

Ph.D. ENTRANCE EXAMINATION, APRIL 2021**BOTANY**

Time : Two Hours

Maximum : 100 Marks

*Attempt Questions carefully.**Put tick mark against the correct answer.**Do not mark more than one answer for the MCQs.**All questions carry one mark each.**1 mark will be deducted for each wrong answer.*

1. International Biological programme was initiated in :
 - a) 1957.
 - b) 1964.
 - c) 1973.
 - d) 1986.
2. Friedreich Ataxia is a genetic condition due to the anticipation of the trinucleotide :
 - a) AGC.
 - b) GAA.
 - c) CAG.
 - d) CGG.
3. Which of the following statement is CORRECT ?
 - a) Gain of function of proto oncogene leads to cancer.
 - b) Loss of function of proto oncogene leads to cancer.
 - c) Gain of function of tumor suppressor gene leads to cancer.
 - d) All of the above.
4. Deamination of cytosine produce :
 - a) Xanthin.
 - b) 2,4 dioxo pyrimidine.
 - c) 2,6 dioxo purine.
 - d) Inosine.
5. Co factor of Alk-B :
 - a) Fe^{2+} .
 - b) Oxygen.
 - c) α -ketoglutarate.
 - d) All of the above.

6. Dioxin is an _____ causes gene mutation.
- a) Intercalating agent.
 - b) Alkylating agent.
 - c) Cross linking agent.
 - d) Oxidizing agent.
7. UvrB is a :
- a) Polymerase.
 - b) Ligase.
 - c) Primase.
 - d) Helicase.
8. IPTG is a gratuitous inducer of :
- a) Transacetylase.
 - b) β galactocidase.
 - c) lac permease.
 - d) None of the above.
9. Nitrogen fixing symbiont of *Saccharum officinarum* :
- a) Azospirillum.
 - b) Acetobacter.
 - c) Azorhizobium.
 - d) Azotobacter.
10. Synthetic auxin
- a) NAA.
 - b) 2, 4-D.
 - c) Dicamba.
 - d) All of the above.
11. The conversion-inter conversion property of Phytochrome :
- a) Photochromism.
 - b) Photoirradiation.
 - c) Photoperiodism.
 - d) None of the above.
12. Digitoxin is extracted from the leaves of :
- a) Acanthus.
 - b) Monkey face.
 - c) Fox glove.
 - d) Cryptomeria.
13. A net work of microtubules and F actins that formed during late cytokinesis :
- a) Spindle.
 - b) Plasmodesmata.
 - c) Tubulin.
 - d) Phragmoplast.
14. Cyclin A level increase at the onset of :
- a) G1 phase.
 - b) S phase.
 - c) G2 phase.
 - d) M phase.

15. Plant gene specific to nodules are called :

- a) Nodulation genes.
- b) Nodule genes.
- c) Nodulin genes.
- d) Nod genes.

16. Non β -lactam antibiotic :

- a) Cephamicin.
- b) Penicillin.
- c) Vancomycin.
- d) Cephalosporin.

17. Match the following :

- | | |
|------------------------|-----------------|
| I. Sclero protein | A. Albumin. |
| II. Conjugated protein | B. Collagen. |
| III. Basic protein | C. Histone. |
| IV. Globular protein | D. Lipoprotein. |
- a) I-A, II-D, III-C, IV-B.
 - b) I-D, II-B, III-A, IV-C.
 - c) I-B, II-D, III-C, IV-A.
 - d) I-C, II-B, III-A, IV-D.

18. Securin inactivates :

- a) APC.
- b) Cohesin cleaving enzyme.
- c) Cyclin A.
- d) None of the above.

19. Largest phase of cell cycle :

- a) G1.
- b) S.
- c) G2.
- d) M.

20. Sleeping beauty is a _____.

- a) Pseudogene.
- b) LTR.
- c) RNA transposon.
- d) DNA transposon.

21. The process of aligning chromosomes on the spindle is called :

- a) Spindle congression.
- b) Chromosome congression.
- c) Chromosome segregation
- d) Spindle alignment

22. Moon light enzyme :

- a) Aconitase.
- b) Pyruvate carboxylase.
- c) Aldolase.
- d) All of the above.

23. Dicer is a type of _____.

- a) Reverse transcriptase.
- b) Ribonuclease.
- c) Isomerise.
- d) Transferase.

