

(NOT TO BE OPENED BEFORE TIME OR TILL ASKED TO DO SO)

PHDURS-EE-2013

SUBJECT : Botany



10045

Sr. No.

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Candidate's Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Roll No. (in figures) _____ (in words) _____

Date of Examination _____

(Signature of the Candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. **All questions are compulsory and carry equal marks.**
2. All the candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means/misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing **within two hours** after the test is over. No such complaint(s) will be entertained thereafter.
4. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **Should Not** be ticked in the question booklet.
5. **Use black or blue ball point pen only in the OMR Answer-Sheet.**
6. For each correct answer, the candidate will get full credit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer. There will be No Negative marking.
7. *Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.*

PHDURS-EE-2013/Botany/(A)



1. The high solubility of amino acids in water is due to :
 - (1) presence of side chain
 - (2) dipolar ion structure
 - (3) unipolarity
 - (4) hydrophilic nature of amino groups
2. Which is the most common approach to determine the precise 3-D structure of globular proteins ?
 - (1) Circular dichroism
 - (2) Mass spectroscopy
 - (3) Infrared spectroscopy
 - (4) X-ray diffraction
3. Which of the following contributes nitrogen atoms to both purine and pyrimidine rings ?
 - (1) Aspartate
 - (2) Carbamoyl phosphate
 - (3) Carbon dioxide
 - (4) Glutamine
4. If a solution of double stranded DNA is heated above its melting temperature, its absorbance will :
 - (1) decrease
 - (2) increase
 - (3) remain unchanged
 - (4) initially increase and then decrease
5. N-Glycosyl linkage joins 1st carbon of pentose sugar with :
 - (1) N-9 of pyrimidine
 - (2) N-9 of purine
 - (3) N-3 of pyrimidine
 - (4) N-3 of purine
6. Which of the following enzyme is correctly paired with its allosteric effector ?
 - (1) hexokinase – ATP
 - (2) phosphofructokinase – glucose-6-phosphate
 - (3) pyruvate kinase – alanine
 - (4) glucokinase – fructose 2, 6 biphosphate
7. Which one of the following is *not true* about monosaccharides ? They are :
 - (1) colourless
 - (2) soluble in water
 - (3) sweet in taste
 - (4) soluble in non-polar solvent
8. All of the following statement about the biological role of fatty acids is correct *except* :
 - (1) fatty acid is essential component of plasma membrane
 - (2) fatty acid are stored as triacylglycerols in body
 - (3) fatty acid acts as intracellular second messenger
 - (4) fatty acids mainly contain odd number of carbons

9. An uncompetitive inhibitor of enzyme binds to :
- (1) the active site of enzymes
 - (2) sites other than the active site
 - (3) enzyme substrate complex
 - (4) any other site and modifies part of an enzyme
10. Which one of the following vitamins does not act as precursor for coenzymes ?
- (1) Biotin
 - (2) Thiamine
 - (3) Folic acid
 - (4) Ascorbic acid
11. How many microfibrils combine to form a fibril of cellulose ?
- (1) 50
 - (2) 100
 - (3) 200
 - (4) 250
12. The parallel layering of membranes in chloroplast is suited for :
- (1) Maximum light absorption
 - (2) Maximum exposure of enzymes
 - (3) Minimum light absorption so that cells can maintain their temperature
 - (4) All of the above
13. Eukaryotic cells have a well organised nucleus and :
- a. Both 70s and 80s ribosomes
 - b. 9 + 2 organization of flagella
 - c. show cytoplasmic streaming
 - d. DNA is complexed with histones to constitute the chromatin
- (1) All are correct
 - (2) Only (a) is incorrect
 - (3) Only (c) and (d) are correct
 - (4) Both (b) and (c) are incorrect
14. Which of the following is *not* considered as a part of endomembrane system ?
- (1) Vacuole
 - (2) Lysosome
 - (3) Golgi complex
 - (4) Peroxisome
15. Important site for formation of glycoproteins and glycolipids is :
- (1) Lysosome
 - (2) Vacuole
 - (3) Golgi apparatus
 - (4) Plastid
16. In Eubacteria, a cellular component that resembles eukaryotic cell is :
- (1) Cell wall
 - (2) Plasma membrane
 - (3) Nucleus
 - (4) Ribosomes

