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**PHDURS-EE-2013**

**SUBJECT : Botany**



**10043**

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)

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- 1. All questions are compulsory and carry equal marks.**
- 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.
- 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.
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PHDURS-EE-2013/Botany/(C)





1. 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
2. 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
3. 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
4. First stable product of nitrogen fixation is :
  - (1)  $\text{NO}_3^-$
  - (2)  $\text{NH}_3$
  - (3)  $\text{NO}_2^-$
  - (4) Glutamic acid
5. 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
6. Which conditions favours 'Guttation' ?
  - (1) High water absorption
  - (2) High transpiration
  - (3) Low transpiration
  - (4) Both (1) and (3)
7. Chlorosis is caused due to deficiency of :
  - (1) Mg
  - (2) Ca
  - (3) B
  - (4) Mn
8. 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
9. Genes for cytoplasmic male sterility in plants are generally located in :
  - (1) Nuclear genome
  - (2) Chloroplast genome
  - (3) Cytosol
  - (4) Mitochondrial genome

10. 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
11. 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)
12. 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
13. The movement of auxin is largely :
- (1) Centripetal      (2) Basipetal  
(3) Acropetal      (4) Both (1) and (3)
14.  $\text{NADH}_2$  generated in glycolysis produces ATP in ETS in the presence of oxygen. In the absence of oxygen, this  $\text{NADH}_2$  functions as :
- (1) Oxidising agent      (2) Phosphorylating agent  
(3) Reducing agent      (4) Carboxylating agent
15. 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
16. A competitive inhibitor of succinic dehydrogenase is :
- (1)  $\alpha$ -ketoglutarate      (2) Malate  
(3) Malonate      (4) Oxaloacetate



17. 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<sub>2</sub> function as it is strong inhibitor of photo system II
  - (3) checking respiration
  - (4) destroying chloroplast
18. Nitrogen fixation in the roots nodules of *Alnus* is brought about by :
- (1) *Frankia*
  - (2) *Azorhizobium*
  - (3) *Bradyrhizobium*
  - (4) *Clostridium*
19. Sulphur is an important nutrient for optimal growth and productivity in :
- (1) Fibre crops
  - (2) Oil seed crops
  - (3) Pulse crops
  - (4) Cereals
20. By which action a seed coat becomes permeable to water ?
- (1) Scarification
  - (2) Stratification
  - (3) Vernalization
  - (4) All of the above
21. 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
22. Apospory is the development of gametophytic plant body from :
- (1) Cells of nucellus
  - (2) Synergids
  - (3) Haploid female gametophyte
  - (4) Microspores
23. Which of the following specialized tissue is known as integumentary tapetum ?
- (1) Endothelium
  - (2) Endothecium
  - (3) Middle layer
  - (4) Epidermis
24. Which one of the following is *correct* match :
- (1) Geitonogamy - *Vallisneria*
  - (2) Heterostyly - *Primula*
  - (3) Exothecium - *Hibiscus*
  - (4) Anemophily - *Adansonia*
25. 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

26. 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
27. 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
28. 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*
29. Discovery of Emerson effect showed the existence of :
- (1) Photorespiration  
(2) Light and dark reaction in photosynthesis  
(3) Photophosphorylation  
(4) Two distinct pigment system
30. In CAM plants, CO<sub>2</sub> acceptor in the night is :
- (1) RUBP                      (2) OAA                      (3) PGA                      (4) PEP
31. Connecting link between respiration (TCA cycle) and protein synthesis is :
- (1) Citric acid                      (2)  $\alpha$  ketoglutaric acid  
(3) Succinic acid                      (4) Fumaric acid
32. 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
33. A decrease in photosynthetic rate with increased availability of oxygen is called :
- (1) Warburg effect                      (2) Richmond Lang effect  
(3) Blackman's law of limiting factors                      (4) Emerson's enhancement effects
34. The plant part which consists of two generations one within the other is :
- (1) Embryo                      (2) Germinating pollen grain  
(3) Unfertilized ovule                      (4) Seed

35. Plasmodesmata connections help in :
- (1) Cytoplasmic streaming
  - (2) Synchronous mitotic division
  - (3) Locomotion of unicellular organisms
  - (4) Movement of substances between cells
36. 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
37. 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
38. CAMP is a :
- (1) second messenger
  - (2) precursor for DNA synthesis
  - (3) proton pump
  - (4) first messenger
39. 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
40. The P21 and P15 proteins are example of :
- (1) cdk inhibitors
  - (2) cyclins
  - (3) oncogenes
  - (4) growth factors
41. How many microfibrils combine to form a fibril of cellulose ?
- (1) 50
  - (2) 100
  - (3) 200
  - (4) 250
42. 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