24. Endosymbiotic theory was proposed by :

- a) Lynn Margulis.
- b) Albert Von Kolliker.
- c) Richard Altman.
- d) Carl Benda.

25. Match the following :

- | | |
|----------------------|----------------------|
| I. Ascomycotina | A. Fungi Imperfecti. |
| II. Basidiomycotina | B. Club fungi. |
| III. Deuteromycotina | C. Sac fungi. |
| IV. Zygomycotina | D. Coenocytic fungi. |

- a) I-C, II-B , III-A, IV-D.
- b) I-D , II- A, III-C , IV-B.
- c) I-C , II-B , III-A , IV-D.
- d) I-A , II- B, III-C , IV-D.

26. Which of the following is not a C4 plant ?

- a) Pearl millet.
- b) Wheat.
- c) Sorghum.
- d) Sugarcane.

27. Which of the following is non-coding RNA ?
- PiRNA.
 - miRNA.
 - RNaseP.
 - All of the above.
28. 'Taxonomy of Indian mosses' was a monograph published by :
- S K Pande.
 - S S Kumar.
 - RS Chopra.
 - Srivastava.
29. Apogamy was first reported in :
- Pteris sulcata*.
 - Pteris cretica*.
 - Osmunda javanica*.
 - Osmunda regalis*.
30. Which of the following yeasts have been studied as Single Cell Protein (SCP) ?
- Candida lipolytica*.
 - Toruopsis Candida*.
 - Hansenula polymorpha*.
 - All of the above.
31. Cryoprotectant :
- Dimethyl sulfoxide.
 - Sucrose.
 - Glycerol.
 - All of the above.
32. In which year Government of India launched 'Project Elephant' ?
- 1992.
 - 1993.
 - 1994.
 - 1995.
33. Match the following :
- | | |
|--------------------------------|----------------------|
| I. Gulf of Mannar | A. Western Ghats. |
| II. Sunderbans | B. Sikkim. |
| III. Nilgiri Biosphere Reserve | C. Tamilnadu. |
| IV. Kanchanjunga | D. Western Himalaya. |
| V. Nanda Devi | E. West Bengal. |
- I-D , II-E, III-A , IV-B , V-C.
 - I-D, II-E , III-A, IV-C , V-B.
 - I- A, II-E , III- B, IV-D, V-C.
 - I-C, II-E, III-A, IV-B, V-D.

34. PS II associated protein :

- a) D1.
- b) D2.
- c) CP43.
- d) All of the above.

35. The essential role of light in photosynthesis was documented by :

- a) C B Van Niel.
- b) Robert Emerson.
- c) Jan Ingenhousz.
- d) William Arnold.

36. Route of phloem loading

- a) Phloem Parenchyma → Companion Cells → Mesophyll Cells → Sieve Tubes.
- b) Mesophyll Cells → Phloem Parenchyma → Companion Cells → Sieve Tubes.
- c) Phloem Parenchyma → Companion Cells → Sieve Tubes → Mesophyll Cells.
- d) Sieve Tubes → Companion Cells → Mesophyll Cells → Phloem Parenchyma.

37. Gonophyll theory was proposed by :

- a) A W Eichler.
- b) Carl Linnaeus.
- c) John Ray.
- d) Ronald Melville.

38. Acid Fast bacteria :

- a) Mycobacterium tuberculosis.
- b) Mycobacterium leprae.
- c) Mycobacterium avium.
- d) All of the above.

39. Stachyose on hydrolysis gives :

- a) Two α -D glucose, one α -D galactose, one β -D fructose.
- b) Two α -D galactose, one α -D glucose, one β -D fructose.
- c) Two β -D fructose, one α -D glucose, one α -D galactose.
- d) Two α -D glucose, two α -D galactose, one β -D fructose.

40. Leaf area per unit of land area :

- a) Leaf area ratio.
- b) Leaf area unit.
- c) Land area ratio.
- d) Leaf area index.

41. Term ecology was coined by :

- a) Robert Marshall.
- b) A G Tansley.
- c) EP Odum.
- d) Harvey Broome.

42. Match the following :

Forest vegetation	Annual rain fall(cm)
I. Tropical wet evergreen forest	A. 87-127.
II. Tropical wet semi evergreen forest	B. 100- 200.
III. Tropical moist deciduous forest	C. 110- 250.
IV. Tropical dry evergreen forest	D. 200- 250.
V. Himalayan moist temperate forest	E. 290-320.