17. Synaptonemal complex was discovered in :
(1) 1956 (2) 1950 (3) 1935 (4) 1980
18. How many electrons, protons and photons are involved in the lysis of water to evolve one molecule of oxygen ?
(1) $4 e^-$, $4 H^+$ and 4 photons (2) $4 e^-$, $4 H^+$ and 8 photons
(3) $2 e^-$, $2 H^+$ and 8 photons (4) $2 e^-$, $2 H^+$ and 4 photons
19. Which of the given enzymes of glycolysis catalyzes and irreversible reaction and have a regulatory role ?
(1) Hexokinase (2) Aldolase (3) Isomerase (4) Mutase
20. Plant requires magnesium for :
(1) Protein synthesis (2) Chlorophyll synthesis
(3) Cell wall development (4) Holding cells together
21. Connecting link between respiration (TCA cycle) and protein synthesis is :
(1) Citric acid (2) α ketoglutaric acid
(3) Succinic acid (4) Fumaric acid
22. Protein helping in opening of DNA double helix in form of replication fork is :
(1) DNA gyrase (2) DNA polymerase I
(3) DNA ligase (4) DNA topoisomerase
23. A decrease in photosynthetic rate with increased availability of oxygen is called :
(1) Warbing effect (2) Richmond Lang effect
(3) Blackman's law of limiting factors (4) Emerson's enhancement effects
24. The plant part which consists of two generations one within the other is :
(1) Embryo (2) Germinating pollen grain
(3) Unfertilized ovule (4) Seed
25. Plasmodesmata connections help in :
(1) Cytoplasmic streaming
(2) Synchronous mitotic division
(3) Locomotion of unicellular organisms
(4) Movement of substances between cells

26. Which of the following biochemical reactions is most commonly utilized by living cells to propagate intracellular signals ?
- (1) acylation (2) phosphorylation
(3) methylation (4) decarboxylation
27. Ribozymes :
- (1) are any ribonucleoprotein particle
(2) are enzymes whose catalytic function resides in RNA subunits
(3) require a protein factor to form a peptide bond
(4) All of the above
28. CAMP is a :
- (1) second messenger (2) precursor for DNA synthesis
(3) proton pump (4) first messenger
29. Intracellular receptors :
- (1) usually binds hydrophobic ligands
(2) may be located in the cytosol or nucleus in unbound state
(3) when bound to their ligand regulate gene transcription
(4) All of the above
30. The P21 and P15 proteins are example of :
- (1) cdk inhibitors (2) cyclins
(3) oncogenes (4) growth factors
31. Integrins are transmembrane proteins that connect :
- (1) nuclear lamina to cytoplasmic kinases
(2) extracellular matrix to cytoskeleton
(3) focal adhesion to hemidesmosomes
(4) microtubule to actin filaments
32. Apospory is the development of gametophytic plant body from :
- (1) Cells of nucellus (2) Synergids
(3) Haploid female gametophyte (4) Microspores
33. Which of the following specialized tissue is known as integumentary tapetum ?
- (1) Endothelium (2) Endothecium
(3) Middle layer (4) Epidermis

