as:
- (A) Melittophily
  - (B) Malacophily
  - (C) Myrmecophily
  - (D) Myophily
50. The ovules in which micropyle-chalaza line is horizontal and placed at right angle to the line of funicle are known as:
- (A) Anatropous
  - (B) Orthotropous
  - (C) Hemitropous
  - (D) Amphitropous

51. *Polygonum*-type of embryo sac consists of:
- 7 cells and 7 nuclei
  - 8 cells and 7 nuclei
  - 7 cells and 8 nuclei
  - 8 cells and 8 nuclei
52. Embryogenesis in *Citrus* is an example of:
- Simple polyembryony
  - Adventive polyembryony
  - Cleavage polyembryony
  - None of the above
53. Raunkiaer's life forms are recognised on the basis of:
- Minimum height of the plants
  - Canopy dominance of the plants
  - Position of perennating buds on plants
  - Life span of the plant
54. An ecotone has:
- Lower number of species as compared to neighboring communities
  - Higher number of species as compared to neighboring communities
  - Almost equal number of species as occurring in neighboring communities
  - Both (B) and (C)
55. The type of ecological succession in which the existing community is replaced by external factors is referred to as:
- Secondary succession
  - Autogenic succession
  - Autotrophic succession
  - Allogenic succession
56. Kashmir falls in the Indian biogeographic province of:
- Trans-Himalaya
  - West Himalaya
  - Western Himalaya
  - North-West Himalaya
57. *Crocus sativus* belongs to the family:
- Ixiolioraceae
  - Iridaceae
  - Crocusaceae
  - Cruciferae
58. Cotton is an example of:
- Bast fibres
  - Structural fibres
  - Surface fibres
  - Xylary fibres
59. Which part of *Saussurea costus* plant is medicinally most important?
- Root
  - Leaves
  - Flowers
  - Fruits
60. Which of the following is not related with *Papaver somniferum*?
- Morphine
  - Codeine
  - Opine
  - Noscapine

## ROUGH WORK

Sr. No. ....0105.....

# ENTRANCE TEST-2022

## SCHOOL OF BIOLOGICAL SCIENCES

### BOTANY

Question Booklet Series **A**

Total Questions : 60

Time Allowed : 70 Minutes

Roll No. :

#### Instructions for Candidates :

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14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. Choose the most appropriate response among the following :
  - (A) The genetic material of viruses is enclosed in a protein coat called capsid
  - (B) All viruses perform both lytic and lysogenic cycles
  - (C) Both (A) and (B) are correct
  - (D) Only (A) is correct and (B) is incorrect
2. The pigment phycoerythrin is characteristic of :
  - (A) Green algae
  - (B) Red algae
  - (C) Brown algae
  - (D) Blue green algae
3. The primary advantage of Bentham and Hooker system of classification is :
  - (A) The classification is exclusively based on evolutionary relationships
  - (B) The classification is mainly based on phytochemistry and anatomical features
  - (C) The classification is based on similarities at genetic/molecular level
  - (D) The classification is based on the actual examination of the specimens
4. Choose the most appropriate match among the following :
  - (A) *Rhizopus stolonifer*–Zygomycetes & *Venturia inaequalis* – Dothideomycetes
  - (B) *Rhizopus stolonifer* – Dothideomycetes & *Venturia inaequalis* – Zygomycetes
  - (C) *Rhizopus stolonifer* – Zygomycetes & *Venturia inaequalis* –Deuteromycetes
  - (D) *Rhizopus stolonifer* – Basidiomycetes & *Venturia inaequalis*–Ascomycetes
5. The non motile, greatly thickened asexual spore in algae are called :
  - (A) Ascospores
  - (B) Zoospores
  - (C) Hypnospores
  - (D) Aplanospores
6. Pick the pair that is incorrectly matched :
  - (A) Cycas – Corraloid roots
  - (B) Pinus – Winged pollen grains
  - (C) Cycas – Winged pollen grains
  - (D) Pinus – Mycorrhizal Association
7. A very thick walled non flagellated structure which is produced by fusion of specialized budding structures from mycelia of homothallic or heterothallic mating types is called :
  - (A) Basidiospore
  - (B) Zygospore
  - (C) Ascospore
  - (D) All the above
8. Which of the following is not correctly matched ?
  - (A) Chlamydomonas – Unicellular and flagellate
  - (B) Ectocarpus – Profusely branched and uniseriate filaments
  - (C) Oedogonium – Filamentous, multicellular and unbranched
  - (D) Vaucheria – Unicellular, colonial and flagellate
9. Identify the incorrect statement about binomial system of nomenclature :
  - (A) Binomial nomenclature has two parts namely genetic epithet and specific epithet
  - (B) Both genetic and specific names should be Latinized
  - (C) The generic and specific names should start with a small and capital letter respectively
  - (D) The generic and specific names should start with a capital and small letter respectively

10. Among the following, which is not the characteristic feature of Bryophytes ?
- Heteromorphic alternation of generation
  - Sporophyte is dependent on gametophyte
  - Water is essential for fertilization
  - Presence of protosteles
11. The international day for biodiversity is celebrated every year on :
- March 21
  - April 15
  - May 22
  - June 10
12. In which of the following activities, the moss peristome takes part in ?
- Spore dispersal
  - Photosynthesis
  - Protection of male and female gametes
  - Fertilization of male and female gametes
13. In sexually reproducing angiosperms, choose the correct statement :
- Interspecific incompatibility prevents cross pollination
  - Intraspecific incompatibility promotes cross pollination
  - Both (A) and (B) are true
  - Neither (A) nor (B) is true
14. The substitute for newly collected specimen when the original type is missing in a herbarium is called :
- Holotype
  - Neotype
  - Lectotype
  - Isotype
15. The binary fission in bacteria involves all except :
- Cell elongation
  - Cytokinesis
  - DNA duplication
  - Spindle formation
16. Identify the mismatch with regard to anatomical features :
- Root apex – Tunica-Corpus Theory
  - Vessels – bordered pits
  - Endodermis – casparian strips
  - Pericycle – lateral roots
17. The characteristic feature of endosperm of cycas is :
- Diploid and produced after fertilization
  - Diploid but produced before fertilization
  - Triploid and produced after fertilization
  - Haploid and produced before fertilization
18. The document that contains all the information related to a particular genus or family is termed as :
- Herbarium
  - Monograph
  - Manual
  - Holotype
19. A haplontic and diplontic life cycle is found in following algal types :
- Chlamydomonas and Ectocarpus respectively
  - Ectocarpus and Chlamydomonas respectively
  - Chlamydomonas and Oedogonium respectively
  - Ectocarpus and Cladophora respectively
20. In tetradynamous condition, the stamens are :
- 2 short and 2 long
  - 4 short and 2 long
  - 4 long and 4 short
  - 4 long and 2 short

21. The fern sporophyte produces genetically unique spores by meiosis. What happens to the spore after dispersal ?
- It germinates to become a prothallus
  - It fuses with another spore to form a zygote
  - It develops into a thick walled structure called zygospore
  - It produces a sporangiophore
22. In preparation of a herbarium, identify the correct sequence :
- Labeling – Pressing – Collection – Drying – Poisoning – Mounting
  - Collection – Pressing – Drying – Poisoning – Mounting – Labeling
  - Collection – Pressing – Drying – Poisoning – Labeling – Mounting
  - Collection – Labeling – Pressing – Mounting – Poisoning – Drying
23. The antherozoids of *Funaria* are :
- Non-flagellate
  - Multiflagellate
  - Uniflagellate
  - Biflagellate
24. Choose the incorrect match among the following :
- Gibberellic acid – Callus differentiation
  - Abscissic acid – Stomatal closure
  - Auxin – Apical dominance
  - Cytokinin – Cell division
25. In bacteria, which of the following can be used as a measure to construct a linkage map of Hfr chromosome ?
- Size of F factor in the donor cell
  - Time of transfer during conjugation
  - Presence or absence of nutrients in the medium
  - All the above
26. Find the odd one out :
- Late blight of potato – *Phytophthora infestans*
  - Basidium – *Agaricus*
  - Ascospore – *Venturia inaequalis*
  - Paddy blast – *Xanthomonas oryzae*
27. A botanical garden represents collection of :
- Endemic living species only
  - Exotic living species only
  - Both endemic and exotic living species
  - Herbarium specimens of all available plants
28. In case of dicot stem, the vascular bundles are :
- Open, conjoint, endarch
  - Closed, conjoint, endarch
  - Closed, conjoint, exarch
  - Open, conjoint, exarch
29. Which of the following statements is true about the Tobacco Mosaic Virus ?
- Helical, DNA virus, Rod shaped
  - Helical, RNA virus, Rod shaped
  - Linear, RNA virus, Spherical
  - Linear, DNA virus, Cuboidal
30. In Pteridophytes, the spore bearing leaf like structures are called as :
- Pteridophylls
  - Sporangia
  - Sporophyte
  - Sporophylls
31. What is true about a monocot leaf ?
- Reticulate venation
  - Absence of bulliform cells in epidermis
  - Mesophyll not differentiated into palisade and spongy tissue
  - Well differentiated mesophyll

32. In a flower structure, the syncarpous condition means :
- Fused carpels
  - Fused Corolla
  - Fused sepals
  - All the above
33. Find the odd one out :
- Cleistogamy – Self pollination
  - Xenogamy – Cross pollination
  - Entomophily – Pollination by insects
  - Anemophily – Pollination by birds
34. Which among the following is an example of natural fiber ?
- Cotton
  - Silk
  - Wool
  - All the above
35. In which of the following fungal groups have motile cells with two laterally inserted flagella (tinsel and whiplash type) ?
- Zygomycetes
  - Deuteromycetes
  - Oomycetes
  - Chytridiomycetes
36. In angiosperms (i) Endosperm formation is the result of triple fusion (ii) Seedless fruits are formed if fertilization fails to take place.
- Both (i) and (ii) statements are false
  - Both (i) and (ii) statements are true
  - Statement (i) only is true
  - Statement (ii) only is true
37. According to fluid mosaic model of cell membranes, which of the following is true about phospholipids ?
- The hydrophobic tails face the interior whereas hydrophilic heads face the exterior side of the membrane
  - Phospholipids in the bilayer can move laterally along the plane of the membrane
  - Both (A) and (B) are correct
  - Only (A) is true but (B) is false
38. In which of the following aspects are the components of the ecosystem seen to function as a unit ?
- Productivity
  - Decomposition
  - Energy flow
  - All the above
39. The following arrangement is found in a bicollateral vascular bundle :
- Xylem being sandwiched between phloem
  - Phloem being sandwiched between xylem
  - Transverse splitting of vascular bundle
  - Longitudinal splitting of vascular bundle
40. Identify the incorrect one :
- Micronutrient – Calcium
  - Micronutrient – Iron
  - Macronutrient – Nitrogen
  - Macronutrient – Potassium
41. In which of the following groups would you place a plant which produces spores and embryos but lacks seed and vascular tissue ?
- Algae
  - Bryophyta
  - Pteridophyta
  - Gymnosperms

42. The DNA has following properties except :
- Serves as the template for the synthesis of mRNA in 3' to 5' direction by DNA polymerase
  - Serves as the genetic material for transfer of traits from one generation to the next
  - Remains constant despite changes in environmental conditions
  - In the double helical structure, adenine base pairs with thymine and guanine base pairs with cytosine
43. A population is characterized by the following factors except :
- Mortality
  - Natality
  - Stratification
  - Sex ratio
44. The first product of C3 and C4 cycle is :
- OAA and 3-PGA respectively
  - 3-PGA, OAA respectively
  - PGAL, RuBP respectively
  - OAA and PGAL respectively
45. What is not true about a taxonomic key ?
- A taxonomic key is used for identification of plants
  - A taxonomic key at a time shows acceptance of one character and rejection of another character
  - Each statement in the key is called lead
  - A taxonomic key will not help us in identifying unknown species/plant
46. In humans the gene for eye color is present on 'X' chromosome. Brown eye color (B) is dominant to blue eye color (b). A female with brown eye color (BB) marries a man with blue eye color. What is the expected phenotype of their male and female children ?
- Male has blue eyes whereas female child has brown eyes
  - Male has brown eyes whereas female has blue eyes
  - Both male and female have brown eyes
  - Both male and female have blue eyes
47. Identify the correct statement :
- In C3 plants Calvin Pathway occurs in Mesophyll cells
  - In C4 plants Calvin Pathway occurs in Bundle Sheath Cells
  - Both (A) and (B) are true
  - Neither (A) nor (B)
48. The process of osmosis involves :
- Movement of solute through a semi-permeable membrane
  - Movement of solvent through a semi-permeable membrane
  - Both (A) and (B)
  - Neither (A) nor (B)
49. Which of the following is a correct interpretation of law of independent assortment ?
- The dominant and recessive factors of a trait enter into separate gametes during meiosis
  - For multiple traits under consideration, each segregate independently of one another
  - For multiple traits under consideration, the expression of one trait is masked by the other trait
  - All the above

50. The following enzyme plays important role in opening of DNA replication origins and formation of negative supercoils which aids in unwinding of DNA :
- DNA Polymerase-III
  - DNA gyrase
  - Primase
  - Klenow polymerase
51. The net gain of ATP molecules in Glycolysis is :
- 2ATPs
  - 3 ATPs
  - 6 ATPs
  - 8 ATPs
52. During protein synthesis in prokaryotes, which component is the last to join the initiation complex ?
- Mature mRNA molecule
  - The small ribosomal subunit
  - The large ribosomal subunit
  - The initiator tRNA carrying methionine amino acid
53. It has been established that the pyramid of energy is always upright, because :
- The energy conversion efficiency of herbivores is better than carnivores
  - The energy conversion efficiency of carnivores is better than herbivores
  - Producers are less in number but generate more biomass
  - Consumers are more in number but generate less biomass
54. To fix one molecule of nitrogen :
- 6 ATP molecules are required
  - 12 ATP molecules are required
  - 16 ATP molecules are required
  - 24 ATP molecules are required
55. In your opinion which human activities have adverse effect on carbon cycle in the atmosphere ?
- Overpopulation & Habitat destruction
  - Aforestration & Invasion
  - Burning of fossil fuels & deforestation
  - All the above
56. The enzyme pyruvate dehydrogenase is used in converting :
- Pyruvic acid to Lactic acid
  - Pyruvic acid to acetyl-CoA
  - Pyruvate to glucose
  - Glucose to Pyruvate
57. Identify the correct pair :
- Trisomy (44+XXY) – Klinefelter syndrome
  - Monosomy (44+X0) – Turner syndrome
  - Duplication – Cry-du-cat syndrome
  - Both (A) and (B)
58. The major phyto-chemicals in saffron (*Crocus sativa*) are :
- Crocin, aniline & atropine
  - Picrocrocin, Saffranal & Hyocyanine
  - Crocin, picrocrocin & saffranal
  - Crocin, hyocymine & atropine
59. In a monohybrid cross, red flower color (RR) is dominant over white flower color (rr). What will be the phenotypic ratio from a cross between Rr × rr parents ?
- 50% red and 50% white
  - 50% red and 25% white
  - 100 % red
  - 100% white
60. The genes responsible for dwarfness in wheat and rice are :
- Norin-10 & Dee-geo-wo-gene respectively
  - Dee-geo-wo-gene & Norin-10 respectively
  - Norin-10 & Orizin-10 respectively
  - De-geo-wo-gene and Orizin-10 respectively

Sr. No. ....