- a) I-E, II-D, III-B, IVA-, V-C.
- b) I-D, II-A, III-C, IV-B, V-E.
- c) I-E, II-D, III-B, IV-A, V-C.
- d) I-C, II-A, III-D, IVA-E, V-B.

43. Ratio of sensible heat flux to the latent heat flux :

- a) Flux ratio.
- b) Bowen ratio.
- c) Heat flux ratio.
- d) None of the above.

44. What is the unit of molar absorptivity which is used to determine absorbance A in Beer Lamberts law ?

- a) $L \text{ mol}^{-1} \text{ cm}^{-1}$.
- b) $L \text{ gm}^{-1} \text{ cm}^{-1}$.
- c) $L^{-1} \text{ mol}^{-1}$.
- d) No unit.

45. Which of the following pigment play an essential role in photo protection ?

- a) Zeaxanthin.
- b) Carotenoid.
- c) Chlorophyll.
- d) Anthocyanin.

46. Kino veins are found in :

- a) Eucalyptus.
- b) Angophora.
- c) Corymbia.
- d) All of the above.

47. Saturated fatty acid :

- a) Stearic acid.
- b) Oleic acid.
- c) Linoleic acid.
- d) Arachidonic acid.

48. Perigonial nectarines are present in :

- a) Ranunculus.
- b) Polygonium.
- c) Ceratonia.
- d) Caesalpinia.

49. Match the following

- | | |
|---------------------|---------------|
| I. Amphitropous | A. Opuntia. |
| II. Campylotropous | B. Mirabilis. |
| III. Circinotropous | C. Cycas. |
| IV. Orthotropous | D. Alisma. |
- a) I-A, II-D, III-B, IV-C.
 - b) I-B, II-C, III-A, IV-D.
 - c) I-D, II-B, III-A, IV-C.
 - d) I-C, II-D, III-A, IV-B.

50. Q banding of chromosome was developed by :

- a) Torbjorn Caspersson.
- b) Maximo Drets.
- c) Margery Shaw.
- d) Hans Von Winiwarter.

51. Largest known human gene :

- a) Myosin gene.
- b) Collagen gene.
- c) Dystrophin gene.
- d) Actin gene.

52. Match the following :

- | | |
|----------------------------|--|
| I. Haploid parthenogenesis | A. Development of embryo from any cell of the embryo sac other than egg. |
| II. Haploid apogamy | B. Development of embryo from any diploid cell of the ovule lying outside the embryosac. |
| III. Somatic apospory | C. Development of embryo from an unfertilized egg. |
| IV. Adventive embryony | D. Development of diploid embryo sac from the cells of nucellus/ integument. |
- a) I-A, II-C, II-D, IV-B.
b) I-C, II-A, II-D, IV-B.
c) I-C, II-B, II-A, IV-D.
d) I-A, II-B, II-C, IV-D.

53. Pataus syndrome :

- | | |
|------------------|----------------|
| a) Tetrasomy 12. | b) Trisomy 13. |
| c) Nullisomy. | d) Monosomy. |

54. Invitro culture of embryo was first initiated by :

- | | |
|----------------|-------------|
| a) Hanning. | b) SanNoem. |
| c) Maheshwari. | d) Steward. |

55. Seed germination is hypogeal in :

- a) *Ricinus communis*.
b) *Tamarindus indica*.
c) *Cicer arietinum*.
d) *Gossypium hirsutum*.

56. Protein present in plants which involved in the processing of miRNA :

- | | |
|-----------|-----------------------|
| a) DCL 1. | b) MYB. |
| c) P53. | d) None of the above. |

57. APG II recognised _____ families.

- | | |
|---------|---------|
| a) 389. | b) 457. |
| c) 562. | d) 675. |

58. The term cladistics was coined by :

- | | |
|-----------------------|--------------------|
| a) Cain and Harrison. | b) Van Valen. |
| c) Nixon and Wheeler. | d) Wet and Harlen. |

59. RNA world hypothesis put forth by :

- | | |
|-------------------|----------------------|
| a) Francis crick. | b) Carl Woese. |
| c) Leslie Orgel. | d) All of the above. |

60. Homologous genes in different species are called :

- | | |
|-----------------------|----------------------|
| a) Paralogous genes. | b) Cis genes. |
| c) Orthologous genes. | d) Hemilogous genes. |