34. Which one of the following is *correct* match :
- (1) Geitonogamy - *Vallisneria* (2) Heterostyly - *Primula*
(3) Exothecium - *Hibiscus* (4) Anemophily - *Adansonia*
35. An ovule which becomes curved as a result nucellus and embryo sac lie at right angle to the funicle is :
- (1) Hemitropous (2) Campylotropous
(3) Anatropous (4) Orthotropous
36. In which type of tapetum do the protoplast of tapetal cells mix or fuse and surround the developing microspore in the anther ?
- (1) Glandular tapetum (2) Secretory tapetum
(3) Amoeboid tapetum (4) All of the above
37. Which one of the following protein is *not* a transmembrane protein in photosynthetic electron transport chain ?
- (1) LHC (2) PS II (3) Ferredoxin (4) ATP synthase
38. The experimental material that Van Niel used to show that oxygen comes from water was :
- (1) *Chlorella pyrenoidosa* (2) *Scenedesmus*
(3) Blue green algae (4) *Chromatium Vinosum*
39. Discovery of Emerson effect showed the existence of :
- (1) Photorespiration
(2) Light and dark reaction in photosynthesis
(3) Photophosphorylation
(4) Two distinct pigment system
40. In CAM plants, CO₂ acceptor in the night is :
- (1) RUBP (2) OAA (3) PGA (4) PEP
41. Which of the following are *true* for Brassinosteroids ?
- a. are steroid growth promoters
b. synthesized by short day plants only
c. similar in function to ABA
d. chemically similar to ecdysone hormone
- (1) (a) and (d) (2) (c) and (d) (3) (a) and (b) (4) (a) and (c)

42. What is common between leaf abscission and fruit ripening ?
- (1) both involve cell swelling
 - (2) both are induced by ethylene
 - (3) both involve dissolution of cell wall by cellulases
 - (4) both are inhibited by auxins
43. The movement of auxin is largely :
- (1) Centripetal
 - (2) Basipetal
 - (3) Acropetal
 - (4) Both (1) and (3)
44. NADH_2 generated in glycolysis produces ATP in ETS in the presence of oxygen. In the absence of oxygen, this NADH_2 functions as :
- (1) Oxidising agent
 - (2) Phosphorylating agent
 - (3) Reducing agent
 - (4) Carboxylating agent
45. During which stage of complete oxidation of glucose, the greatest number of ATP molecules are formed from ADP ?
- (1) Glycolysis
 - (2) Krebs cycle
 - (3) Conversion of pyruvic acid to acetyl CoA
 - (4) Electron transport chain
46. A competitive inhibitor of succinic dehydrogenase is :
- (1) α -ketoglutarate
 - (2) Malate
 - (3) Malonate
 - (4) Oxaloacetate
47. DCMU, a herbicide kills the plant by :
- (1) inhibiting photolysis of water as it is a strong inhibitor of photo system II
 - (2) inhibiting CO_2 function as it is strong inhibitor of photo system II
 - (3) checking respiration
 - (4) destroying chloroplast
48. Nitrogen fixation in the roots nodules of *Alnus* is brought about by :
- (1) *Frankia*
 - (2) *Azorhizobium*
 - (3) *Bradyrhizobium*
 - (4) *Clostridium*
49. Sulphur is an important nutrient for optimal growth and productivity in :
- (1) Fibre crops
 - (2) Oil seed crops
 - (3) Pulse crops
 - (4) Cereals

50. By which action a seed coat becomes permeable to water ?
(1) Scarification (2) Stratification
(3) Vernalization (4) All of the above
51. The closing and opening of the leaves of *Mimosa pudica* is due to :
(1) Seismonastic movement (2) Chemonastic movement
(3) Thermonastic movement (4) Hydrotropic movement
52. Plant deficient in element Zinc shows its effect on the biosynthesis of which plant growth hormone :
(1) Auxin (2) Cytokinin (3) Ethylene (4) Abscissic acid
53. Nitrifying bacteria :
(1) reduces nitrates to free nitrogen
(2) oxidizes ammonia to nitrates
(3) convert free nitrogen to nitrogen compounds
(4) convert protein into ammonia
54. First stable product of nitrogen fixation is :
(1) NO_3^- (2) NH_3 (3) NO_2^- (4) Glutamic acid
55. During stomatal opening (photoactive) which does *not* occur ?
(1) Increase in pH of guard cells (2) Hydrolysis of starch in guard cells
(3) Increased TP of subsidiary cells (4) Dissociation of malic acid in guard cells
56. Which conditions favours 'Guttation' ?
(1) High water absorption (2) High transpiration
(3) Low transpiration (4) Both (1) and (3)
57. Chlorosis is caused due to deficiency of :
(1) Mg (2) Ca (3) B (4) Mn
58. Allele is the :
(1) alternate trait of gene pair
(2) total number of genes for a trait
(3) total number of chromosomes of a haploid set
(4) total number of genes present on a chromosome