# ENTRANCE TEST-2021

## SCHOOL OF BIOLOGICAL SCIENCES

### BOTANY

Total Questions : 60

Time Allowed : 70 Minutes

Question Booklet Series **A**

Roll No. : 

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1. A seed can be conceived to have evolved from a specialized megasporangium via:
  - (A) Reduction in the number of megaspores to one
  - (B) Sinking of megaspore towards the basal part of megasporangium
  - (C) Displacement of the vascular strand and its division into two branches
  - (D) All the above
2. Which of the following is true for the gemmae in *Marchantia* ?
  - (A) Chlorophyllous structures
  - (B) Have two or more lateral notches
  - (C) Born on one celled stalk
  - (D) All of the above
3. In photosynthesis, the first step is:
  - (A) Photolysis of water
  - (B) Production of NADPH<sub>2</sub>
  - (C) Photoexcitation of chlorophyll
  - (D) Synthesis of ATP
4. The precursor for abscissic acid (ABA) is:
  - (A) Zeatin
  - (B) Lutein
  - (C) Violaxanthin
  - (D) Mevalonic acid
5. What is the most precise function of the filiform apparatus?
  - (A) Guide the entry of pollen tube
  - (B) Recognize the suitable pollen at the stigma
  - (C) Produce nectar
  - (D) Stimulate division of generative cell
6. Functional megaspore in an angiosperm develops into:
  - (A) Endosperm
  - (B) Embryo
  - (C) Embryo-sac
  - (D) Ovule
7. When the activity of one gene is suppressed by the activity of a non-allelic gene, it is known as:
  - (A) Pseudo-dominance
  - (B) Hypostasis
  - (C) Epistasis
  - (D) Incomplete dominance
8. Which term represents a pair of contrasting characters?
  - (A) Heterozygous
  - (B) Homozygous
  - (C) Codominant genes
  - (D) Allelomorphs
9. In the life cycle of a pine tree, the ovules are found on the:
  - (A) Needlelike leaves
  - (B) Seed cones
  - (C) Pollen cones
  - (D) Roots, stems and leaves
10. The influence of parent material is:
  - (A) More evident on soils from glaciated region than comparable un-glaciated regions
  - (B) More evident on soils from un-glaciated region than comparable glaciated regions
  - (C) Equally evident on soils from both glaciated and un-glaciated regions
  - (D) None of the above
11. Histones, the very important constituent of chromatin, represent a family of:
  - (A) Negatively charged protiens
  - (B) Positively charged protiens
  - (C) Both positively and negatively charged protiens
  - (D) Carbohydrates not protiens
12. Which of the following is true about *Nostoc* ?
  - (A) Akinetes are produced
  - (B) Heterocysts are produced
  - (C) Trichomes are embedded in mucilage
  - (D) All of the above

13. The function of a catalyst is to:
- Decrease the rate of a reaction by way of affecting the reaction equilibria
  - Increase the rate of a reaction by way of affecting the reaction equilibria
  - Decrease the rate of a reaction but not affecting the reaction equilibria
  - Increase the rate of a reaction but not affecting the reaction equilibria
14. Which of the following is not true for the palmella stage in *Chlamydomonas* ?
- It is a means of sexual reproduction
  - It is a means of asexual reproduction
  - A large number of near naked cells devoid of flagella lie inside a mucilage mass
  - The stage develops in response to unfavourable water conditions and toxic chemicals
15. Introns are segments of DNA that:
- Are expressed as genes
  - Regulate mRNA production
  - Code for long sequences of amino acids
  - Are inserted between expressed genes
16. Which of the following is not true about the Sieve cells and Sieve tube elements ?
- They are morphologically almost equivalent
  - They are alike in fundamental structure and function
  - They are quite similar in perforation pattern of their wall
  - They differ in perforation pattern of their wall
17. Which of the following Botanical Gardens is not correctly matched with its place ?
- Royal Botanical Garden - Kew
  - Pisa Botanical Garden - Italy
  - Missouri Botanical Garden - USA
  - Padua Botanical Garden - Germany
18. In the host cell, replication of RNA virus takes place in:
- Nucleus
  - Cytoplasm
  - Mitochondria
  - Centriole
19. The phase of the cell cycle immediately preceding mitosis is called:
- S phase
  - G1 phase
  - G2 phase
  - M phase
20. Protein molecules that differ in a few amino acid residues are called:
- Isoforms
  - Isotypes
  - Glycoforms
  - Polymers
21. Which of the following is mismatched ?
- Pollen grain – microgametophyte
  - Ovule – megagametophyte
  - Seed – immature sporophyte
  - Pollen tube – spores
22. Which of these are found in all viruses?
- Envelope, nucleic acid, capsid
  - DNA, RNA, proteins
  - Proteins and a nucleic acid
  - Proteins, nucleic acids, carbohydrates and lipids.
23. During bacterial conjugation, as a result of cross between  $F^+$  and  $F^-$  :
- $F^-$  becomes  $F^+$  and  $F^+$  remains  $F^+$
  - $F^-$  becomes  $F^+$  and  $F^+$  becomes  $F^-$
  - $F^+$  becomes  $F^-$  and  $F^-$  remains  $F^-$
  - $F^+$  remains  $F^+$  and  $F^-$  remains  $F^-$

24. The most conspicuous feature(s) of *Equisetum* include:
- (A) Jointed nature of stems
  - (B) Intercalary growth
  - (C) Small leaves around the nodes
  - (D) All the above
25. A low  $K_M$  value indicates:
- (A) High substrate concentration
  - (B) High product concentration
  - (C) Weak enzyme-substrate binding
  - (D) Strong enzyme-substrate binding
26. Which of the following pigments does not have oxygen in its molecule ?
- (A) Chlorophyll a
  - (B) Chlorophyll b
  - (C) Carotene
  - (D) Xanthophyll
27. In photorespiration the molecule that is oxidized in mitochondria to release  $CO_2$  is:
- (A) Glycine
  - (B) Glycolate
  - (C) Glyoxylate
  - (D) Glyceric acid
28. The enzymes of glycolysis are present in:
- (A) Outer mitochondrial membrane
  - (B) Inner mitochondrial membrane
  - (C) Mitochondrial matrix
  - (D) Cytosol
29. Which of the following is not a termination codon in the universal genetic code ?
- (A) AUG
  - (B) UGA
  - (C) UAG
  - (D) UAA
30. The pressure-flow model of phloem transport states that:
- (A) phloem sap always flows from the root to the leaves
  - (B) water flow brings sucrose from a source to a sink
  - (C) water pressure creates a flow of water
  - (D) Both (B) and (C) are correct
31. A plant requiring a dark period of at least 14 hours will:
- (A) flower if a 14-hour night is interrupted by a flash of light
  - (B) not flower if a 14-hour night is interrupted by a flash of light
  - (C) not flower if the days are 14 hours long
  - (D) Both (B) and (C) are correct
32. In which of the following processes molybdenum has an important role ?
- (A) Nitrogen fixation
  - (B) Flower induction
  - (C) Chromosome contraction
  - (D) Carbon assimilation
33. The cell at zero turgor pressure shows:
- (A) Evident plasmolysis
  - (B) Incipient plasmolysis
  - (C) Limiting plasmolysis
  - (D) Deplasmolysis
34. Which of the following concepts in APG-II received criticism, hence was abandoned in APG-III ?
- (A) Phylogentic principle and constructing taxa on the basis of monophyly
  - (B) Reduction in the number of unplaced families
  - (C) Bracketed keys
  - (D) Construction of supraordinal monophyletic clades

35. Which of the following characterize the monocot ?
- Root phloem between arms of xylem
  - Root xylem and phloem in a ring
  - Stem vascular bundles in a distinct ring
  - Stem and root vascular bundles with same arrangement
36. Between the bark and the wood in a woody stem, there is a layer of meristem called:
- Cork cambium
  - Vascular cambium
  - Procambium preceding bark
  - Apical meristem
37. Which of the following types of plants are most likely to be benefitted under increased CO<sub>2</sub> concentration in a climate change context ?
- C3 plants to be benefitted more than C4 plants
  - C4 plants to be benefitted more than C3 plants
  - Both C3 and C4 to be equally benefitted
  - Neither C3 nor C4 plants to be benefitted at all
38. A pollen grain is a:
- a haploid structure
  - a diploid structure
  - first a diploid and then a haploid structure
  - first a haploid and then a diploid structure
39. A cross between homozygous recessive and heterozygous plant is:
- Monohybrid cross
  - Dihybrid cross
  - Test cross
  - Back cross
40. When both alleles express their effect on being present together, the phenomenon is called:
- Dominance
  - Codominance
  - Pseudodominance
  - Aphidominance
41. A chromosome with sub-terminal centromere is:
- Acentric
  - Acrocentric
  - Metacentric
  - Telocentric
42. Which of the following is the principal cereal of tropics and was introduced from Old World into New World ?
- Maize
  - Potato
  - Rice
  - Tobacco
43. Opium is obtained from:
- Rauwolfia serpentina*
  - Arnebia benthamii*
  - Saussurea costus*
  - Papaver somniferum*
44. The National Botanical Research Institute is located in:
- New Delhi
  - Lucknow
  - Kolkata
  - Bengaluru
45. Which of these is mismatched?
- Polar nuclei – plumule
  - Ovary – fruit
  - Egg and sperm - zygote
  - Ovule – seed
46. The megasporocyte and the microsporocyte:
- Both produce pollen grains
  - Both divide meiotically
  - Both divide mitotically
  - Produce pollen grains and embryo sacs, respectively

47. Which of the following is a well-known greenhouse gas ?
- $N_2O$
  - NO
  - $NO_2$
  - None of the above
48. The interaction in which one species is harmed and the other is unaffected is called:
- Amensalism
  - Commensalism
  - Parasitism
  - Predation
49. Which of the following is the best example of a perfect nutrient cycle ?
- Nitrogen cycle
  - Phosphorus cycle
  - Carbon cycle
  - Sulphur cycle
50. Which of the following statements is true ?
- Grazing food chains are dominant in terrestrial ecosystems while the detritus based ones are so in aquatic ecosystems
  - Detritus based food chains are dominant in terrestrial ecosystems while the grazing ones are so in aquatic ecosystems
  - Detritus based and grazing food chains are equally dominant in terrestrial ecosystems as well as aquatic ecosystems
  - None of the above
51. Which of the following names of Taxonomic Keys is not correctly matched ?
- Yoked – Indented
  - Bracketed – Parallel
  - Serial – Numbered
  - Indented – Bracketed
52. Which of the following is not a strategy for ex-situ conservation ?
- Botanical garden
  - Biosphere reserve
  - Seed bank
  - Cryopreservation
53. Mycorrhizas are critically important for host plants under:
- Low phosphorus conditions in soil
  - High phosphorus conditions in soil
  - Aquatic environments
  - None of the above conditions
54. A specimen which is a duplicate of the holotype, collected from the same place, at the same time and by the same person is called the:
- Lectotype
  - Neotype
  - Isotype
  - Topotype
55. The technique used to make huge number of copies of a specific DNA segment is:
- Ligase chain reaction
  - Polymerase chain reaction
  - Transcription
  - Translation
56. Chipko movement was launched for the protection of:
- Wetlands
  - Forests
  - Grasslands
  - Esturies

57. The surface of the gill, on both sides, in *Agaricus* is covered with a fertile layer called:
- (A) Hymenium
  - (B) Basidium
  - (C) Cystidium
  - (D) Closteridium
58. The casparian strip affects:
- (A) how water and minerals move into the vascular cylinder
  - (B) vascular tissue composition
  - (C) how organic nutrients move into the vascular tissue
  - (D) how soil particles function
59. According to Vavilov, the origin of cultivated wheat is:
- (A) Africa
  - (B) South America
  - (C) Australia
  - (D) Ancient Mediterranean including Southwest Asia
60. The characteristic feature(s) of Rhyniophytes include:
- (A) Sporangia at the tips of branches
  - (B) Green stems
  - (C) Both (A) and (B)
  - (D) Neither (A) nor (B)

## ROUGH WORK



Sr. No. .... 1012 .....

**ENTRANCE TEST-2020**  
**SCHOOL OF BIOLOGICAL SCIENCES**  
**BOTANY**

**Total Questions : 60**  
**Time Allowed : 70 Minutes**

Question Booklet Series **D**  
Roll No. : 

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**Instructions for Candidates :**

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be '**Negative Marking**' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. Flower colour in 'dog flower' is a good example to understand the law of :
  - (A) Incomplete dominance
  - (B) Complete dominance
  - (C) Co-dominance
  - (D) Segregation
2. As per Mendel's Laws of Inheritance, the segregation of alleles is a random process, and so the chance of a gamete containing either allele is :
  - (A) 100 %
  - (B) 50 %
  - (C) 75 %
  - (D) 25 %
3. The enzyme responsible for cloning of a gene is :
  - (A) Nuclease
  - (B) Polymerase
  - (C) Ligase
  - (D) Lyase
4. What is true about plasmids ?
  - (A) They have the ability to replicate within bacterial cells independent of the control of chromosomal DNA
  - (B) Their ability to replicate within the bacterial cells is under the control of chromosomal DNA
  - (C) They do not have the ability to replicate, that is why they are used as vectors
  - (D) They do not have the ability to replicate in the host cells
5. The duplication of the centriole in a dividing cell takes place during :
  - (A) Metaphase
  - (B) Anaphase
  - (C) S phase of interphase
  - (D) None of the three
6. In genetic code, some amino acids are coded by more than one codon. This means that the genetic code is :
  - (A) Specific
  - (B) Degenerate
  - (C) Universal
  - (D) Unambiguous
7. The intracellular space of eukaryotic cells is divided into luminal and extra luminal compartments by :
  - (A) Golgi bodies
  - (B) Ribosome
  - (C) Lysosomes
  - (D) Endoplasmic reticulum
8. The 50S and 30S units of ribosome when present together in a prokaryotic cell, form :
  - (A) 80S ribosome
  - (B) 90S ribosome
  - (C) 70S ribosome
  - (D) 20S ribosome
9. In agarose gel electrophoresis, the DNA fragments are separated under an electric field, in a medium, as they are :
  - (A) Positively charged and move towards cathode
  - (B) Negatively charged and move towards anode
  - (C) Positively charged and move towards anode
  - (D) Negatively charged and move towards cathode



10. In the new world, evidence from archaeological sites show agricultural beginning in the following two areas :
- Canada and North America
  - Mexico and Central America
  - Australia and New Zealand
  - Burma and China
11. Formation of one-grained spikelet is a characteristic feature of :
- Durum Wheat
  - Emmer Wheat
  - Einkorn Wheat
  - Common Bread Wheat
12. In *Crocus sativus*, the commercially important floral organ used for flavouring is :
- Petal
  - Stamen
  - Anther
  - Stigma
13. Apple clonal rootstocks are commercially propagated by :
- Mound Layering
  - Grafting
  - Budding
  - All the three
14. Walnuts are clonally propagated by :
- Stem cuttings
  - Stem bud cuttings
  - Root cuttings
  - Patch budding
15. Late blight of potato is caused by :
- Alternaria solani*
  - Aspergillus niger*
  - Albugo candida*
  - Phytophthora infestans*
16. The technique which is an alternative to sedimentation and makes the process of separating plant cellular components, from a solution, much faster is :
- PAGE
  - SDS-PAGE
  - Centrifugation
  - Chromatography
17. In a bright field compound microscope, the light source aimed at a lens beneath the specimen is called :
- Condenser
  - Objective
  - Eye piece
  - Oracular lens
18. The unit for the amount of light that a substance, dissolved in solvent, absorbs at a specific wavelength and measured by a spectrophotometer is :
- Absorbance units
  - Nanometres
  - Gigahertz
  - Millimetres
19. *Curcuma domestica* belongs to family :
- Fabaceae
  - Rubiaceae
  - Laminaceae
  - Zingiberaceae

20. In case of clonally propagated plants, the pathogen free stock is produced by :
- (A) Root tissue culture
  - (B) Stem tissue culture
  - (C) Meristem tip culture
  - (D) Pith tissue culture
21. Viruses that infect plants, have the genetic material in the form of :
- (A) Double stranded RNA
  - (B) Double stranded DNA
  - (C) Single stranded RNA
  - (D) Circular DNA
22. Imperfect fungi reproduce by :
- (A) Oospores
  - (B) Ascospores
  - (C) Basidiospores
  - (D) Conidia
23. In *Agaricus*, reproduction takes place by :
- (A) Fusion of isogametes
  - (B) Fusion of anisogametes
  - (C) Fusion of somatic cells
  - (D) Oogamy
24. Kanamycin is obtained from :
- (A) Bacteria
  - (B) Cyanobacteria
  - (C) Fungi
  - (D) Mycorrhiza
25. The plant body is a coenocytus in :
- (A) Volvox
  - (B) Ectocarpus
  - (C) Batrachospermum
  - (D) Vaucheria
26. In algae, the gametogenic meiosis is a salient feature of :
- (A) Diplontic life cycle
  - (B) Diplohaplontic life cycle
  - (C) Haplontic life cycle
  - (D) Diplobiontic life cycle
27. In Marchantia, Gemma cups are produced on :
- (A) Male thallus
  - (B) Female thallus
  - (C) Both (A) and (B)
  - (D) Sporophyte
28. The gametophyte in *Funaria* develops from :
- (A) Oospore
  - (B) Prothallus
  - (C) Rhizome
  - (D) Protonema
29. The type of stele, consisting of central xylem with radiating ribs and phloem in small patches in between the radiating ribs of xylem, is known as :
- (A) Actinostele
  - (B) Ectophloic siphonostele
  - (C) Haplostele
  - (D) Amphiphloic siphonostele
30. Pteridophytes are also called as :
- (A) Cryptogams
  - (B) Vascular cryptogams
  - (C) Phanerogams
  - (D) Amphibians of the plant kingdom
31. Which of the following is true about *Cycas* ?
- (A) There is one male cone and one female cone on the same plant
  - (B) There is one male cone on the male plant
  - (C) There are many female cones on the female plant
  - (D) There is one female cone on the female plant