61. Match the following :

- | | |
|------------------------|-------------------|
| I. Anomocytic stomata | A. Acanthaceae. |
| II. Anisocytic stomata | B. Mimosaceae. |
| III. Paracytic stomata | C. Solanaceae. |
| IV. Diacytic stomata | D. Ranunculaceae. |

- | |
|----------------------------|
| a) I-A, II-B, III-C, IV-D. |
| b) I-D, II-C, III-B, IV-A. |
| c) I-B, II-A, III-C, IV-D. |
| d) I-C, II-D, III-A, IV-B. |

62. Ewig's sarcoma :

- a) Develops in cells that form skeletal muscles.
- b) Develops in skin.
- c) Develop in the cells near the tendons and joints.
- d) Develop in bone cells or immature soft tissue.

63. The changes in gene frequency brought about purely by chance is called :

- a) Gene flow.
- b) Sewall Wright effect.
- c) Population Drift.
- d) Frequency shift.

64. Annonaceae family seeds contains :

- a) Nuclear endosperm.
- b) Ruminant endosperm.
- c) Helobial endosperm.
- d) None of the above.

65. 'Philosophia Botanica' was written by :

- a) A Pde Candolle.
- b) Aristotle.
- c) Carl Linnaeus.
- d) Adolf Engler.

66. Match the following :

- | | |
|-------------------|----------------------|
| I. Acidic stain | A. Cotton blue. |
| II. Basic stain | B. Eosin. |
| III. Vital stain | C. Orcein. |
| IV. Neutral stain | D. Janus green blue. |

- a) I-B, II-A, III-D, IV-C.
- b) I-A, II-D, III-B, IV-C.
- c) I-A, II-D, III-C, IV-B.
- d) I-D, II-B, III-A, IV-C.

67. ABA is a :

- a) Monoterpene.
- b) Diterpene.
- c) Triterpene.
- d) Sesquiterpene.

68. Which of the following is not crustose lichen ?

- a) Haematoma.
- b) Rhizocarpon.
- c) Cladonia.
- d) Lecanora.

69. Match the following :

- | | | |
|--------------------------------|----------------------|------------------|
| I. <i>Digitalis species</i> | A. Quinine | P. Antibacterial |
| II. <i>Papaver somniferum</i> | B. Cardiac glycoside | Q. Heart failure |
| III. <i>Plumbago indica</i> | C. Morphine | R. Pain killer |
| IV. <i>Cinchona ledgeriana</i> | D. Plumbagine | S. Antimalarial |

- a) I-B-P, II-C-Q, III-D-S, IV-A-R.
 b) I-A-R, II-C-S, III-D-Q, IV-B-P.
 c) I-B-Q, II-C-P, III-D-R, IV-A-S.
 d) I-B-Q, II-C-R, III-D-P, IV-A-S.

70. Which of the following is not a mangrove species ?

- a) *Ceriops decandra*. b) *Begonia grandis*.
 c) *Exoecaria agallocha*. d) *Bruguiera parviflora*.

71. Match the following :

- | | | |
|-------------------|-------------------------|--------------------------------|
| I. Oxidoreductase | A. Amylase | P. Pyruvic acid → Lactic acid. |
| II. Ligase | B. Pyruvate carboxylase | Q. Glutamic acid → GABA. |
| III. Hydrolase | C. Decarboxylase | R. Starch → Sugar. |
| IV. Lyase | D. Dehydrogenase | S. Pyruvate → OAA. |

- a) I-C-P, II-B-S, III-A-R, IV-D-Q.
 b) I-A-R, II-D-P, III-B-S, IV-C-Q.
 c) I-B-P, II-D-S, III-C-Q, IV-A-R.
 d) I-D-P, II-B-S, III-A-R, IV-C-Q.

72. Who postulated tunica corpus theory ?

- a) Hanstein. b) Schmidt.
 c) Schuepp. d) Nageli.