59. Genes for cytoplasmic male sterility in plants are generally located in :
- (1) Nuclear genome
 - (2) Chloroplast genome
 - (3) Cytosol
 - (4) Mitochondrial genome
60. In *Drosophila* a set of homeotic genes which controls body plan at the time of organ differentiation is known as :
- (1) TATA box
 - (2) Homeobox
 - (3) Pribnow box
 - (4) All of the above
61. A tautomeric shift causing the substitution of one purine for a pyridine is called :
- (1) transversion
 - (2) translocation
 - (3) transition
 - (4) inversion
62. A common test to find the genotype of a hybrid is :
- (1) crossing of one F_1 progeny with female parent
 - (2) studying the sexual behaviour of F_1 progenies
 - (3) crossing of one F_1 progeny with male parent
 - (4) crossing of one F_2 progeny with male parent
63. DNA elements that can switch their position are called :
- (1) Cistrons
 - (2) Transposons
 - (3) Exons
 - (4) Introns
64. Retting of fibers is done by :
- (1) *Azotobacter*
 - (2) *Clostridium*
 - (3) *Rhizobium*
 - (4) *Pseudomonas*
65. Motile stages are *not* found in life cycle of :
- (1) Red algae and green algae
 - (2) Red algae and brown algae
 - (3) Red algae and blue green algae
 - (4) Green algae and brown algae
66. Bryophyte shows an advancement over, algae in :
- (1) having multicellular sporophytic generation
 - (2) having parasitic sporophyte
 - (3) having zygotic meiosis
 - (4) None of the above
67. Cone bearing pteridophytes are :
- (1) Lycopsida and Psilopsida
 - (2) Filicinae and Lycopsida
 - (3) Filicinae and Sphenopsida
 - (4) Lycopsida and Sphenopsida

68. Multiciliate male gametes are found in :
(1) *Pinus* (2) *Cycas* (3) *Gnetum* (4) Mango
69. A special modification of leaf of *Acacia* in which petiole becomes flat and photosynthetic is known as :
(1) Phylloclade (2) Cladode (3) Cladophyll (4) Phyllode
70. Presence of staminode is characteristic feature of :
(1) Caesalpinoideae (2) Mimosoideae
(3) Areaceae (4) Euphorbiaceae
71. Which one of the following *correctly* represents an organism and its ecological niche ?
(1) *Vallisneria* and pond
(2) Desert locust (*Schistocerca*) and desert
(3) Plant lice (aphids) and leaf
(4) Vultures and dense forest
72. Which one of the following is *correctly* matched for an endangered animal and a national park ?
(1) Great Indian Bustard – Keoladeo National Park
(2) Lion – Corbett National Park
(3) Rhinoceros – Kaziranga National Park
(4) Wild Ass – Dudhwa National Park
73. The zone of a lake lying below the light compensation depth is :
(1) Photic zone (2) Profundal zone
(3) Disphotic zone (4) Euphotic zone
74. The transitional zone where two different communities meet is called :
(1) Border (2) Ecotone (3) Ecotype (4) Niche
75. Which are direct ecological factors which determine vegetation of an area ?
(1) altitude, soil texture and wind
(2) rain, soil and altitude
(3) soil, organisms, precipitation and altitude
(4) temperature, light, soil, air and humidity