32. The smallest three dimensional volume needed to give full representation of horizontal variability of soil, is termed as :
- Pedon
  - Pedograph
  - Podsol
  - Podzol
33. Sulphur shower is a term associated with :
- Bryophytes
  - Pteridophytes
  - Gymnosperms
  - Angiosperms
34. The pyramid of biomass in an aquatic ecosystem is :
- Upright
  - Inverted
  - Spindle shaped
  - Either (A) or (B)
35. The biogeographic region of India extending from Gujarat to north of Cape Comorin, is known as :
- Malabar
  - Gangetic plains
  - Deccan
  - Nicobar
36. The pioneer species on bare rocks are :
- Fungi
  - Lichens
  - Algae
  - Bryophytes
37. A duplicate of the holotype often collected from the same plant or from the same gathering is called :
- Epitype
  - Isotype
  - Syntype
  - Neotype
38. Bentham and Hooker have classified plants in their book :
- Genera Plantarum
  - Historia Plantarum
  - Species Plantarum
  - De Plantis
39. Which of the hierarchical arrangement, in ascending order of the taxonomic categories is correct ?
- Species → Genus → Order → Family
  - Genus → Order → Family → Class
  - Species → Genus → Family → Order
  - Family → Class → Order → Division
40. The principles of International Code of Nomenclature (earlier known as ICBN) were laid down in the International Congress in 1975, held at :
- Cambridge
  - Paris
  - Vienna
  - Leningrad
41. In grasses the parts removed by the grazing of herbivore, are regenerated by the activity of :
- Apical meristem
  - Lateral meristem
  - Intercalary meristem
  - Permanent tissue
42. When the xylem and phloem, within a vascular bundle, are arranged in an alternate manner on different radii, the arrangement is called as :
- Endarch
  - Conjoint open
  - Conjoint closed
  - Radial

43. Interfascicular cambium is formed by the meristematic activity of :
- Medullary rays
  - Cortex
  - Primary xylem
  - Primary phloem
44. Which of the following statements is true about an isobilateral leaf ?
- The stomata are present only on the upper epidermis
  - The mesophyll is differentiated into palisade and spongy parenchyma
  - The stomata are present on both upper and lower epidermis
  - The stomata are present only on the lower epidermis
45. How many post meiotic mitotic divisions occur in male gametophyte of angiosperms ?
- Two
  - Three
  - One
  - Many
46. Transfer of pollen grains from anther to the stigma of another flower of the same plant, is known as :
- Chasmogamy
  - Cleistogamy
  - Geitonogamy
  - Xanogamy
47. The hallow foliar structure, protecting the shoot apex, in a monocot embryo is called as :
- Epicotyl
  - Coleoptile
  - Coleorrhiza
  - Epiblast
48. In Oranges, the pleural embryos develop from the :
- Nucellar cells
  - Synergids
  - Antipodal cells
  - Egg cell
49. Facilitated diffusion across a membrane is required, for the substances which :
- Are soluble in lipids
  - Have hydrophilic moiety
  - Require ATP to move across the membrane
  - Have hydrophobic moiety
50. What is true about  $C_4$  plants ?
- They can not tolerate high temperature
  - They have less productivity of biomass
  - They lack a process called photorespiration
  - They show response to low light intensities
51. In phloem transport, the source-sink relationship is :
- Unidirectional
  - Bidirectional
  - Multidirectional
  - Invariable
52. The cyclic flow of electrons during photo-phosphorylation results in the synthesis of :
- ATP
  - $NADPH+H^+$
  - Both (A) and (B)
  - $NADP^+$
53. The first product of the Krebs cycle is :
- Succinic acid
  - Citric acid
  - Malic acid
  - Oxaloacetic acid

54. Which plant growth regulator is used to prepare weed-free lawns ?  
(A) ABA  
(B) GA3  
(C) BAP  
(D) 2, 4-D
55. During respiration the site for the metabolic pathway, through which the electrons pass from one carrier to another, is :  
(A) Mitochondrial matrix  
(B) Inner mitochondrial membrane  
(C) Inter-membrane space  
(D) Outer mitochondrial membrane
56. For its activity, the enzyme nitrogenase requires :  
(A) Anaerobic condition  
(B) High amounts of ATP  
(C) Ferredoxin  
(D) All the three
57. The long protein chain folded upon itself like a hollow woollen ball, give rise to its :  
(A) Primary structure  
(B) Secondary structure  
(C) Tertiary structure  
(D) Quaternary structure
58. Which of the following is a nucleotide ?  
(A) Uracil  
(B) Adenine  
(C) Adenosine  
(D) Adenylic acid
59. The purpose of emasculation in hybridization is to prevent :  
(A) Cross pollination  
(B) Inbreeding depression  
(C) Mutation  
(D) Self pollination
60. Selection of plants from those obtained through self-pollination from single homozygous individual is known as :  
(A) Mass selection  
(B) Artificial selection  
(C) Natural selection  
(D) Pure Line selection

1. The type of vascular bundle in which strand of phloem is present external to xylem on the same radius side by side is known as :
  - (A) Bicollateral vascular bundle
  - (B) Collateral vascular bundle
  - (C) Concentric vascular bundle
  - (D) Radial vascular bundle
2. Chir pine is the common name of :
  - (A) *Pinus roxburghii*
  - (B) *Pinus wallichiana*
  - (C) *Pinus mungo*
  - (D) *Pinus sylvestris*
3. Girdling leaf traces are the important features of :
  - (A) *Pinus*
  - (B) *Ephedra*
  - (C) *Gnetum*
  - (D) *Cycas*
4. Arrangement of flower on the peduncle is called :
  - (A) Spadix
  - (B) Califlowery
  - (C) Anthotaxy
  - (D) Coryomb
5. The flowers in the family Liliaceae are :
  - (A) Trimerous, epigynous
  - (B) Trimerous, hypogynous
  - (C) Pentamerous, epigynous
  - (D) Pentamerous, hypogynous
6. If a pollen of a flower falls on the stigma of another flower belonging to the same plant, it is :
  - (A) Ecologically cross pollination
  - (B) Ecologically and genetically cross-pollination
  - (C) Genetically self-pollination and ecologically cross-pollination
  - (D) None of the above
7. Pollination by Snails is known as :
  - (A) Anemophily
  - (B) Ophiophily
  - (C) Malacophily
  - (D) Ornithophily
8. The inverted ovule in which funicle and micropyle lie side by side is :
  - (A) Campylotropous ovule
  - (B) Amphitropous ovule
  - (C) Orthotropous ovule
  - (D) Anatropous ovule
9. The quantity of water transpired by a unit of leaf area of leaf surface in a unit time is called :
  - (A) Transpiration Pull
  - (B) Transpiration Ratio
  - (C) Transpiration Flux
  - (D) Evapotranspiration
10. Who for the first time documented the observation of "Osmosis" ?
  - (A) J. A. Nollet
  - (B) R. J. H. Dutrochet
  - (C) Stephen Hales
  - (D) M. Traube
11. What will be the sequence of events, when the plant wilts ?
  - (A) Exosmosis, plasmolysis, temporary and permanent wilting
  - (B) Endosmosis, plasmolysis, temporary and permanent wilting
  - (C) Exosmosis, deplamolysis, plasmolysis, temporary and permanent wilting
  - (D) Exsmosis, plasmolysis, deplamolysis, temporary and permanent wilting
12. During the opening of guard cells which of the following changes occur in the cell sap of guard cells ?
  - (A) Increase in osmotic pressure but decrease in turgor pressure
  - (B) Decrease in osmotic pressure but increase in turgor pressure
  - (C) Increase in osmotic pressure but decrease in turgor pressure
  - (D) Decrease of osmotic as well as turgor pressure

13. Characteristic symptom of black necrosis of the young leaves and terminal buds, unusually stiff and brittle stems sometimes the loss of apical dominance are associated with deficiency of :
- Silicon
  - Iodine
  - Boron
  - All of these
14. During 24 hours there is a time when plants neither give carbondioxide nor oxygen. This is the time of :
- Night
  - Day light
  - Twilight
  - None of these
15. Who has proved that oxygen evolved in photosynthesis comes from water ?
- Robert Hill
  - Melvin Calvin
  - Ruben, Hassld and Kamen
  - Emerson and Arnold
16. In  $C_4$  and CAM plants the  $CO_2$  fixed by PEP carboxylase into  $C_4$  acids is released back and fed to Calvin cycle by the enzyme:
- Acid dehydrogenase
  - NAD(P) malic enzyme
  - RUBISCO
  - All of these
17. Which of the following conversions during citric acid cycle are accompanied by release of  $CO_2$  ?
- Fumarate to malate
  - Malate to oxaloacetate
  - $\alpha$ -Ketoglutarate to Succinyl-CoA
  - Succinate to fumarate
18. Enzymes are biological catalysts that enhance the rate of reaction by :
- Lowering free energy of reactants
  - Increasing free energy of products
  - Lowering activation energy of the reaction
  - All of these
19. Which of the following is true for gibberellin ?
- Gibberellins Influence floral sex determination
  - Gibberellin can substitute for cold requirement for flowering in many plants
  - Gibberellin causes stimulation of fruit set
  - All of the above
20. Neutral lipids stored in the form of lipid droplets have a protective protein coat that prevents untimely lipid mobilization. The proteins of the coat are termed as :
- Oxylipins
  - Perilipins
  - Glycolipids
  - Lipoproteins
21. Which of the following is not true about phytochromes in plants ?
- Pfr is the physiologically active form of phytochrome
  - Pr is the physiologically active form of phytochrome
  - The chromophore of phytochrome is a linear tetrapyrrole
  - All of these
22. The movement in the leaf of Touch-me-not (*Mimosa*) plant is known as :
- Photonasty
  - Seismonasty
  - Epinasty
  - Nyctinasty
23. The percentage of oxygen and carbon dioxide in the atmosphere is :
- 20.95 % and 0.004 %
  - 20.95% and 0.04%
  - 20.00% and 0.40 %
  20. 0% and 0.44 %
24. Which of the following soil is preferred for crops ?
- Sandy soil
  - Silt soil
  - Sandy loam soil
  - Loam soil

25. Plants which grow under shade are called :
- Sciophytes
  - Heliophytes
  - Psamophytes
  - Cryptophytes
26. In pond ecosystem, the pyramid of biomass is :
- Upright
  - Inverted
  - Irregular
  - Spindle shaped
27. The basic processes involved in succession is :
- Nudation  $\rightarrow$  invasion  $\rightarrow$  competition and co-action  $\rightarrow$  reaction  $\rightarrow$  stabilization
  - Invasion  $\rightarrow$  nudation  $\rightarrow$  competition and co-action  $\rightarrow$  reaction  $\rightarrow$  stabilization
  - Nudation  $\rightarrow$  stabilization  $\rightarrow$  competition and co-action  $\rightarrow$  invasion  $\rightarrow$  reaction
  - Invasion  $\rightarrow$  stabilization  $\rightarrow$  competition and co-action  $\rightarrow$  reaction  $\rightarrow$  stabilization
28. Which of the bacteria helps to oxidize nitrites ( $\text{NO}^2$ ) into nitrates ( $\text{NO}^3$ ) in a Nitrogen cycle ?
- Bacillus*
  - Nitrosomonas*
  - Nitrococcus*
  - Nitrobacter*
29. Fibre of great commercial importance derived from epidermis is :
- Flax
  - Hemp
  - Coir
  - Cotton
30. Paraboiling of rice grains before milling conserve :
- Vitamin  $\text{B}_6$
  - Vitamin D
  - Vitamin  $\text{B}_{12}$
  - Vitamin K
31. The capsid of TMV is made up of :
- 3130 molecules of coat protein
  - 2130 molecules of coat protein
  - 3170 molecules of coat protein
  - 1130 molecules of coat protein
32. Cryptogram of TMV is :
- R/2 : 1/5 : E/P : X/S
  - R/1 : 2/5 : E/E : S/A
  - R/1 : 1/8 : S/S : S/AF
  - R/1 : 2/7 : E/E : S/X
33. *Morchella* belongs to which of the following divisions of Fungi :
- Ascomycota
  - Zycomycota
  - Basidiomycota
  - Deuteromycota
34. Plaque stage or Cruciate stage is found in which of the following algae :
- Vaucharia*
  - Ectocarpus*
  - Volvox*
  - Nostoc*
35. The first land inhabiting plants are :
- Pteridophytes
  - Bryophytes
  - Angiosperms
  - Gymnosperms
36. Which place in India is called gold mine of liverworts ?
- Eastern Himalaya
  - Western Himalaya
  - Western Ghats
  - Eastern Ghats
37. The protosteles having central core with radiating ribs or star shaped xylem core surrounded by phloem is :
- Haplostele
  - Plectosteles
  - Euxylele
  - Actinosteles

38. In Pteridophytes, reduction division occurs when :
- Prothallus is formed
  - Sex organs are formed
  - Spores are formed
  - Gametes are formed
39. The fluid like substance of the nucleus in which chromatin material, nucleolus, and other particulate elements of nucleus are suspended is known as :
- Karyotheca
  - Karyolymph
  - Nucleolema
  - Both (A) and (B)
40. Balbiani rings in the Polytene chromosomes represent the sites of :
- Polysaccharide synthesis
  - Lipid synthesis
  - RNA and Protein synthesis
  - Nucleotide synthesis
41. The genetic mutation caused by indels of a no of nucleotides in a DNA sequence that is not divisible by three is called :
- Silent mutation
  - Frameshift mutation
  - Non-sense mutation
  - Missense mutation
42. Meiosis has evolutionary significance because it results in :
- Genetically similar daughters
  - Four daughter cells
  - Eggs and sperms
  - Recombinations
43. Mitoplasts are :
- Mitochondria without membranes
  - Mitochondria without inner membrane
  - Mitochondria without outer membrane
  - Mitochondrial plastids
44. What is the probability of all offsprings in the cross  $Aa \times aa$  having "A" : phenotype ?
- 0.50
  - 0.75
  - 0.25
  - 1.0
45. During this phase of the cell cycle nuclear and cell division takes place :
- G<sub>1</sub>-Phase
  - M-Phase
  - S-Phase
  - All the above
46. In a garden pea, yellow seed color (Y) is dominant over green color (y) and round seed shape (S) is dominant over shrunken (s). A cross between  $YYSS \times yyss$  yields yellow round  $YySs$  in the  $F_1$  progeny, when  $F_1$  plants are selfed,  $F_2$  segregates into :
- 9 yellow round : green shrunken
  - 9 yellow : 3 yellow shrunken : 3 green round : 1 green shrunken
  - 13 yellow round : 3 green shrunken
  - 9 yellow round : 7 green shrunken
47. Epistasis implies :
- Many genes collectively control a particular genotype
  - One pair of genes can independently mask the expression of another pair of genes
  - One pair of genes enhances the phenotypic expression of other pair of genes
  - One pair of genes independently controls a particular phenotype
48. The sequence of six nucleotides (thymine-adenine-thymine-etc.) that is an essential part of a promoter site on DNA for transcription to occur in bacteria is known as :
- Pribnow box
  - TATA box
  - Palindromic nucleotides
  - None of the above
49. Nucleic acid hybrids can be formed between :
- Two strands of RNA
  - Two strands of DNA
  - One strand of RNA and one strand of DNA
  - All the above