79. Transcription rate in prokaryotes :
- a) 20-30 nucleotides/ sec.
 - b) 40- 60 nucleotides/ sec.
 - c) 60- 70 nucleotides/ sec.
 - d) 80- 100 nucleotides/sec.
80. Which of the following polypeptide of RNA polymerase II hold the catalytic triad ?
- a) RPB1.
 - b) RPB3.
 - c) RPB5.
 - d) RPB7.
81. In Guinea pigs rough coats (R) is dominant over smooth coat (r) and black coat (B) is dominant over white (b). A rough black Guinea pig bred with a rough white one gives 28 rough black, 31 rough white, 11 smooth black and 10 smooth white. What are the genotypes of the parents?
- a) RRB band RrBb.
 - b) RrBb and RRbb.
 - c) RrBb and Rrbb.
 - d) RrBB and rrBb.
82. In a population of dogs, the allele for white hair is recessive and the allele for brown hair is dominant. If the population consists of 500 individuals and the frequency of homozygous brown dog is 49 %, what is the frequency of the recessive allele ?
- a) 0.03.
 - b) 0.70.
 - c) 0.30.
 - d) 0.09.
83. Which of the following is a symptom of fungal disease ?
- a) Tar spots.
 - b) Mildews.
 - c) Scab.
 - d) All of the above.
84. Restriction site of Hind III :
- a) AAGCTT.
 - b) AACGTA.
 - c) ACGTAC.
 - d) ACTAGA.
85. If recombination event of three point crossing produces 6 double crossovers, 142 single crossovers and 352 non crossovers. What will be the percentage crossover between the terminal genes?
- a) 10 %.
 - b) 14.8 %.
 - c) 20.8 %.
 - d) 30.8 %.

86. In Arabidopsis mutant the flowers had sepals, sepals, carpels, carpels in the four whorls. Mutation in which of the following is the cause of mutant phenotype :
- a) A class gene.
 - b) B class gene.
 - c) A and B class gene.
 - d) C class gene.
87. In a symmetrical distribution :
- a) Skewness = 0, Kurtosis < 3.
 - b) Skewness = -1, Kurtosis > 3.
 - c) Skewness = 0, Kurtosis \neq 3
 - d) Skewness = 0, Kurtosis = 3.
88. DNA amplification where the region of DNA amplified lies on either side of a known segment :
- a) RT PCR.
 - b) Anchored PCR.
 - c) Inverse PCR.
 - d) Nested PCR.
89. Which of the following statement is correct about dark field illumination in microscopy ?
- a) Observe sample by illuminating the back surface.
 - b) Outline of the sample shine against a dark background.
 - c) Observe specimen darker than background.
 - d) None of the above.
90. Plants which complete their life cycle before the occurrence of stress are called :
- a) Stress avoider.
 - b) Stress escaper.
 - c) Stress tolerant.
 - d) None of the above.
91. Typification concept was dealt in
- a) Leningrad Code.
 - b) Stockholm Code.
 - c) Shenzen Code.
 - d) Melbourne Code.
92. The first published gene sequence was of :
- a) T4 phage.
 - b) Lamda phage.
 - c) Phi \times 174.
 - d) M13 phage.
93. Consider a gene with four alleles S_1 , S_2 , S_3 and S_4 . In a cross between $S_1 S_2$ and $S_3 S_4$, what is the probability that a particular offspring inherits either S_1 or S_3 or both ?
- a) 1/2.
 - b) 1/4.
 - c) 3/2.
 - d) 3/4.

94. Margaret Dayhoff developed the first protein sequence database called :
- a) PDB.
 - b) SWISS PORT.
 - c) Atlas of protein sequence and structure.
 - d) Protein sequence data book.
95. Mad cow disease is caused by :
- a) Virus.
 - b) Viroids.
 - c) Bacteria.
 - d) Prions.
96. First cultivated wheat was :
- a) Triticum speltoides.
 - b) Triticum monococum.
 - c) Triticum boeoticum.
 - d) Triticum tauschi.
97. Artificial male sterility can be obtained for hybridisation experiments with the help of :
- a) NAA.
 - b) 2, 4-D.
 - c) Maeic hydraside.
 - d) All of the above.
98. Race specific resistance is called :
- a) Horizontal resistance.
 - b) Vertical resistance.
 - c) Apparent resistance.
 - d) Specific race resistance.
99. Wilt disease of sugarcane was first reported in India from :
- a) Tamilnadu.
 - b) Punjab.
 - c) Bihar.
 - d) Uttarpradesh.
100. Improved dwarf wheat variety with higher percentage of lysine/protein is :
- a) Kalyan.
 - b) Sonalika.
 - c) Lerma Roja.
 - d) Sharbati Sonara.