76. Which of the following is most important for speciation ?
(1) Seasonal isolation (2) Reproductive isolation
(3) Behavioural isolation (4) Tropical isolation
77. The first step towards succession is :
(1) Ecesis (2) Migration (3) Nudation (4) Competition
78. Which one is linked to evolution ?
(1) Extinction (2) Competition (3) Variation (4) Reproduction
79. Abiogenesis is the :
(1) origin of life from non-living material
(2) origin of life from living organism
(3) origin of viruses and microbes
(4) None
80. The phenomenon of genetic drift is most likely to occur in populations that are :
(1) small and inbred (2) undergoing gene flow
(3) allopatric (4) large and panmictic
81. Similarities in organisms with different genotype indicate :
(1) Microevolution (2) Macroevolution
(3) Convergent evolution (4) Divergent evolution
82. Prebiotic environment was different from present environment and was devoid of :
(1) CO₂ (2) atmosphere (3) O₂ (4) N₂
83. The beginning of plant cultivation is considered to have taken place in :
(1) Neolithic age (2) Paleolithic age
(3) Mesolithic age (4) None of these
84. Shotgun approach is used for the construction of :
(1) cDNA library (2) Genomic library
(3) Both (4) None
85. DNA finger printing process involves :
(1) chain terminators (2) degenerate oligonucleotides
(3) UNTR loci (4) RFLPs

86. A transgenic food crop that may help in solving the problem of night blindness in developing country is :
- (1) Golden rice (2) Flavr Savr tomatoes
(3) Starlink Maize (4) Bt. soyabean
87. A genetically engineered micro-organism used in bioremediation of oil spills is a species of :
- (1) *Trichoderma* (2) *Xanthomonas* (3) *Bacillus* (4) *Pseudomonas*
88. What role do opines play in crown gall diseases ?
- (1) transfer of T-DNA to plant cells
(2) source of carbon, nitrogen and energy for the *Agrobacterium*
(3) attachment of *Agrobacterium* to the plants
(4) induction of the expression of Vir genes
89. Which gene isolated from *Bacillus thuringiensis* is known to control the insect population of corn borer ?
- (1) HLA-gene (2) Cry I Ab-gene
(3) Cry I Ac-gene (4) Cry II Ab-gene
90. Meristem culture is practised in horticulture to get :
- (1) Somaclonal variation (2) Haploids
(3) Virus free plants (4) Slow-growing callus
91. The unusual property of Taq polymerase that is critical to the PCR is its :
- (1) ability to use dNTPs as substrate (2) ability to use ddNTPs as substrate
(3) thermostability (4) ability to use RNAs as template
92. An electron microscope gives higher magnification than a light microscope because :
- (1) electrons have more energy than light particles
(2) velocity of electrons is less than that of light
(3) wavelength of electrons used is smaller as compared to visible light
(4) electron microscope uses more powerful lense
93. Which of the following technique is relevant to functional genomics study ?
- (1) yeast two hybrid analysis (2) DNA Microarray
(3) SAGE (4) All of the above

94. RFLP analysis is a technique that :
- (1) uses hybridization to detect specific DNA restriction fragments in genomic DNA
 - (2) used to determine the transcription of a gene in specific cells
 - (3) measures the transfer frequency of genes during conjugation
 - (4) used to amplify genes for producing useful products
95. Dendogram in numerical taxonomy represents :
- (1) Phenetic similarities
 - (2) Phylogenetic similarities
 - (3) Evolutionary similarities
 - (4) No similarity
96. Which technique is used to study de Novo RNA synthesis ?
- (1) Southern blotting
 - (2) Northern blotting
 - (3) Microarray
 - (4) RT-PCR
97. An oligonucleotide DNA sequence tagged with fluorescent tag used to identify unknown gene by hybridization is termed as :
- (1) probe
 - (2) reporter gene
 - (3) ligand
 - (4) cDNA
98. Silencing of mRNA has been used in producing transgenic plants resistant to :
- (1) White rusts
 - (2) Bacterial blights
 - (3) Bollworms
 - (4) Nematodes
99. Which of the following is *not* correctly match ?
- (1) Reporter Molecule – Acts as shuttle vector
 - (2) Maxam Gilbert Method – Chemical modification of bases
 - (3) Dideoxy terminators – Sanger Method
 - (4) Biotin – Non-radioactive label
100. ELISA is used to detect viruses and they key reagent is :
- (1) Alkaline phosphatase
 - (2) Catalase
 - (3) DNA probe
 - (4) RANase