50. The DNA sequence to which RNA polymerases binds to initiate transcription of a gene is called :
- Operator
  - Promoter
  - Repressor
  - Initiator
51. Bentham and Hooker classified Dicots into :
- Polypetalae, Gamopetalae and Glumiflorae
  - Polypetalae, Gamopetalae and Monochlamydae
  - Archichlamydae, Monochlamydae and Glumiflorae
  - Archechlamydae and monochlamydae
52. In which of the families, the gynoecium is bicarpellary and syncarpous but ovary is unilocular with basal placentation ?
- Solanaceae
  - Malvaceae
  - Asteraceae
  - Liliaceae
53. A nomenclatural type in which one specimen or illustration upon which a name is based originally, used or designated at the time of publication is :
- Holotype
  - Isotype
  - Lectotype
  - Neotype
54.  $\downarrow K (5) C (5) A_2 + 2 G (2)$  is the floral formula of :
- Papaveraceae
  - Labiatae
  - Liliaceae
  - Ranunculaceae
55. The cells of the quiescent centre are characterized by :
- Having light cytoplasm and small nuclei
  - Having light cytoplasm and prominent nucleus
  - Dividing regularly to add to the tunica
  - Dividing regularly to add to the corpus
56. Organization of stem apex into corpus and tunica is determined mainly by :
- Planes of cell division
  - Regions of meristematic activity
  - Rate of cell growth
  - Rate of shoot tip growth
57. Out of diffuse porous wood and ring porous wood which is correct :
- Ring porous wood carries more water for short time
  - Ring porous wood carries more water when need is higher
  - Diffuse porous wood carries more water
  - Diffuse porous wood is less specialized but conducts water rapidly
58. Periderm is produced by :
- Vascular cambium
  - Fascicular cambium
  - Intrafascicular cambium
  - Phallogen
59. As the tree grows, which of the following increases more rapidly in thickness :
- Sap wood
  - Phloem
  - Cortex
  - Heart wood
60. What happens in plants during vascularization ?
- Differentiation of procambium, followed by formation of primary phloem and primary xylem simultaneously
  - Differentiation of procambium, formation of primary phloem followed by formation of primary xylem
  - Formation of procambium, primary phloem and primary xylem simultaneously
  - Differentiation of procambium followed by formation of secondary xylem

1. Among the four morphological types of viruses, Tobacco Mosaic Virus belongs to :
  - (A) Enveloped Viruses
  - (B) Icosahedral Viruses
  - (C) Pox Viruses
  - (D) Helical Viruses
2. Which of the following statements is incorrect ?
  - (A) Rice Tungro is a viral disease
  - (B) In a Lysogenic cycle, the Phage controls the cellular biosynthetic machinery of host to produce new copies of viral genome and proteins
  - (C) Foot and Mouth Disease is a viral disease of domestic animals
  - (D) Viruses possess DNA or RNA but never both
3. In Batrachospermum, male cell lack flagella hence is called :
  - (A) Spermatangium
  - (B) Spermatium
  - (C) Carposporangium
  - (D) Carpospore
4. Which of the following fungi causes Yellow Rust of wheat ?
  - (A) Puccinia graminis
  - (B) Alternaria solani
  - (C) Puccinia striiformis
  - (D) Cercospora personata
5. What is true about Plectenchyma ?
  - (A) It is a false tissue formed by the fungal mycelium which is interwoven of hyphae
  - (B) It is the aerenchyma of Hydrophytes
  - (C) It is the parenchymatous tissue of Epiphytes
  - (D) It is the vascular tissue of Liverworts
6. What is related to Sexual reproduction in Marchantia ?
  - (A) Plant is Oogamous and Dioecious
  - (B) Plant is Isogamous and Monoecious
  - (C) Plant is Heterogamous and Dioecious
  - (D) Plant is Anisogamous and Monoecious
7. Who is known as the Father of Indian Bryology ?
  - (A) S.S. Beer
  - (B) P. Kachroo
  - (C) P.N. Mehra
  - (D) S.R. Kashyap
8. In fern Equisetum, vegetative reproduction takes place through :
  - (A) Microphylls
  - (B) Tubers
  - (C) Aerial branches
  - (D) Adventitious roots
9. What is true about Lycopodium ?
  - (A) Leaves of all species of Lycopodium are eligulate, simple, small and sessile
  - (B) Several species of Lycopodium are known as Christmas Greens
  - (C) Like Equisetum, Lycopodium is homosporous
  - (D) All above are true
10. The Telome Theory, throwing light on the phylogeny of vascular plants, was proposed by :
  - (A) Bower (1884)
  - (B) Potonic (1912)
  - (C) Zimmerman (1952)
  - (D) Andrews (1960)
11. The Bar Body in Human cells represents :
  - (A) Heterochromatin in male and female cells
  - (B) All Heterochromatin in female cells
  - (C) Inactive X Chromosomes in somatic cells of females
  - (D) Y Chromosome in somatic cells
12. Nucleosome Model of Chromosome organization was proposed by :
  - (A) Kornburg and Thomas (1974)
  - (B) Crick (1971)
  - (C) Du-Praw (1965)
  - (D) Ris (1961)

13. Cat-Cry syndrome in man is considered as genetic consequence of :
- Chromosome Duplication
  - Position Effect
  - Chromosome Deletion
  - Chromosome Inversion
14. Plasma membrane in plants is composed of :
- Proteins (100%)
  - Proteins, Carbohydrates and Phospholipids (40:40:20)
  - Proteins and Phospholipids (50:50)
  - Proteins and Nucleotides (60:40)
15. Oxysomes are sub-microscopic particles located in :
- Outer mitochondrial membrane
  - Inner mitochondrial membrane
  - Mitochondrial matrix
  - Intermembrane space
16. The physical separation of homologous chromosomes during Anaphase I is the physical basis of Mendel's Law of :
- Independent Assortment
  - Segregation
  - Unit Characters
  - Dominance
17. Korenberg Enzyme is the second name of :
- Alkaline Phosphatase
  - Restriction Endonuclease
  - DNA Ligase
  - DNA Polymerase
18. Most abundant form of RNA in a cell is :
- r RNA
  - t RNA
  - m RNA
  - hn RNA
19. Example of Multiple Allelism is :
- Human ABO blood group
  - Waxy gene of maize
  - Self Incompatibility in plants
  - All the above three
20. Wobble Hypothesis showed :
- Genetic Code is degenerate
  - Genetic Code is non-overlapping
  - Genetic Code is Universal
  - None of the above
21. Which of the following organisms has larger sized Plasmids ?
- E. coli
  - Pseudomonas putida
  - Agrobacterium tumefaciens
  - Staphylococcus aureus
22. Plasmids are useful in Genetic Engineering because they :
- Can replicate independently
  - Carry useful genes
  - Are common in Eukaryotes
  - Can be easily extracted from viruses
23. Methods of Gene Transfer of unrelated species include :
- Electroporation
  - Microprojectile gene transfer
  - Agro-bacterium mediated gene transfer
  - All of the above
24. Which of the following codons are known as 'Termination Codons' ?
- UAA, UAG, UGA
  - UUU, UUC, UUG
  - AUG, AUG, AUA
  - CAA, CAU, CAG

25. Both the genotypic and phenotypic ratios are same in case represented by :
- Incomplete Dominance
  - Co-Dominance
  - Epistasis
  - Both (A) and (B)
26. Who wrote *Philosophica Britannica* in 1753, *Systema Naturae* in 1758 and also introduced Binomial Nomenclature ?
- De-Candole
  - Sir Joseph Hooker
  - Carolus Linnaeus
  - George Bentham
27. Nature of dispersal of seed in *Papaver somniferum* is :
- Anemochory
  - Autochory
  - Hydrochory
  - Zoochory
28. Crocin, Picrocrocin and Saffranal are the active chemical constituents of which of the following medicinal plants of Kashmir Himalaya ?
- Colchicum luteum*
  - Bunium persicum*
  - Lactuca serriola*
  - Crocus sativus*
29. Gene Saviour Award was recently given by PPV and FR Authority of India to which land race of rice grown only in J & K State ?
- Rambir Basmati
  - Kamad
  - Mushqa Budji
  - Zagg
30. What is not true about Family Poaceae ?
- Inflorescence is Spike or Panicle of Spikelets
  - Fruit pericarp is fused with seed
  - Stamens numerous ; and anthers fixed
  - Carpel 1; Ovary superior, unilocular with single ovule
31. Die-back disease of fruit trees is due to the deficiency of which nutrient ?
- Iron
  - Copper
  - Manganese
  - Boron
32. The amount of water available to a plant is called :
- Holard
  - Chesard
  - Echard
  - Run-away Water
33. Which statement is not true about Chlorophyll molecule ?
- Its Phytol chain is hydrophilic in nature thus keeping it away from the photosynthetic membrane
  - Richard Willstatter discovered its structural formula
  - It has a porphyrin ring and a phytol chain
  - A Magnesium atom is chelated in the centre of its tetrapyrrole ring
34. In which of the stomatal types in Dicotyledons, guard cells are not surrounded by any subsidiary cell ?
- Paracytic type
  - Caryophyllaceous type
  - Ranunculaceous type
  - Cruciferous type

35. Conjoint, Collateral or Bicollateral, Endarch and Open Vascular bundles are characteristically present in the stem of :
- Dicotyledons
  - Monocotyledons
  - Both (A) and (B)
  - In none of them
36. Stone cells or Brachysclereids are present in fleshy pericarp of which fruit ?
- Grapes
  - Pineapple
  - Gooseberry
  - Pear
37. Which of the statements is incorrect ?
- The Xylem in Hydrophytes is absent or poorly developed
  - Cork cells are impervious to water because they are suberized and thick walled
  - Vascular bundles in Monocotyledons do not possess Cambium layer which is responsible for secondary growth
  - Chlorenchyma cells are pigment less parenchymatous cells
38. Choose a wrong statement about Pinus :
- Kernel of its seed or endosperm is haploid in nature
  - Embryo shows cleavage polyembryony hence its seeds are polyembryonic
  - Transfusion tissue is characteristically present in its leaves
  - Mature embryo is massive and has 8-14 cotyledons
39. Calyptrogen is a meristamatic tissue which gives rise to :
- Root cap
  - Epidermis
  - Ground Tissue
  - Vascular Tissue
40. Which of the root tissues is large and well developed in Monocot root but small or absent in Dicots ?
- Pith
  - Pericycle
  - Cambium
  - Endodermis
41. Tunic-Corpus Theory about Shoot Apex Organization was proposed by :
- Amefort (1956)
  - Newman (1961)
  - Popham and Cham (1950)
  - Schmidt (1924)
42. Mosaic Endosperm in Maize is the result of :
- Double Fertilization
  - Deficiency of Nutrients in soil
  - Effect of Apomixis
  - Lack of proper photoperiod requirement
43. What is true about Gametophytic Incompatibility ?
- It is not associated with morphological differences in flowers
  - The incompatibility reaction of pollen is controlled by the genotype of the plant on which it is produced
  - The incompatibility reaction of pollen is controlled by its own genotype
  - Both (A) and (C)

44. Pollen grains in Angiosperms are generally released at :
- Tetra-nucleate stage
  - Tri-nucleate stage
  - Bi-nucleate stage
  - Uni-nucleate stage
45. Somatic Embryogenesis is being exploited for :
- Mass cloning of plants
  - Development of synthetic seeds
  - Efficient production of transgenic plants
  - All above
46. In which of the following ovule types micropyle lies close to the funiculus ?
- Anatropous
  - Orthotropous
  - Amphitropous
  - Campylotropous
47. Guard cells differ from epidermal cells in having :
- Mitochondria
  - Chloroplasts
  - Vacuoles
  - Porous cell walls
48. Opening and closing of flowers represents kind of :
- Nutation
  - Tropic movements
  - Nastic movements
  - Autonomic movements
49. Names of W. W. Garner and H.A. Allard are related with :
- Photolysis
  - Photo-phosphorylation
  - Phototropism
  - Photoperiodism
50. What is true about Crassulacean Acid Metabolism plants ?
- Their stomata remain closed during night
  - Carbon dioxide fixation takes place during night
  - Generally produce Oxygen in presence of light but in absence of Carbon-dioxide
  - Both (B) and (C)
51. During Light Reaction of Photosynthesis which of the following phenomenon is observed during Cyclic as well as Non-cyclic Phosphorylation ?
- Release of Oxygen
  - Formation of NADP H
  - Formation of ATP
  - Photolysis of water
52. Parenchymatous cells surrounding the Hydathodes of leaves are :
- Collenchyma
  - Epibelma
  - Epithem
  - Aerenchyma
53. Water potential in plants is generally :
- Zero
  - Positive
  - Negative
  - Always positive and never negative
54. Which of the following is the best example of low energy, non-ionizing radiation ?
- X-rays
  - Alfa Particles
  - Fast Neutrons
  - UV rays

55. Buck wheat is the common name of :
- (A) *Triticum durum*
  - (B) *Triticum turgidum*
  - (C) Scale cereal
  - (D) *Fagopyrum esculentum*
56. Plants growing on rock crevices are called :
- (A) Chasmophytes
  - (B) Psammophytes
  - (C) Oxylophytes
  - (D) Halophytes
57. Which of the following tree species is the major cause of respiratory allergies in Kashmir during Spring season ?
- (A) *Populus deltoidea*
  - (B) *Salix aegyptica*
  - (C) *Ulmus wallichiana*
  - (D) *Populus alba*
58. Pyramid of Energy is always :
- (A) Horizontal
  - (B) Upright
  - (C) Inverted
  - (D) Both Upright (Terrestrial Ecosystem) and Inverted (Aquatic Ecosystem)
59. In which of the following Centres in India, the Gene Bank for Crop plants and their wild relatives has been established ?
- (A) Forest Research Institute, Dehradun
  - (B) Central Institute of Medicinal and Aromatic Plants, Lucknow
  - (C) Botanical Survey of India, Calcutta
  - (D) National Bureau of Plant Genetic Resources, New Delhi
60. First genetic material was most likely RNA due to :
- (A) Could catalyse all molecules necessary for survival and replication
  - (B) Unstable and reactive making it more prone to mutations
  - (C) Both (A) and (B)
  - (D) None of them

Sr. No. ....1004.....

# ENTRANCE TEST-2017

## SCHOOL OF BIOLOGICAL SCIENCES

### BOTANY

Total Questions : 60

Question Booklet Series

**B**

Time Allowed : 70 Minutes

Roll No. : 

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#### Instructions for Candidates :

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. In living system the cell membranes are composed of lipids and proteins in which of the following proportion ?
  - (A) Lipid molecules are more in number than proteins
  - (B) Protein molecules are more in number than lipids
  - (C) Sometimes lipid molecules are more in number and sometimes proteins are more in number
  - (D) The number of lipid and protein molecules is always equal
2. If the trans positioned *crp* regulator gene of lac operon is mutated and produces a defective protein (CAP), this mutation will result in:
  - (A) Constitutive expression of lac operon
  - (B) Inducible expression of lac operon
  - (C) Permanent switching off of the lac operon
  - (D) Upregulation of lac operon
3. If the promoter of a structural gene is detached from the cis position and is placed at a distance (trans position) from the structural gene in the genome, the structural gene will:
  - (A) Show overexpression
  - (B) Stop expressing/ functioning
  - (C) Show under expression
  - (D) No effect on expression
4. Identical copies of a gene which occur on different loci on non homologous chromosomes in a cell or organism are:
  - (A) Alleles
  - (B) Isoalles
  - (C) Pesudoalleles
  - (D) Multiple alleles
5. A cross between round and yellow pea (RRYY) and wrinkled and green pea (rryy) produce F<sub>1</sub> which is round and yellow (RrYy). If this plant with RrYy genotype is crossed with a plant having genotype rryy what will be the genotypic and phenotypic ratio of the off springs ?
  - (A) 9:3:3:1
  - (B) 1:1:1:1
  - (C) 3:1
  - (D) 1:2:1
6. Replication and transcription are polymerization processes where DNA acts as template and new polynucleotides are synthesized by DNA polymerases in replication and RNA polymerases in transcription. On an average one wrong nucleotide is incorporated in replication and transcription per:
  - (A)  $10^7$  bases copied in replication and  $10^4$  bases in transcription
  - (B)  $10^7$  bases in replication and  $10^9$  bases in transcription
  - (C)  $10^9$  bases in replication and  $10^7$  bases in transcription
  - (D)  $10^4$  bases in replication and  $10^3$  bases in transcription
7. Degeneracy of genetic code is:
  - (A) Many codons coding for same amino acid
  - (B) A single codon coding for many amino acids
  - (C) Only one codon coding for one amino acid
  - (D) None of the above
8. The role of DHU arm of tRNA during translation is:
  - (A) Binding of tRNA with small subunit of ribosomes
  - (B) Binding of tRNA with larger subunit of ribosome
  - (C) Binding of tRNA with aminoacyl synthetase
  - (D) Binding of tRNA with peptidyl transferase
9. During translation the first amino acids which initiates polypeptide synthesis is:
  - (A) Methionine in both eukaryotes and prokaryotes
  - (B) Formylmethionine in eukaryotes and methionine in prokaryotes
  - (C) Methionine in eukaryotes and formylmethionine in prokaryotes
  - (D) Formylmethionine in both eukaryotes and prokaryotes