43. Eukaryotic cells have a well organised nucleus and :
- Both 70s and 80s ribosomes
  - 9 + 2 organization of flagella
  - show cytoplasmic streaming
  - 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
44. Which of the following is *not* considered as a part of endomembrane system ?
- (1) Vacuole (2) Lysosome  
(3) Golgi complex (4) Peroxisome
45. Important site for formation of glycoproteins and glycolipids is :
- (1) Lysosome (2) Vacuole  
(3) Golgi apparatus (4) Plastid
46. In Eubacteria, a cellular component that resembles eukaryotic cell is :
- (1) Cell wall (2) Plasma membrane  
(3) Nucleus (4) Ribosomes
47. Synaptonemal complex was discovered in :
- (1) 1956 (2) 1950 (3) 1935 (4) 1980
48. 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
49. Which of the given enzymes of glycolysis catalyzes an irreversible reaction and has a regulatory role ?
- (1) Hexokinase (2) Aldolase (3) Isomerase (4) Mutase
50. Plant requires magnesium for :
- (1) Protein synthesis (2) Chlorophyll synthesis  
(3) Cell wall development (4) Holding cells together
51. 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



52. 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
53. Which of the following contributes nitrogen atoms to both purine and pyrimidine rings ?
- (1) Aspartate (2) Carbamoyl phosphate  
(3) Carbon dioxide (4) Glutamine
54. 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
55. 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
56. 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
57. 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
58. 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
59. 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

60. Which one of the following vitamins does not act as precursor for coenzymes ?  
(1) Biotin                      (2) Thiamine                      (3) Folic acid                      (4) Ascorbic acid
61. 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
62. 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
63. 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
64. 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
65. Dendogram in numerical taxonomy represents :  
(1) Phenetic similarities                      (2) Phyogenetic similarities  
(3) Evolutionary similarities                      (4) No similarity
66. Which technique is used to study de Novo RNA synthesis ?  
(1) Southern blotting                      (2) Northern blotting  
(3) Microarray                      (4) RT-PCR
67. 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
68. Silencing of mRNA has been used in producing transgenic plants resistant to :  
(1) White rusts                      (2) Bacterial blights  
(3) Bollworms                      (4) Nematodes

69. 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
70. ELISA is used to detect viruses and they key reagent is :
- (1) Alkaline phosphatase
  - (2) Catalase
  - (3) DNA probe
  - (4) RANase
71. Similarities in organisms with different genotype indicate :
- (1) Microevolution
  - (2) Macroevolution
  - (3) Convergent evolution
  - (4) Divergent evolution
72. Prebiotic environment was different from present environment and was devoid of :
- (1) CO<sub>2</sub>
  - (2) atmosphere
  - (3) O<sub>2</sub>
  - (4) N<sub>2</sub>
73. 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
74. Shotgun approach is used for the construction of :
- (1) cDNA library
  - (2) Genomic library
  - (3) Both
  - (4) None
75. DNA finger printing process involves :
- (1) chain terminators
  - (2) degenerate oligonucleotides
  - (3) UNTR loci
  - (4) RFLPs
76. 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
77. A genetically engineered micro-organism used in bioremediation of oil spills is a species of :
- (1) *Trichoderma*
  - (2) *Xanthomonas*
  - (3) *Bacillus*
  - (4) *Pseudomonas*

78. 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
79. 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
80. Meristem culture is practised in horticulture to get :
- (1) Somaclonal variation
  - (2) Haploids
  - (3) Virus free plants
  - (4) Slow-growing callus
81. 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
82. 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
83. The zone of a lake lying below the light compensation depth is :
- (1) Photic zone
  - (2) Profundal zone
  - (3) Disphotic zone
  - (4) Euphotic zone
84. The transitional zone where two different communities meet is called :
- (1) Border
  - (2) Ecotone
  - (3) Ecotype
  - (4) Niche



85. 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
86. Which of the following is most important for speciation ?  
(1) Seasonal isolation (2) Reproductive isolation  
(3) Behavioural isolation (4) Tropical isolation
87. The first step towards succession is :  
(1) Ecesis (2) Migration (3) Nudation (4) Competition
88. Which one is linked to evolution ?  
(1) Extinction (2) Competition (3) Variation (4) Reproduction
89. 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
90. 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
91. A tautomeric shift causing the substitution of one purine for a pyridine is called :  
(1) transversion (2) translocation (3) transition (4) inversion
92. 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
93. DNA elements that can switch their position are called :  
(1) Cistrons (2) Transposons (3) Exons (4) Introns



94. Retting of fibers is done by :  
(1) *Azotobacter*      (2) *Clostridium*      (3) *Rhizobium*      (4) *Pseudomonas*
95. 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
96. 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
97. Cone bearing pteridophytes are :  
(1) Lycopsidea and Psilopsida      (2) Filicinae and Lycopsidea  
(3) Filicinae and Sphenopsida      (4) Lycopsidea and Sphenopsida
98. Multiciliate male gametes are found in :  
(1) *Pinus*      (2) *Cycas*      (3) *Gnetum*      (4) Mango
99. A special modification of leaf of *Acaccia* in which petiole becomes flat and photosynthetic is known as :  
(1) Phylloclade      (2) Cladode      (3) Cladophyll      (4) Phyllode
100. Presence of staminode is characteristic feature of :  
(1) Caesalpinoideae      (2) Mimosoideae  
(3) Areaceae      (4) Euphorbiaceae