10. Which of the following statements is incorrect ?
- (A) The mRNA of prokaryotes is not processed  
 (B) mRNA is monocistronic in eukaryotes while polycistronic in prokaryotes  
 (C) Shine Dalgarno sequence of prokaryotic mRNA is complementary to 3' end of 16S rRNA  
 (D) Shine Dalgarno sequence of prokaryotic mRNA is complementary to 5' end of 16S rRNA
11. Which of the following represents the correct position of gymnosperms in Bentham and Hooker's system of classification ?
- (A) Dicots, gymnosperms, monocots  
 (B) Gymnosperms, dicots, monocots  
 (C) Monocots, gymnosperms, dicots  
 (D) Dicots, monocots, gymnosperms
12. In the taxonomic hierarchy the correct sequence of categories in a descending order is :
- (A) Kingdom, division, order, class, family, genus, species  
 (B) Kingdom, division, class, family, order, genus, species  
 (C) Kingdom, division, class, order, family, genus, species  
 (D) Kingdom, class, division, order, family, genus, species
13. In Takhtajan's system of classification the woody plants are treated as :
- (A) Advanced compared to herbaceous plants  
 (B) Neither primitive nor advanced compared to herbaceous plants  
 (C) Primitive compared to herbaceous plants  
 (D) Some are primitive and some are advanced as compared to herbaceous plants
14. An illegitimate binomial like *Solanum solanum* where both the generic name and specific epithet are the same is called as :
- (A) Autonym (B) Synonym  
 (C) Tautonym (D) Basionym
15. When petiole of a leaf is modified into a flat leaf like structure to minimize transpiration and bring about photosynthesis, it is called as :
- (A) Cladode (B) Phyllode  
 (C) Phylloclade (D) Petiolode
16. An incomplete flower is :
- (A) Always without accessory whorls  
 (B) Always perfect  
 (C) Always imperfect  
 (D) May be perfect or imperfect
17. Parthenocarpic fruits are :
- (A) Always seedless  
 (B) Always seeded  
 (C) May be seedless or seeded  
 (D) Formed from whole inflorescence
18. Which of the following feature does not pertain to family Brassicaceae?
- (A) Cruciform corolla  
 (B) Basal placentation  
 (C) Tetradynamous androecium  
 (D) Fruit siliqua
19. Caryopsis is the characteristic fruit of family:
- (A) Asteraceae (B) Solanaceae  
 (C) Liliaceae (D) Poaceae
20. The wood of *Cycas* is:
- (A) Manoxylic and Monoxylic  
 (B) Pycnoxylic and Polyxylic  
 (C) Manoxylic and Polyxylic  
 (D) Pycnoxylic and Polyxylic

21. The periderm is having the following sequence of layers starting from outside:
- Phellem, phellogen, phelloderm
  - Phelloderm, phellogen, phellem
  - Phellogen, phelloderm, phellem
  - Phellem, phelloderm, phellogen
22. In dicots the procambium gives rise to:
- Fasicular cambium only
  - Interfasicular cambium only
  - Primary xylem; primary phloem and interfasicular cambium
  - Primary xylem; primary phloem and fascicular cambium
23. Duramen is:
- Physiologically functional light coloured primary xylem
  - Physiologically non functional dark coloured primary xylem
  - Physiologically functional light coloured secondary xylem
  - Physiologically non functional dark coloured secondary xylem
24. In angiosperms after sporogenic meiosis, how many mitotic divisions are required for the development of a mature male and female gametophyte (normal type):
- 3 for male gametophyte and 2 for female gametophyte
  - 3 for male gametophyte and 3 for female gametophyte
  - 2 for male gametophyte and 2 for female gametophyte
  - 2 for male gametophyte and 3 for female gametophyte
25. Which of the following statements is incorrect about angiosperms?
- Megaspore is not shed from megasporangium
  - Both the gametes discharged from pollen tube bring about fertilization (Double fertilization)
  - The ploidy of primary endosperm nucleus varies from  $2n$  to  $9n$  and this variation in ploidy is determined by the contribution of female gametophyte only
  - Fertilization occurs by zooidogamy
26. In most of the hydrophytes pollination is brought about by:
- wind or insects
  - water
  - snails
  - fishes
27. Self incompatibility is a barrier which prevents mating/fertilization between:
- Individuals of different species
  - Genetically close individuals of same species
  - Individuals of same species differing in their size
  - Genetically very different individuals of same species
28. The deficiency symptoms of calcium and iron elements occur:
- Simultaneously in both older and younger leaves
  - First older leaves then younger leaves
  - First in younger leaves then in older leaves
  - In only older leaves as calcium and iron mobilize from older to younger leaves during deficiency
29. The role of Molybdenum in plants is:
- It is part of PS II in chloroplast
  - It is part of cytochrome oxidase in mitochondria
  - It is important component of enzyme nitrate reductase
  - It is part of enzyme RUBISCO



30. A very high accumulated internal  $\text{CO}_2$  concentration in leaf and low pH in guard cells can cause:
- Stomatal closure
  - Opening of stomata
  - No effect on stomatal mechanics
  - None of the above
31. The log phase of growth corresponds to:
- Phase of cell division
  - Phase of cell elongation
  - Phase of cell maturation
  - All of the above
32. A chloroplast if illuminated with light consisting of radiations of 690nm only will:
- Show both cyclic and non cyclic photophosphorylation
  - Only non cyclic photophosphorylation
  - Only cyclic photophosphorylation
  - First cyclic then non cyclic photophosphorylation
33. The cell organelles which are involved in photorespiration along with their correct order of action in the process are:
- Chloroplast > Mitochondria > Golgi apparatus
  - Chloroplast > Mitochondria > Peroxisome
  - Chloroplast > Peroxisome > Mitochondria
  - Mitochondria > Chloroplast > Peroxisome
34. If under a particular set of conditions all the NAD of an eukaryotic cell is reduced into NADH, the pace of Krebs's cycle will
- Not be affected
  - Slow down considerably
  - Speed up
  - None of the above
35. In the electron transport chain of mitochondria, the complex which doesn't pump protons outside into the inter membrane space is:
- NADH Dehydrogenase complex
  - Succinate dehydrogenase complex
  - Cytochrome b c complex
  - Cytochrome oxidase complex
36. The genetically dwarf mutants can be induced to become tall by exogenously spraying:
- Auxins
  - Gibberlins
  - Cytokinins
  - Ethylene
37. A tourist finds a plant (not a day neutral one) in full bloom in a garden in summer when day length is about 15 hours, this plant is:
- Necessarily a long day plant
  - A Short day plant
  - May be short day or long day plant
  - None of the above
38. The hormone which is anti apical dominance is:
- Auxins
  - Gibberlins
  - Cytokinins
  - Ethylene
39. The enzyme nitrogenase is found in:
- All prokaryotes and some eukaryotes
  - Some eukaryotes and some prokaryotes
  - Some prokaryotes and no eukaryotes
  - Some eukaryotes and no prokaryotes
40. Soil texture of a field can be changed by:
- Ploughing it
  - By moving trucks over it
  - By adding organic matter to it
  - None of the above
41. In soil profile the zone of eluviation is:
- $A_2$  layer of A horizon
  - $A_1$  region of A horizon
  - $B_1$  region of B horizon
  - $B_2$  region of B horizon

42. Helophytes are plants:
- Which grow in shade
  - Which grow under sunny conditions
  - Which grow in marshy swamps
  - Which grow on rocks
43. In logistic equation of population growth when  $K$  becomes equal to  $N$ ; ( $K=N$ ):
- There is no further increase in population size
  - Population starts increasing exponentially
  - Population size starts declining sharply
  - The value of  $r$  increases tremendously
44. Ecological succession which begins on a virgin substratum where no plant life had occurred in past is:
- Primary succession
  - Secondary succession
  - Cyclic succession
  - Retgressive succession
45. Succession is a predictable process and thus you can predict which serial stage follows the other. In a xerosere occurring on rock surface the moss stage will be followed by:
- Crustose lichens stage
  - Herbaceous stage
  - Shrub stage
  - Forest
46. Phenology refers to:
- Study of timing of occurrence of events or developmental stages in the life cycle of a plant
  - Study of phenotype of an organism
  - Study of pollen grains
  - Study of phenerogams
47. In community ecology, physiognomy is evaluated as:
- Analytical quantitative character
  - Analytical qualitative character
  - Synthetic character
  - No community attribute at all
48. *Podophyllum* plant is:
- Annual herbaceous fern endemic to Western Ghats
  - Annual herbaceous angiosperm endemic to Himalayas
  - Perennial woody angiosperm endemic to Himalayas
  - Perennial herbaceous angiosperm endemic to Himalayas
49. *Artemisia* plant in Kashmiri folklore is used as an:
- anti-pyretic
  - Anti-helminthic
  - Anti-allergic
  - Antiseptic
50. In jute plant the cells which are extracted as fibre of commerce are:
- Xylary fibres
  - Bast fibres
  - Fibre tracheids
  - Libriform fibres
51. Tobacco mosaic virus has:
- Cuboidal symmetry, 2013 capsomers and dsDNA
  - Helical symmetry, 2130 capsomers and ssDNA
  - Helical symmetry, 2130 capsomers and ssRNA
  - Cuboidal symmetry, 1320 capsomers and ssRNA
52. Which of the following pairs of thallophytes has coenocytic thallus?
- Puccinia* and *Ectocarpus*
  - Vaucheria* and *Morchella*
  - Phytophthora* and *Vaucheria*
  - Batrachospermum* and *Phytophthora*



53. The dikaryophase of *Puccinia graminis tritici* occurs on:
- Wheat which is its secondary or alternate host
  - Wheat which is its primary host
  - Barberry which is the primary host
  - Barberry which is its secondary host
54. The sporophyte of *Ectocarpus* bears both plurilocular and unilocular sporangia to give rise to zoospores which develop into new plants. Which of the following statements is not true about ectocarpus ?
- Meiosis occurs in plurilocular sporangia to form haploid zoospores
  - Plurilocular sporangia produce diploid zoospores
  - Zoospores from Unilocular sporangia form haploid plants
  - Zoospores from both type of sporangia produce morphologically similar plants
55. The heterospory is a phenomenon which occurs in all:
- Spermatophytes
  - Thallophytes
  - Cryptogams
  - Tracheophytes
56. In plant kingdom outside algae the only plant which shows pyrenoids in its chloroplasts is:
- Marchantia*
  - Anthoceros*
  - Polytrichum*
  - Funaria*
57. Which of the following statements is not true about pteridophytes ?
- The plant body is a well differentiated sporophyte
  - They show sporogenic meiosis
  - The gametophyte is not dependent on sporophyte
  - They don't need water for fertilization
58. Which of the following is commonly known as club moss ?
- Polytrichum*
  - Funaria*
  - Lycopodium*
  - Anthoceros*
59. The biosynthesis of ribosomes in eukaryotes occurs in:
- Nucleoplasm
  - Nucleolus
  - Cytoplasm
  - All of the above
60. The nucleosome core particle consists of:
- 2 copies each of H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub>, H<sub>4</sub> histones and 146 bp of DNA
  - 2 copies each of H<sub>1</sub>, H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub> histones and 146 bp of DNA
  - 2 copies each of H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub>, H<sub>4</sub> histones and 200bp of DNA
  - One copy each of H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub>, H<sub>4</sub> histones and 146 bp of DNA

Sr. No. ....0745.....

# ENTRANCE TEST-2016

## FACULTY OF BIOLOGICAL SCIENCES

### M.Sc. BOTANY

Total Questions : 60

Time Allowed : 70 Minutes

Question Booklet Series

A

Roll No. :

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#### Instructions for Candidates :

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
13. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. One molecule of genomic single strand RNA of TMV consists of :
 

(A) 6400 nucleotides	(B) 7400 nucleotides
(C) 5400 nucleotides	(D) 4400 nucleotides
  
2. The change of colour by blue green alga according to the wavelength of light is called :
 

(A) Photoperception	(B) Photoadaption
(C) Gaidukov phenomenon	(D) Warburg phenomenon
  
3. Storage product in *Batrachospermum* (Red Alga) is :
 

(A) Starch and Oil	(B) Floridean starch
(C) Cellulose	(D) Glycogen
  
4. Generally, in culture of *Rhizopus*, zygospores are not produced :
 

(A) Due to lack of oxygen	(B) Due to shortage of light
(C) Due to absence of '+' and '-' strains	(D) Due to presence of '+' and '-' strains
  
5. *Marchantia* is a bryophyte because it :
 

(A) Has multicelled and jacketed sex organs	(B) Lacks xylem
(C) Lacks roots	(D) No production of seeds
  
6. Which among the following is haploid ?
 

(A) Peristome	(B) Columella
(C) Operculum	(D) Calyptra
  
7. Formation of sporophyte from vegetative portion of prothallus (or from gametophyte) without sexual fusion is known as :
 

(A) Apospory	(B) Apogamy
(C) Apomixis	(D) Apocarpny

8. The stele in which phloem is only on the external side of xylem, pith in the centre, phloem surrounded by pericycle and endodermis is called :
- (A) Amphiphloic siphonostele                      (B) Ectophloic siphonostele  
(C) Plectostele    (D) Actinostele
9. If meiosis occurred without synapsis and cells simply underwent mitosis without an accompanying cycle of chromosomal duplication :
- (A) Only interchromosomal recombination could occur  
(B) Only intrachromosomal recombination could occur  
(C) Both types occur for a limited number of cell divisions  
(D) None of above , because recombination occurs only during synapsis
10. In inversion type of chromosomal alterations :
- (A) The genetic material remains the same but is rearranged  
(B) The genetic material may change but is also rearranged  
(C) Total amount of genetic information may increase  
(D) Total amount of genetic information may decrease
11. The presence of DNA in mitochondria and chloroplast supports the hypothesis that :
- (A) Mitochondria and chloroplast undergo meiosis and mitosis independent of nucleus  
(B) Mitochondria and chloroplast have originated as independent free living organisms  
(C) Glycolysis occurs in both mitochondria and chloroplast  
(D) ATP is produced in both mitochondria and chloroplast
12. The maximum substance in the middle lamellae between plant cells is :
- (A) Calcium    (B) Potassium  
(C) Sodium    (D) Magnesium
13. Pure homozygous offsprings in a dihybrid cross in the F<sub>2</sub> generation will be :
- (A) 1/2    (B) 1/8  
(C) 1/4    (D) 1/16

14. A cross between F1 heterozygous for two factors and the recessive parent, recessive for both factors, yield a phenotypic ratio of :

- (A) 9:3:3:1 (B) 7:1:1:7  
(C) 1:1:1:1 (D) 1:3:3:9

15. Expression of recessive phenotypes in a deletion heterozygote is called :

- (A) Under-dominance (B) Pseudo-dominance  
(C) Over-dominance (D) Co-dominance

16. Mendel's laws were published in :

- (A) *Genera Plantarum*  
(B) *Annual proceedings of the natural history society of Brun*  
(C) *Systema naturae*  
(D) *Theorie elementaire de la botanique*

17. Western blotting is the technique for the detection of :

- (A) Specific DNA in a sample (B) Specific RNA in a sample  
(C) Specific proteins in a sample (D) Specific glycolipid in a sample

18. A single anticodon can recognize more than one codon of m-RNA. This phenomenon is termed as :

- (A) Richmond and Lang effect (B) Gene flow hypothesis  
(C) Wobble hypothesis (D) Template hypothesis

19. Termination of chain growth in protein synthesis is brought about by :

- (A) UUG, UGC, UCA (B) UCG, GCG, ACC  
(C) UAA, UAG, UGA (D) UAG, AUG, UAC

20. The plasmids with a bacterial *oriV*, an antibiotic selection marker and a cloning site, but with one or two *cos* sites derived from bacteriophage lambda are :

- (A) Cosmids (B) Phasmids  
(C) Phages (D) Plastids

21. Numerical taxonomy is also known as :
- (A) Cladistics (B) Phenetics  
(C) Descriptive taxonomy (D) Evolutionary taxonomy
22. A nomenclatural type is generally a :
- (A) Description of a taxon  
(B) Circumscription of a taxon  
(C) Rank of a taxon in the taxonomic hierarchy  
(D) Specimen, illustration or a photograph
23. A subspecies or variety name that is the duplicate of the specific epithet is called :
- (A) Synonym (B) Tautonym  
(C) Autonym (D) Basonym
24. A specimen that is selected from the original material to serve as the type when no holotype was designated at the time of publication or if it was lost or destroyed is known as :
- (A) Lectotype (B) Isotype  
(C) Holotype (D) Neotype
25. Monotheclus anthers and monoadelphous stamens are the characteristic features of family:
- (A) Malvaceae (B) Graminae  
(C) Liliaceae (D) Ranunculaceae
26. Mark the correct statement for Poaceae :
- (A) The carpel has two styles (B) Spikelet is always in pairs  
(C) Awn is an appendage of paleu (D) Paleu is the bracteole
27. In Solanaceae the flowers are :
- (A) Zygomorphic, unisexual and hypogynous  
(B) Actinomorphic, bisexual and hypogynous  
(C) Actinomorphic, bisexual and perigynous  
(D) Actinomorphic, bisexual and epigynous

28.  $*K_5C_5A_{\infty}G_{\infty}$  is the floral formula of :
- (A) Solanaceae (B) Ranunculaceae  
(C) Liliaceae (D) Poaceae
29. The largest sperm and ovule is found in :
- (A) *Ephedra* (B) *Pinus*  
(C) *Cycas* (D) *Cedrus*
30. Which of the following represent haploid structure in *Pinus* ?
- (A) Microspore mother cell (B) Megaspore mother cell  
(C) Endosperm (D) Plant itself
31. A concentric amphivasal vascular bundle is that in which :
- (A) Centrally located xylem is surrounded by phloem  
(B) Xylem is flanked by phloem on exterior sides only  
(C) Centrally located phloem is surrounded by xylem  
(D) Phloem is flanked by xylem on interior sides only
32. Growth rings are formed due to activity of :
- (A) Intrastelar cambium (B) Intercalary cambium  
(C) Extrastelar cambium (D) Primary cambium
33. Cambium is considered as lateral meristem because :
- (A) It increases the height and diameter of stem  
(B) It gives rise to lateral branches of stem  
(C) It increases the girth of a plant  
(D) It increases the length of a plant
34. The organization of shoot apex into tunica and corpus is determined by largely on the basis of :
- (A) Regions of meristematic activity (B) Planes of cell division  
(C) Rate of shoot tip growth (D) Rate of cell division

35. A tissue with spiral thickenings in the cell wall capable of absorbing water from air is known as :

- (A) Velamen
- (B) Cork
- (C) Epiblema
- (D) Hypodermis

36. If there are more than one tunica layers in a stem, which among the following is most likely to happen ?

- (A) All the layers will develop into epidermal cells
- (B) Only the outer layer will develop into epidermal cells
- (C) All the layers will develop into cortex
- (D) Inner layer develops into cortex

37. Cauliflory is :

- (A) Formation of flowers in clusters
- (B) Production of flowers on young branches
- (C) Production of flowers on tree trunks or old stem from new buds
- (D) Formation of plants from epiphyllous buds

38. The edible part of the apple and pear is :

- (A) Endosperm
- (B) Thalamus
- (C) Mesocarp
- (D) Pericarp

39. Dichogamy favoring cross pollination is a type of floral mechanism where :

- (A) Anthers and stigma are placed at different levels
- (B) Structure of anther and stigma act as barrier
- (C) Stamens and stigmas mature at different times
- (D) Anthers mature earlier than the stigmas of same flower

40. Fruit that develops from hypanthodium inflorescence is :

- (A) Syconus
- (B) Sorosis
- (C) Samara
- (D) Siliqua

41. Little leaf disease and Mottle leaf of citrus is caused due to :
- (A) Nitrogen deficiency                      (B) Zinc deficiency  
(C) Molybdenum deficiency                (D) Calcium deficiency
42. Which group of elements is not essential for normal plants ?
- (A) Potassium, calcium, magnesium, sulphur  
(B) Iron, calcium, manganese, boron  
(C) Nickel, lead, iodine, sodium  
(D) Magnesium, iron, molybdenum, phosphorus
43. Who has considered Transpiration as a 'necessary evil' in plants ?
- (A) Levitt, 1974                                (B) Sayre, 1926  
(C) Curtis, 1926                                (D) Scarth, 1932
44. The real force causing entry of water into a cell from other cells is termed as :
- (A) Turgor pressure                            (B) Diffusion Pressure deficit  
(C) Osmotic pressure                         (D) Wall Pressure
45. In  $C_3$  plants fixing of 6  $CO_2$  molecules into a hexose requires :
- (A) 18 NADPH & 12 ATP                    (B) 12 NADPH & 18 ATP  
(C) 30 NADPH & 12 ATP                    (D) 18 NADPH & 18 ATP
46. Thylakoids of grana possess :
- (A) Enzymes for photophosphorylation  
(B) Enzymes of  $C_3$  pathway  
(C) Enzymes of Krebs cycle  
(D) Enzymes of  $C_4$  pathway
47. The first stable compound in  $C_3$  plants is :
- (A) 3- Phosphoglycerate                    (B) 1, 3- bisphosphoglycerate  
(C) Oxaloacetae                                (D) Maleate

48. How many cycles of  $\beta$ -oxidation are required to oxidise completely one molecule of 18 carbon fatty acid into acetyl Co A?
- (A) 9 cycles (B) 8 cycles  
(C) 12 cycles (D) 10 cycles
49. Blocking of active site of an enzyme is a kind of:
- (A) Feedback inhibition (B) Non-competitive inhibition  
(C) Allosteric inhibition (D) Competitive inhibition
50. Which of the following ions acts as a cofactor for glutamine synthetase involved in ammonium assimilation in plants?
- (A)  $Mg^{2+}$  (B)  $Fe^{2+}$   
(C)  $Ca^{2+}$  (D) All of these
51. In dicot plants such as cucumber and hemp, application of which of the following hormones promotes formation of male flowers?
- (A) Cytokinins (B) Gibberellins  
(C) Abscisic acid (D) All of these
52. Higher auxin: cytokinin ratio in cultured callus tissues from tobacco stimulates:
- (A) Shoot formation (B) Root formation  
(C) Callus formation (D) All of the above
53. A stable population is depicted by one of the below hypothetical age pyramid diagram:
- (A) A bell shaped polygon (B) An urn-shaped figure  
(C) A pyramid with broad base (D) All of the above
54. The plants whose buds are situated close to the ground and are common to high altitudes are categorized into:
- (A) Phanerophytes (B) Therophytes  
(C) Chamaephytes (D) Cryptophytes

55. Formation of sticky, compact, structure less layer at the bottom of the 'B' horizon and the consequent accumulation of a peaty layer above it is known as :
- (A) Podsolization (B) Gleization  
(C) Lateralization (D) Cacification
56. Three constituents that contribute towards stratospheric ozone depletion are :
- (A) CFC-11, CFC-12,  $N_2O$  (B) CFC-11, CFC-16,  $NO_2$   
(C) CFC-11, CFC-12,  $O_2$  (D) CFC-11, CFC-13,  $H_2$
57. Pyramid of energy is always :
- (A) Upright (B) Inverted  
(C) Both (A) and (B) (D) None of the above
58. Which of the following is the logical sequence of carbon cycle ?
- (A) Photosynthesis → decomposers → consumers  
(B) Photosynthesis → consumers → decomposers  
(C) Decomposers → photosynthesis → consumers  
(D) Consumers → photosynthesis → decomposers
59. Which of the following medicinal plants is a source of anticholinergic drugs ?
- (A) *Artemisia absinthium* (B) *Podophyllum hexandrum*  
(C) *Atropa belladonna* (D) *Artemisia annua*
60. 'Golden rice' is a variety of rice produced through genetic engineering technique to biosynthesize :
- (A)  $\beta$  - Carotene (B) Niacin  
(C) Biotin (D) Nicotinic acid

1. The first natural plant cytokinin that was isolated from maize is :  
(A) Zeatin (B) Kinetin  
(C) BAP (D) Ortho-topolin
2. Which of the following is principle blue light receptor in plants ?  
(A) Phytochrome (B) Cryptochrome  
(C) Pheromone (D) All of these
3. Tropical rain forests on the basis of temperature conditions can fall into one of the following classes :  
(A) Megatherm (B) Mesotherm  
(C) Microtherm (D) Heckistotherm
4. Hydrolysis of orthoclase (a clay alumino-silicate) gives rise to :  
(A) Haematite (B) Limonite  
(C) Kaolinite (D) None of the above
5. Illuviation occurs in which of the soil horizon ?  
(A) 'A' horizon (B) 'B' horizon  
(C) 'C' horizon (D) 'O' horizon
6. According to Raunkiaer's (1934) five frequency classes, the class 'D' has a frequency value (%) of :  
(A) 0-11 (B) 41-60  
(C) 61-80 (D) 21-30
7. Which of the following sequence represents general process of succession :  
(A) Migration, Nudation, Ecesis, Aggregation, Coaction and Stabilisation  
(B) Ecesis, Migration, Nudation, Coaction, Aggregation and Stabilisation  
(C) Nudation, Migration, Ecesis, Aggregation, Coaction and Stabilisation  
(D) Migration, Aggregation, Ecesis, Nudation, Coaction and Stabilisation
8. In a grassland, shape of a biomass pyramid is :  
(A) Upright (B) Inverted  
(C) Irregular (D) Spindle



16. What type of spores are present in Bryophytes ?
- (A) Haploid in nature (B) Diploid in nature  
(C) Triploid in nature (D) Tetraploid in nature
17. *Equisetum* differs from *Funaria* in having :
- (A) Motile spore (B) Well developed vascular system  
(C) An independent gametophyte (D) Archegonia
18. The Amphiphloic siphonostele shows that :
- (A) Phloem is present on both external and internal sides of the xylem  
(B) Phloem is present on the inner side of xylem only  
(C) Phloem is present on the outer side of xylem only  
(D) Phloem is present in the centre surrounded on both sides by xylem
19. The protein "packaging plant" in the cell is :
- (A) Golgi apparatus (B) Mitochondria  
(C) Lysosomes (D) Endoplasmic reticulum
20. Semi-autonomous organelle in the cell is :
- (A) Peroxisomes (B) Chloroplasts  
(C) Endoplasmic reticulum (D) Golgi bodies
21. Indicate the correct answer in meiosis :
- (A) Chiasmata are formed before metaphase I  
(B) Chiasmata are formed before metaphase II  
(C) Chiasmata are eliminated until anaphase I  
(D) Chiasmata are eliminated during anaphase I
22. Which of the following biomolecules has a self repair mechanism ?
- (A) DNA, RNA and proteins (B) DNA and RNA  
(C) DNA only (D) DNA and proteins
23. The dihybrid test cross ratio is :
- (A) 9:3:2:1 (B) 9:3:2:2  
(C) 1:1:1:1 (D) 9:3:3:1

24. Inheritance of ABO blood groups illustrates :
- (A) Polyploidy (B) Epistasis  
(C) Linkage (D) Multiple allelism
25. A gene which affects the character of another gene not located on similar locus of the homologous chromosome is called :
- (A) Duplicate gene (B) Complementary gene  
(C) Epistatic gene (D) Supplementary gene
26. What is the probability of offsprings for the cross  $Aa \times aa$  having A phenotype ?
- (A) 0.25 (B) 0.50  
(C) 0.75 (D) 1.00
27. Which of the following possesses both 5' – 3' and 3' – 5' exonuclease activity :
- (A) Kornberg enzyme (B) DNA polymerase III  
(C) Taq DNA polymerase (D) None of these
28. The first engineered plasmid vector is :
- (A) pBR 322 (B) pUC vectors  
(C) pSC 101 (D) PUC 19
29. The enzyme involved in amino acid activation during protein synthesis is :
- (A) ATP synthetase (B) Aminoacyl t-RNA synthetase  
(C) Aminoacyl t-RNA synthase (D) Aminoacyl r-RNA synthetase
30. What key feature of Taq polymerase allows PCR to be conveniently performed ?
- (A) Taq polymerase does not require primers  
(B) Taq polymerase does not require a template  
(C) Taq polymerase is not damaged by heating  
(D) Taq polymerase can work at very low temperatures
31. The term Taxonomy was first coined by :
- (A) Carolus Linnaeus (B) Theoprastus  
(C) John Ray (D) A. P. de Candolle
32. A binomial in which the genus name and the species epithet are identical in spelling is called :
- (A) Synonym (B) Autonym  
(C) Tautonym (D) Basonym

33. Natural system of classification differs from artificial system of classification in :
- (A) Taking into account only vegetative characters
  - (B) Taking into account all the similarities between plants
  - (C) Taking into account only floral characters
  - (D) All of these
34. The specimen or illustration upon which a name is based, originally used or designated at the time of publication is called :
- (A) Lectotype
  - (B) Isotype
  - (C) Holotype
  - (D) Neotype
35. Cruciform corolla and tetradynamous stamens are characteristic features of family :
- (A) Malvaceae
  - (B) Brassicaceae
  - (C) Papilionaceae
  - (D) Solanaceae
36. In the family Ranunculaceae, the stamens are :
- (A) Spirocyclic, monotheclus, extrose
  - (B) Spirocyclic, dithecus, extrose
  - (C) Spirocyclic, dithecus, introse
  - (D) Spirocyclic, monotheclus, introse
37. Cypsela fruit is a characteristic feature in :
- (A) Poaceae
  - (B) Asteraceae
  - (C) Brassicaceae
  - (D) Lamiaceae
38.  $P_{3+3} A_{3+3} G_{(3)}$  is the floral formula of :
- (A) Poaceae
  - (B) Solanaceae
  - (C) Liliaceae
  - (D) None of the above
39. The Tunica corpus theory was proposed by :
- (A) Nageli
  - (B) Hanstein
  - (C) Schmidt
  - (D) Hofmeister

40. The cells of a meristematic tissue have :
- (A) Thin walls and no intercellular spaces
  - (B) Highly vacuolated cytoplasm
  - (C) Large sized nucleus and active cell division
  - (D) All the above
41. The prop roots of Banyan tree are meant for :
- (A) The retention of water in soil
  - (B) Providing mechanical support to the big size of tree
  - (C) Absorption of water from soil
  - (D) Absorption of air from atmosphere
42. The zone of slowly dividing cells in the middle of highly meristematic cells in root apex is called :
- (A) Vegetative zone
  - (B) Corpus centre
  - (C) Quiescent centre
  - (D) Somatic zone
43. What are the parts of periderm :
- (A) Phellogen, periblem, plerome
  - (B) Dermatogen, cortex, phelloderm
  - (C) Phellem, phellogen, phelloderm
  - (D) Periblem, phallogen, phelloderm
44. Conjoint, collateral and closed vascular bundle scattered in ground tissue is found in :
- (A) Monocot root
  - (B) Dicot root
  - (C) Monocot stem
  - (D) Dicot stem
45. Vascular bundles of *Cycas* are :
- (A) Conjoint, collateral and closed
  - (B) Conjoint, collateral and open
  - (C) Conjoint, bicollateral and closed
  - (D) Conjoint, bicollateral and open
46. Wings in *Pinus* seed develops from :
- (A) Bract scale
  - (B) Ovuliferous scale
  - (C) Cone axis
  - (D) Seed coat

47. A monocarpic plant is that which :

- (A) Produces only one seed per fruit
- (B) Produces only one fruit in its life cycle
- (C) Produces only one carpel in its flower
- (D) Flowers only once in its life cycle

48. Pollination by ants is called :

- (A) Malacophily
- (B) Myrmicophily
- (C) Anemophily
- (D) Ornithophily

49. Curved ovule with horse-shoe shaped embryo sac and with micropyle, chalaza and funicle lie near each other is called :

- (A) Amphitropous ovule
- (B) Anatropous ovule
- (C) Hemianatropous ovule
- (D) Circinotropous ovule

50. Which fruit is a type of nut :

- (A) Walnut
- (B) Cashew nut
- (C) Ground nut
- (D) Arçca nut

51. Whiptail disease in plants such as cauliflower or broccoli, in which the leaves appear twisted and subsequently die, is associated with :

- (A) Nitrogen deficiency
- (B) Molybdenum deficiency
- (C) Zinc deficiency
- (D) Calcium deficiency

52. Formation and expansion of a gas bubble in the xylem, that breaks the continuity of the water column and prevent water transport is known as :

- (A) Guttation
- (B) Tylosis
- (C) Embolism
- (D) Vaporization

53. Among following inorganic solutes which one is relatively immobile in phloem :

- (A) Calcium
- (B) Magnesium
- (C) Chloride
- (D) Potassium

54. Which of following is true about water ?
- (A) Higher specific heat helps plants buffer temperature fluctuations
  - (B) Higher latent heat of vaporization helps plants to cool themselves
  - (C) Higher dielectric constant makes it a good solvent for ionic compounds
  - (D) All of these
55. All chlorophylls have a ring structure related to the porphyrin and a hydrocarbon tail attached to the ring structure. Chlorophyll b differs from Chlorophyll a in :
- (A) Chlorophyll b has a -CHO group attached to ring
  - (B) Chlorophyll a has a complex ring structure
  - (C) Chlorophyll b has a long hydrocarbon tail
  - (D) None of these
56. Which of the following is a water soluble mobile electron carrier in electron transport chain ?
- (A) Plastoquinone
  - (B) P680
  - (C) Plastocyanin
  - (D) Cytochrome  $b_6f$
57. Conversion of glucose to pyruvate in glycolysis gives a net yield of :
- (A) 1 ATP
  - (B) 2 ATP
  - (C) 4 ATP
  - (D) 6 ATP
58. Formation of ATP in the pay off phase of glycolysis is an example of :
- (A) Oxidative phosphorylation
  - (B) Photophosphorylation
  - (C) Substrate level phosphorylation
  - (D) Fermentation
59. Which of the following enzymes is required only during the  $\beta$ -oxidation of unsaturated fatty acids ?
- (A) Dehydrogenase
  - (B) Hydratase
  - (C) Isomerase
  - (D) Thiolase
60. Low  $K_m$  (Michaelis-Menton constant) value signifies that the enzyme :
- (A) Has higher affinity for the substrate
  - (B) Is inefficient
  - (C) Has lower affinity for the substrate
  - (D) None of these

1. Tobacco Mosaic Virus is a :
  - (A) Negative sense single stranded RNA virus
  - (B) Positive sense single stranded RNA virus
  - (C) Positive sense double stranded RNA virus
  - (D) DNA virus
  
2. Which of the following algae can fix atmospheric Nitrogen and also has heterocyst ?
  - (A) *Volvox*
  - (B) *Chara*
  - (C) *Spirogyra*
  - (D) *Nostoc*
  
3. Cynophages are :
  - (A) Virus resembling cynophyceae
  - (B) Viruses infecting cynophyceae
  - (C) Bacteria resembling plant cell
  - (D) Bacteria with carotenoids
  
4. Causal organism of water bloom is :
  - (A) Blue green algae
  - (B) *Spirogyra*
  - (C) Mosses
  - (D) Ferns
  
5. Bryophytes are dependent on water because :
  - (A) It is essential for their vegetative propagation
  - (B) Archegonia cannot develop without it
  - (C) It is essential for fertilization
  - (D) Spores cannot develop without it
  
6. Protonema represents :
  - (A) Fossil pteridophyte
  - (B) Protoplast of nematodes
  - (C) Juvenile stage of *Polytrichum* gametophyte
  - (D) Mature *Polytrichum* gametophyte
  
7. Heterosporous ferns always produce :
  - (A) Monoecious gametophytes
  - (B) Dioecious gametophytes
  - (C) Homothallic gametophytes
  - (D) Sporophyllous gametophytes

8. A stele without a central pith is :  
(A) Dictyostele (B) Siphonostele  
(C) Protostele (D) Solenostele
9. Matrix of primary cell wall is composed of :  
(A) Cellulose (B) Hemi cellulose  
(C) Pectic substances (D) Both (B) and (C)
10. Cellulose synthase – the enzyme involved in cell wall synthesis is located in :  
(A) Plasma membrane  
(B) Rough Endoplasmic reticulum  
(C) Golgi apparatus  
(D) Cytoplasm
11. Bridge and fragment visible during anaphase-I of cell division are signs of :  
(A) Duplication (B) Deficiency  
(C) Paracentric inversion (D) Translocation
12. Translocations represent a type of :  
(A) Intrachromosomal structural alterations  
(B) Interchromosomal structural alterations  
(C) Aneuploidy  
(D) Euploidy
13. Which of the following interactions are not involved in the stability of double helix ?  
(A) Hydrogen bonding (B) Di-sulphide linkage  
(C) Hydrophobic interactions (D) van der Waals's forces
14. Variegated colouration of leaves is inherited only from the female parent. The genes coding for this trait are located in the :  
(A) Nucleus (B) Plastids  
(C) ER (D) Cytoplasm
15. The consensus sequence in most eukaryotic promoters is :  
(A) AAT TAA (B) TTA AAA  
(C) TAT AAA (D) ATA TAT

16. An interaction between non allelic genes in which an allele at one locus prevents expression of an allele at another locus, but not vice versa, is called :
- (A) Collaboration (B) Complementation  
(C) Epistasis (D) Modification
17. pBR 322 has :
- (A) Ampicillin resistance selectable marker only  
(B) Tetracycline resistance selectable marker only  
(C) Tetracycline and Ampicillin selectable markers  
(D) Tetracycline and Kanamycin resistance selectable markers
18. Head of bacteriophage Lambda can accommodate :
- (A) 6 kb DNA fragment (B) 52 kb DNA fragment  
(C) 23 kb DNA fragment (D) 78 kb DNA fragment
19. Which of these is not true ?
- (A) DNA and cDNA are functionally similar  
(B) cDNA and DNA contain introns and exons  
(C) DNA is the naturally occurring genetic material whereas cDNA is the product of reverse transcriptase activity  
(D) The reverse transcriptase uses RNA as a template to synthesize cDNA
20. A protein A was sequenced and found to have the following aminoacid sequence; lys-ser-thr-gly-tyr-lys-gly-glu. In some cells, however, this protein was found to be lys-ser-thr-gly-tyr-ala-gly-glu. What must have happened ?
- (A) mRNA codon was wrongly read  
(B) mRNA codon was wrongly translated  
(C) a single substitution must have occurred in the DNA  
(D) it is a nonsense mutation
21. Taxonomic hierarchy consists of :
- (A) Seven obligatory categories  
(B) Nine obligatory categories  
(C) Eleven obligatory categories  
(D) Thirteen obligatory categories

22. Engler and Prantl system of classification is a :
- (A) Natural system (B) Phylogenetic system  
(C) Artificial system (D) Phenetic system
23. Paratypes are :
- (A) Specimens cited in original description other than holotype  
(B) Specimen to which the name of the taxon is permanently attached  
(C) Duplicate of holotype  
(D) Specimen selected from original material to serve as nomenclature, if holotype is missing
24. Grouping plants together on the basis of few external characters represents :
- (A) Natural system (B) Phenetic system  
(C) Artificial system (D) Phylogenetic system
25. Which of the following is called as the primitive angiosperm ?
- (A) *Magnolia* (B) *Poa*  
(C) *Rosa* (D) *Crocus*
26. Keel petals are characteristic of :
- (A) Papilionaceae (B) Asteraceae  
(C) Poaceae (D) Brassicaceae
27. Capitulum represents a/an :
- (A) Flower in family Asteraceae  
(B) Inflorescence in family Asteraceae  
(C) Fruit in family Asteraceae  
(D) Involucral bracts in Asteraceae
28. Taxa of which of the following families possess actinomorphic as well as zygomorphic flowers ?
- (A) Rosaceae (B) Asteraceae  
(C) Ranunculaceae (D) Solanaceae
29. Quiescent centre is present in :
- (A) Shoot meristem (B) Vascular bundle  
(C) Cortical tissue (D) Root tip

30. Only meristem which is primary in origin and secondary in function is :
- (A) Vascular cambium (B) Shoot apex  
(C) Root apex (D) Cork meristem
31. Scattered vascular bundles are present in the stems of :
- (A) Dicots (B) Monocots  
(C) Gymnosperms (D) Both (A) and (B)
32. Mycorrhiza refers to :
- (A) Abnormal outgrowths on stem in angiosperms  
(B) Root nodules  
(C) Fungi growing in association with roots of higher plants  
(D) Lichens
33. Secondary xylem originates from a/an :
- (A) Intercalary meristem (B) Lateral meristem  
(C) Shoot meristem (D) Cork cambium
34. Vascular cambium is a/an :
- (A) Intercalary meristem  
(B) Lateral meristem  
(C) Apical meristem  
(D) Primary meristem in function
35. Out of the heart and sap wood produced as a result of secondary xylem activity :
- (A) Only sap wood is physiologically active  
(B) Only heart wood is physiologically active  
(C) Both heart and sap wood are active physiologically  
(D) Both heart and sap wood are inactive
36. Which one of the following is designated as living fossil ?
- (A) Lycopodium (B) Ephedra  
(C) Pine (D) Cycas
37. Entomophily represents :
- (A) Pollination by bats (B) Pollination by birds  
(C) Seed dispersal by insects (D) Pollination by insects

38. In sporophytic self-incompatibility :
- (A) S allele of the mother controls incompatible reaction
  - (B) S allele of the pollen controls incompatible reaction
  - (C) S allele of the vegetative cell controls incompatible reaction
  - (D) S allele of the mother controls generative incompatible reaction
39. Primary Endosperm Nucleus (PEN) is a product of :
- (A) Syngamy
  - (B) Polar fusion
  - (C) Triple fusion
  - (D) Pseudogamy
40. Formation of embryo from an unfertilized egg is :
- (A) Apospory
  - (B) Parthenocarpy
  - (C) Pseudogamy
  - (D) Parthenogenesis
41. Water rises in the stem due to :
- (A) Osmotic pressure
  - (B) Turgor pressure
  - (C) Cohesive transpirational force
  - (D) Root absorption force
42. A cell has osmotic potential of  $-25$  bars and a pressure potential of  $+7$  bars. Its water potential is :
- (A)  $-18$  bars
  - (B)  $18$  bars
  - (C)  $32$  bars
  - (D)  $-32$  bars
43. Facilitated diffusion through plasma membrane is helped by :
- (A) Ions
  - (B) Proteins
  - (C) Hydrophobic tails of lipids
  - (D) Water
44. Seed dormancy is attributed to :
- (A) Auxins
  - (B) Gibberellins
  - (C) Ethylene
  - (D) Abscisic acid
45.  $\text{CO}_2$  acceptor in  $\text{C}_3$  plants is :
- (A) PEG
  - (B) PGA
  - (C) Malic acid
  - (D) Rudp

46. Which among the following acts as electron acceptor in photosynthesis ?
- (A)  $O_2$  (B)  $H_2O$   
(C)  $H^+$  (D)  $NADP^+$
47. In presence of red light the phytochrome shifts as :
- (A)  $P_R - Pfr$  form  
(B)  $Pfr - P_R$  form  
(C)  $P_R$  - higher quantity of  $P_R$   
(D)  $Pfr$  - higher quantity of  $Pfr$
48. Kranz anatomy is characteristic of :
- (A)  $C_3$  plants (B)  $C_4$  plants  
(C) CAM plants (D) Both (B) and (C)
49. Plants needing dark period more than the critical length for flowering are :
- (A) Long day plants (B) Short day plants  
(C) Day neutral plants (D) Night flowering plants
50. Catalytic efficiency of an enzyme is given as a ratio of :
- (A)  $V_{max} / [E_T]$  (B)  $k_{cat} / k_m$   
(C) None of the above (D) Both (A) and (B)
51. Chilling requirement for flowering in angiosperms is referred to as :
- (A) Vernalisation (B) Cryopreservation  
(C) Photoperiodism (D) Imbibition
52. According to enzyme code members, the lyases group of enzymes are given which code ?
- (A) EC 2 (B) EC 1  
(C) EC 5 (D) EC 4
53. Variables produced in an essentially homogenous genetic stock under different environmental conditions are called as :
- (A) Ecads (B) Cytotypes  
(C) Ecocline (D) Sympatric species

54. Which one of the following is an adaptive feature of hydrophytes ?  
(A) Spongy tissue (B) Thick palisade layer  
(C) Tap root system (D) Winged seeds
55. Soils at high altitude are characterized with :  
(A) Basic nature (B) Neutral nature  
(C) Acidic nature (D) Both (A) and (B)
56. Ozone layer is situated in :  
(A) Stratosphere (B) Troposphere  
(C) Ionosphere (D) Biosphere
57. Which of the following occupies the basal position in an ecosystem ?  
(A) Producers (B) Micro-consumers  
(C) Macro-consumers (D) Scavengers
58. Which one of the following is anticancerous ?  
(A) Atropine (B) Podophyllotoxin  
(C) Artemisine (D) Scopolamine
59. Which among the following is a source of vegetable oil ?  
(A) Ground nut (B) Maize  
(C) Artemisia (D) Bamboo
60. Pyramid of number in a forest ecosystem is :  
(A) Upright (B) Inverted  
(C) Rhomboidal (D) Either upright or inverted

- The Protein and nucleic acid ratio in TMV (Tobacco Mosaic Virus) is :
  - 64.4:35.6
  - 74.4:25.6
  - 84.4:15.6
  - 94.4:5.6
- Which of the following is an aseptate, siphonous and coenocytic alga :
  - Chlorella*
  - Chara*
  - Vaucheria*
  - Volvox*
- The Gonimoblast initials are found in :
  - Batrachospermum*
  - Ectocarpus*
  - Chara*
  - Oedogonium*
- Match the related features of following columns and choose the correct pairing given below :

**Column A**

- Morchella*
  - Phytophthora infesta*
  - Rhizopus stolonifer*
  - Alternaria brassicae*
  - Puccinia graminis tritici*
- (A) 1-A; 2-B; 3-C; 4-D; 5-E  
(C) 1-C; 2-B; 3-D; 4-B; 5-E

**Column B**

- Late blight of potato
  - Leaf spot of crucifers
  - Guchhi
  - Soft rot of sweet potato
  - Stem rust of wheat
- (B) 1-E; 2-A; 3-D; 4-B; 5-C  
(D) 1-B; 2-C; 3-A; 4-E; 5-D

- A protostele wherein the central xylem core breaks into more or less parallel plates is known as :
  - Haplostele
  - Actinostele
  - Plectostele
  - Mixed protostele
- Nostoc* lives in the thalli of *Anthoceros* possibly as :
  - Nitrogen fixer
  - Obligate parasite
  - Hyper parasite
  - Space parasite

7. Which of the following bryophytic member is commonly known as "Scouring rushes" :
- (A) *Marchantia* (B) *Lycopodium*  
(C) *Equisetum* (D) *Polytrichum*
8. In *Polytrichum* the central part of the capsule occupied by a thick sterile column of parenchymatous cells is labeled as :
- (A) Columella (B) Apophysis  
(C) Epiphragm (D) Annulus
9. In a primary cell wall the hemicelluloses content is upto :
- (A) 25% (B) 50%  
(C) 75% (D) 60.4%
10. The structure formed during meiotic division which facilitates the crossing over is called :
- (A) Chromocentre (B) *Kinetochore*  
(C) Synzetic knot (D) Synoptonemal complex
11. Photosystem II (PSII) occurs in membranes of only appressed parts of :
- (A) Stroma thyllakoids  
(B) Grana thyllakoids  
(C) Both Stroma and Grana thyllakoids  
(D) In partially-appressed parts of grana thyllakoids
12. The crossing-over within the pericentric inversion loop :
- (A) Does not alter the morphology of affected chromosomes  
(B) May alter the centromeric positions  
(C) Dominantly alters the morphology of affected chromosomes  
(D) Both (B) and (C)
13. In sweet pea genes "C" and "P" are necessary for colour of flowers. The flowers are white in the absence of either or both the genes, what will be the percentage of coloured flowers in the offspring of the cross between  $CcPp \times ccPp$  :
- (A) 25% (B) 50%  
(C) 75% (D) 100%

14. 9 :7 ratio in the F2 generation is produced due to the presence of :
- (A) Pleiotropic genes                      (B) Supplementary genes  
(C) Complementary genes                (D) Recessive genes
15. The DNA segments which are formed from RNA under the influence of RNA dependent DNA polymerase enzyme are termed as :
- (A) Transposons                              (B) Retroposons  
(C) Repressible genes                      (D) Pseudogenes
16. Mini-satellite sequences are :
- (A) 1-6 bp repeat units flanked by conserved sequences  
(B) 1-6 bp flanked by conserved restrictions  
(C) 11-30 bp repeat units flanked by conserved sequences  
(D) 11-30 bp flanked by conserved restrictions sites
17. The prokaryotic mRNA is :
- (A) Short living and polycistronic        (B) Short living and monocistronic  
(C) Long living and polycistronic        (D) Long living and monocistronic
18. Which of the following is the first base of all nonsense codons :
- (A) Adenine                                    (B) Cytosine  
(C) Guanine                                    (D) Uracil
19. An amino acid coded by more than one codon reflects the property of genetic code termed as :
- (A) Universal                                  (B) Non-overlapping  
(C) Degenerative                              (D) Colinearity
20. *Agrobacterium* mediated gene transfer is mostly successful in :
- (A) Dicots                                        (B) Monocots  
(C) Both (A) and (B)                        (D) Neither (A) and (B)

21. The specimen collected from the same locality from which the holotype was originally collected is termed as :

- (A) Epitype
- (B) Lectotype
- (C) Topotype
- (D) Syntype

22. The classification based on evolutionary as well as genetic relationships is designated as :

- (A) Artificial system of classification
- (B) Natural system of classification
- (C) Evolutionary system of classification
- (D) Cladistics

23. The term "New systematics" was proposed by :

- (A) John Ray, 1705
- (B) Julian Huxley, 1940
- (C) Hutchinson, 1908
- (D) Bentham and Hooker, 1758

24. Ordinas Anomali of Bentham and Hooker includes :

- (A) A few orders which could not be placed satisfactorily in the classification
- (B) Plants described only in fossil record
- (C) Plants described only in literature
- (D) Seed plants showing abnormal growth and development

25. The Gymnospermous type of wood is present in some members of which of the following angiospermous family :

- (A) Ranunculaceae
- (B) Rosaceae
- (C) Magnoliaceae
- (D) Malvaceae

26. Alpha taxonomy usually refers to :

- (A) Exploratory phase
- (B) Consolidation phase
- (C) Both (A) and (B)
- (D) Biosystematic phase

27. When a fossilized material is extracted in the form of nummified specimen it is known as :

- (A) Ambers
- (B) Incrustations
- (C) Compactions
- (D) Pterifications

28. Which amongst the following possess vessels in its secondary wood :
- (A) *Cycas* (B) *Pinus*  
(C) *Ephedra* (D) *Cedrus*
29. Quiescent centre is a reservoir of cells showing :
- (A) No meristematic activity (B) Occasional meristematic activity  
(C) High meristematic activity (D) Highly dormant phases
30. Tunica-carpus concept was first proposed by :
- (A) Hanstein, 1868 (B) Dermen, 1947  
(C) Schmidt, 1924 (D) Popham, 1952
31. Cambium, a tissue structurally and functionally depicts :
- (A) Secondary origin and primary function  
(B) Primary origin and primary function  
(C) Primary origin and secondary function  
(D) Secondary origin and secondary function
32. The multiple root cap is present in :
- (A) *Cephalis* (B) *Pandanus*  
(C) *Orchis* (D) *Tinospora*
33. Multiciliate top shaped antherozoid is found in :
- (A) *Cycas* (B) *Pinus*  
(C) *Ephedra* (D) *Cedrus*
34. The bract scale of *Pinus* facilitates :
- (A) Seed dispersal (B) Seed development  
(C) Fertilization (D) Both (A) and (B)
35. Which of the following statements is true about "heart wood" :
- (A) It is the outer light coloured zone of secondary xylem  
(B) It is the inner dark coloured zone of secondary xylem  
(C) It is also known as "alburnum"  
(D) None of these

36. The secondary growth as a rare feature of monocots is depicted by :  
 (A) *Dracaena* and *Asparagus* (B) *Asparagus* and *Yucca*  
 (C) *Dracaena* and *Lilium* (D) *Dracaena* and *Yucca*
37. Ubisch granules are connected with the development of :  
 (A) Endosperm (B) Embryosac  
 (C) Pollen grains (D) Embryo
38. When a pollen grain of tetraploid plant brings about the fertilization in diploid plant, the endosperm of the seed will be with :  
 (A)  $4n$  (B)  $3n$   
 (C)  $2n$  (D)  $5n$
39. The fleshy and colourful seed appendage which arises from the funiculus or testa is called :  
 (A) Operculum (B) Aril  
 (C) Caruncle (D) None of these
40. The natural barrier existing between androecium and gynoecium which favours allogamy is known as :  
 (A) Cleistogamy (B) Homogamy  
 (C) Herkogamy (D) Pterkogamy
41. In a completely plasmolysed cell, the TP is zero and osmotic potential is high, hence the DPD of the cell will be :  
 (A)  $DPD = OP - \infty$  (B)  $DPD = OP$   
 (C)  $DPD = OP - DPG$  (D)  $DPD = OP - 2$
42. Characteristic interveinal chlorotic spots develop and the principal vein remains typically green showing fine network of reticulate venation depicting the symptom of :  
 (A)  $Fe^{++}$  or  $Fe^{+++}$  (B)  $BO_3^{3-}$  or  $K^+$   
 (C)  $Zn^{++}$  or  $MoO_4^{--}$  (D)  $Fe^{+}$  or  $Zn^{++}$

43. Match the theories in column I with the names of the Scientists listed in Column II depicting correct combinations :

Column I

1. Relay pump theory
2. Transpiration cohesion theory
3. Mass flow
4. Pulsation theory

Column II

- A. Stocking
- B. Sir J. C. Bose
- C. Godlewski
- D. Dixon and Jolly
- E. Ernst Munch

- (A) 1 = C; 2 = D; 3 = E; 4 = B  
(B) 1 = D; 2 = C; 3 = A; 4 = B  
(C) 1 = C; 2 = B; 3 = E; 4 = B  
(D) 1 = B; 2 = A; 3 = E; 4 = C

44. Phosphorous is absorbed by the plants in the form of :

- (A)  $\text{H}_2\text{PO}_4^-$  and  $\text{H}_2\text{PO}_4^+$  (B)  $\text{HPO}_4^-$  and  $\text{HPO}_4^+$   
(C)  $\text{H}_2\text{PO}_4^{3-}$  and  $\text{H}_2\text{PO}_4^{4-}$  (D)  $\text{H}_2\text{PO}_4^-$  and  $\text{HPO}_4^{2-}$

45. Which of the following photosynthetic bacteria have both PS I and PS II :

- (A) Cyanobacteria (B) Green sulphur bacteria  
(C) Purple sulphur bacteria (D) Purple non-sulphur bacteria

46. The carotenoids absorb light wavelengths between :

- (A) 650 – 740 nm (B) 550 – 650 nm  
(C) 400 – 500 nm (D) 300 – 390 nm

47. When a molecule of pyruvic acid is subjected to anaerobic oxidation, there is :

- (A) Consumption of 2 molecules of ATP  
(B) Consumption of 6 molecules of ATP  
(C) Gain of 2 molecules of ATP  
(D) Gain of 4 molecules of ATP

48. How many water molecules are produced in one Krebs's cycle through electron transport chain ?

- (A) One (B) Two  
(C) Three (D) Four

49. An efficient rooting inducing chemical commercially recommended in horticulture is :

- (A) IBA
- (B) NAA
- (C) GAA
- (D) 2, 4-D

50. Ethylene, a gaseous hormone :

- (A) Breaks bud and seed dormancy in some species
- (B) Is a fruit ripening hormone
- (C) Induces flowering in Mango and Pineapple
- (D) All the above i.e. (A), (B) and (C)

51. Km (Michaelis Menten constant) generally lies between  $10^{-1}$  to  $10^{-6}$ , a high Km of an enzyme depicts :

- (A) High affinity for substrate
- (B) Low affinity for substrate
- (C) No affinity for the substrate
- (D) None of the above

52. In temperate legumes a major part of fixed nitrogen is passed to the host as :

- (A) Glutamine
- (B) Ureids
- (C)  $\alpha$ -Ketoglutarate
- (D) None of the above

53. The soil horizon which contains mineral matter mixed with humus, rich in microorganisms and very high biological activity is :

- (A) C - Horizon
- (B) B - Horizon
- (C) A - Horizon
- (D) O - Horizon

54. Which of the following is also referred to as fecundity rate :

- (A) Realized Mortality
- (B) Potential Mortality
- (C) Realized Natalty
- (D) Potential Natalty

55. In some adapted plants the seed germinates inside the fruit while it is still on the parent tree-a phenomenon known as :

- (A) Lithophytes
- (B) Halophytes
- (C) Xerophytes
- (D) Chersophytes

56. In a population where growth rate is nearly zero, the age pyramid will be :
- (A) Bell shaped                      (B) Urn shaped  
(C) Triangle shaped                (D) Ring shaped
57. Which of the following plant is ethno-medicinally used to cure acidity, diarrhea and hepatic disorders :
- (A) *Podophyllum hexandrum*      (B) *Atropa acuminata*  
(C) *Artemisia absinthium*        (D) *Atropa belladonna*
58. Which of the following ecosystems is least productive :
- (A) Coral reefs                        (B) Pond ecosystems  
(C) Ocean ecosystems                (D) Desert ecosystems
59. Which of the following is the commercial source of ground nut edible oil :
- (A) *Cicer arietinum*                    (B) *Cajanus cajan*  
(C) *Arachis hypogea*                (D) *Butea frondosa*
60. In the process of ecological succession living organisms and environment influence each other, consequently leading to another community, this is termed as :
- (A) Ecosis                                (B) Reaction  
(C) Aggregation                        (D) Nudation

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) Peperomia 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 *b6*/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)  $\text{Ca}^{2+}$  (B)  $\text{Na}^+$   
(C)  $\text{Mg}^{2+}$  (D)  $\text{K}^+$
27. Which component of  $\text{F}_0\text{F}_1$ -ATP synthase contains the catalytic site for conversion of ADP and  $\text{P}_i$  into ATP ?
- (A)  $\text{F}_0$  component  
(B)  $\text{F}_1$  component  
(C) Both  $\text{F}_0$  and  $\text{F}_1$  components have separate catalytic sites  
(D) Neither  $\text{F}_0$  nor  $\text{F}_1$  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) *Nitrospira* (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) *Phytophthora* (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 Tryptophan  
(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

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 uredospores 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 is 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 is 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 Lysosomes
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



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) Heteroplasmy                          (b) Parsimony  
(c) Homoplasmy                          (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 meristem characteristically undergo :
- (a) Only anticlinal divisions  
(b) Only periclinal divisions  
(c) Both anticlinal and periclinal divisions  
(d) Neither anticlinal nor periclinal 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 **antichinal 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 strobilus 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 seed coat to water  
(b) Impermeability of seed 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.  $\alpha$ -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) Sues 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*

# BOTANY - 2010

## M.Sc. Botany

- The unique base present in the DNA of T-even phages is :
  - 5-hydroxymethyl adenine
  - 5-hydroxymethyl guanine
  - 5-hydroxymethyl cytosine
  - Uracil
- The position of heterocysts in *Nostoc* is :
  - Intercalary
  - Terminal
  - Lateral
  - None of the above
- Sexual reproduction in *Phytophthora* is :
  - Isogamous
  - Oogamous
  - Anisogamous
  - All of the above
- Which of the following spore types are uninucleate in *Puccinia graminis* ?
  - Uredospores and Basidiospores
  - Teleutospores Pycnidiospores
  - Uredospores and Teleutospores
  - Basidiospores and Pycnidiospores
- Siphonaceous habit is characteristic of :
  - Volvox*
  - Vaucheria*
  - Oedogonium*
  - Chara*
- A pigment absent in Xanthophyceae is :
  - Chlorophyll
  - Xanthophyll
  - Carotene
  - Phycocyanin
- Elaters in *Marchantia* exhibit :
  - Hydrochasy
  - Xerochasy
  - Circumnutation
  - Nutation
- Which of the following statements is true about *Anthoceros* ?
  - Tuberculate rhizoids are present on ventral surface of the thallus
  - Tuberculate rhizoids are present on dorsal surface of the thallus
  - Smooth-walled rhizoids are present on ventral surface of the thallus
  - 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 hydrogen 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) Bicolateral 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<sub>2</sub> compensation point is high in :
- (a) C<sub>3</sub> plants (b) C<sub>4</sub> plants  
(c) C<sub>2</sub> 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 citric acid cycle yields :
- (a) 2FADH<sub>2</sub>, 2NADH<sub>2</sub>, 2GTP (b) 1FADH<sub>2</sub>, 3NADH<sub>2</sub>, 1GTP  
(c) 1FADH<sub>2</sub>, 2NADH<sub>2</sub>, 1GTP (d) 1FADH<sub>2</sub>, 1NADH<sub>2</sub>, 2GTP
47. Which of the following is responsible for apical dominance ?
- (a) IAA (b) GA<sub>3</sub>  
(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*

# BOTANY 2006

1. Exploitation and analysis 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) Uniflagellate
- (c) Multiflagellate
- (d) Biflagellate

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 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 as

- (a) Acrocarpous
- (b) Pleurocarpous
- (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 in 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 pteridophytic 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 most primitive group in dicots as per Engler and Prantl is

- (a) Ranales
- (b) Asteraceae
- (c) Amentiferae
- (d) Magnoliaceae

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 syngamous ?

- (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) Chasmogamy
- (d) Geitonogamy

31. The first division of the zygote in Piper 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  $\beta$  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 serine
- (b) Conversion of serine to  $\text{CO}_2$  and  $\text{NH}_3$
- (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. Pyramid of number of a parasitic food chain would be always

- a) Upright
- b) Inverted
- 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) Photoheterotrophs
- (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)  $\Delta S$  and  $\Delta H$
- (b)  $-\Delta S$  and  $+\Delta H$
- (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 ATP is

- (a)  $MgATP^{2-}$
- (b)  $Mg^{2+}$
- (c)  $MgADP^-$
- (d) None of the above

52. Which of the following is not formed when yeast is producing wine?

- (a) Pyruvic acid
- (b) Ethanol
- (c)  $CO_2$
- (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)  $\frac{15}{4}$
- (d) 0

The extent of correlation between two related variables decreases, the value of correlation 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 mutant phenotype; 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) near 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*
- (b) *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<sup>+</sup>
- (b) Ca<sup>++</sup>
- (c) Mg<sup>++</sup>
- (d) Mn<sup>+</sup>

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 F<sub>2</sub> 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 recognise codons GCU, GCC and GCA
- (b) can recognise only codon GCU
- (c) can recognise only codon GCA
- (d) can recognise all the three codons

17. The anticodon IGC :

- (a) Prokaryotic DNA polymerase I
- (b) Prokaryotic DNA polymerase II
- (c) Prokaryotic DNA polymerase III
- (d) Eukaryotic DNA polymerase  $\beta$

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 megasporophyllis
- 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) J 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.  $\text{+ff} \cdot \text{1} \setminus \text{5} \text{ C } 5 \sim \sim 5 \text{ G}(2)$  is the floral formula of :

- (a) *Helianthus annuus*
- (b) *Brassica campestris*
- (c) *Lathyrus odoratus*
- (d) *Solanum nigrum*

25. A small cup shaped inflorescence containing 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*

Botany 6

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.  $\Psi_w$  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) End 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) Dinitrogen 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<sub>2</sub>
- (c) RuBP + CO<sub>2</sub>
- (d) RuBP + CO<sub>2</sub> + PEP

45. Which one of the following facts explains "Warburg Effect" ?

- (a) Rate of photosynthesis decreases at low O<sub>2</sub> concentration
- (b) Rate of photosynthesis increases at low O<sub>2</sub> concentration
- (c) Rate of photosynthesis decreases at high O<sub>2</sub> concentration
- (d) Rate of photosynthesis increases at high O<sub>2</sub> 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<sub>3</sub>
- (d) Kinetin

49. The correct sequence of electron acceptors in ATP synthesis" is :

- (a) Cytochrome *a, a<sub>3</sub>' b, c*
- (b) Cytochrome *b, c, a, a<sub>3</sub>*
- (c) Cytochrome *b, c, a<sub>3</sub>' a*
- (d)." Cytochrome *c, b, a, a<sub>3</sub>*

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) Steno'l'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) *Crotalaria 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.

# BOTANY 2008

1. Bacteria cannot 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)  $\text{NH}_4^+$
- (B)  $\text{NO}_2$
- (C)  $\text{NO}_3$
- (D) Organic nitrogen

5. In most of the enzymatic reactions that involve ATP as the phosphoryl donor, the *true* substrate is

- (A)  $\text{Mg ATP}^{2-}$
- (B)  $\text{Mn ATP}^{2-}$
- (C)  $\text{Ca ATP}^{2-}$
- (D) None of the above

6. During photorespiration, the conversion of glycine to serine, and of serine to  $\text{CO}_2$  and  $\text{NH}_3$  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)  $< 400 \text{ nm}$
- (B) Between  $400$  to  $700 \text{ nm}$
- (C)  $>740, \text{ nm}$

(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 cosmid
- (D) 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
- (D) 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 is *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