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OPSC PGT

Previous Year Paper
(Botany) 03
Jul, 2022



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Test Booklet Series

T. B. C. : PGT – 5/20

A

TEST BOOKLET

PART – B

(BOTANY)

50269

Sl. No.

Time Allowed : 2 Hours

Maximum Marks : 100

: INSTRUCTIONS TO CANDIDATES :

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET OF THE SAME SERIES ISSUED TO YOU.
2. ENCODE CLEARLY THE TEST BOOKLET SERIES **A, B, C** OR **D**, AS THE CASE MAY BE, IN THE APPROPRIATE PLACE IN THE ANSWER SHEET USING BALL POINT PEN (BLUE OR BLACK).
3. You have to enter your **Roll No.** on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet.
4. **YOU ARE REQUIRED TO FILL UP & DARKEN** ROLL NO., TEST BOOKLET / QUESTION BOOKLET SERIES IN THE ANSWER SHEET AS WELL AS FILL UP TEST BOOKLET / QUESTION BOOKLET SERIES AND SERIAL NO. AND ANSWER SHEET SERIAL NO. IN THE ATTENDANCE SHEET CAREFULLY. **WRONGLY FILLED UP ANSWER SHEETS ARE LIABLE FOR REJECTION AT THE RISK OF THE CANDIDATE.**
5. This Test Booklet contains **100** items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose **ONLY ONE** response (answer) for each item (question).
6. You have to mark (darken) all your responses (answers) **ONLY** on the **separate Answer Sheet** provided, by using **BALL POINT PEN (BLUE OR BLACK)**. See instructions in the Answer Sheet.
7. All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet. **There will be no negative marking for wrong answer.**
8. Before you proceed to mark (darken) in the Answer Sheet the responses (answers) to various items (questions) in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per the instructions sent to you with your **Admission Certificate**.
9. After you have completed filling in all your responses (answers) on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the **Answer Sheet** issued to you. You are allowed to take with you the candidate's copy / second page of the Answer Sheet along with the **Test Booklet**, after completion of the examination, for your reference.
10. Sheets for rough work are appended in the Test Booklet at the end.

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ZI – 5A/9

(Turn over)

1. Kombu (a Japanese food) is prepared from which species of algae ?
 - (A) Gracilaria
 - (B) Laminaria
 - (C) Chlorella
 - (D) Porphyra
2. Which one of the following is a water-soluble carbohydrate found in algal cell ?
 - (A) Cellulose I
 - (B) Mannan
 - (C) Xylan
 - (D) Carrageenin
3. Gaidukov phenomenon is also described as :
 - (A) Kutusky effect
 - (B) Pasteur effect
 - (C) Complementary chromatic adaptation
 - (D) Environmental adaptation
4. Select the incorrect statement regarding heterocyst :
 - (A) Heterocyst is a large sized thin walled cell occurring only at terminal position in filamentous cyanobacteria
 - (B) Heterocysts are considered as receptacles of enzymes which help formation of akinete
 - (C) It is specialised to perform nitrogen fixation
 - (D) Heterocyst is found in certain algae belonging to Cyanophyceae
5. The spores produced exogenously in fungi are :
 - (A) Zoospores
 - (B) Aplanospores
 - (C) Ascospores
 - (D) Pycniospores
6. Torula condition is found in :
 - (A) Rhizopus
 - (B) Mucor
 - (C) Pilobolus
 - (D) Ulothrix
7. Medulla is a horizontal layer within the thallus of :
 - (A) Lichens
 - (B) Oomycetes
 - (C) Zygomycetes
 - (D) Basidiomycetes

8. Which of the following is not correct regarding vegetative reproduction in lichens ?
- (A) Fragmentation
 - (B) Isidia
 - (C) Pycnia
 - (D) Soredia
9. Late blight of potato was first introduced in India in the Nilgiri hills during which year ?
- (A) 1870 and 1880
 - (B) 1830 and 1840
 - (C) 1845 and 1846
 - (D) 1840 and 1845
10. Citrus canker disease is induced by the bacterial pathogen which is :
- (A) Rod-shaped paratrichous
 - (B) Rod-shaped monotrichous
 - (C) Rod-shaped peritrichous
 - (D) Rod-shaped atrichous
11. Which type of embryogeny is found in bryophytes ?
- (A) Endoscopic with suspensor
 - (B) Endoscopic without suspensor
 - (C) Exoscopic
 - (D) Prone
12. In which species of *Riccia*, the scales are absent or indistinct ?
- (A) *R. Frostii*
 - (B) *R. Fluitans*
 - (C) *R. Natans*
 - (D) *R. Crystallina*
13. Peat, a dead part of *Sphagnum* is rich in :
- (A) Carbon
 - (B) Calcium
 - (C) Magnesium
 - (D) Iron
14. Leaves bearing sporangia are called :
- (A) Sporocarps
 - (B) Sporophyll
 - (C) Strobili
 - (D) Prothalli
15. Plant in which the vascular tissue normally develops in the gametophytic generation ?
- (A) *Lycopodium*
 - (B) *Marsilea*
 - (C) *Psilotum*
 - (D) *Selaginella*
16. In the stem of *Selaginella spinulosa*, the xylem is :
- (A) Exarch
 - (B) Mesarch
 - (C) Centrarch
 - (D) Endarch

17. In which plant the ventral canal cells are absent ?
- (A) *Taxus*
 - (B) *Gnetum*
 - (C) *Pinus*
 - (D) *Cycas*
18. The gymnosperm resembles with pteridophyte in having :
- (A) Both pteridophytes and gymnosperms possess endarch vascular bundles in the leaves
 - (B) Both heterosporous pteridophytes and gymnosperms possess endosporic gametophytes
 - (C) Both heterosporous pteridophytes and gymnosperms possess exosporic gametophytes
 - (D) Both pteridophytes and gymnosperms possess exarch vascular bundles in the leaves
19. Gymnosperms differ from angiosperms in having :
- (A) In gymnosperms cones are bisexual, whereas in angiosperms flowers are usually unisexual
 - (B) *Gnetum* possesses archegonia whereas angiosperms lack archegonia
 - (C) Zygote exhibits free nuclear divisions in gymnosperms but not in angiosperms
 - (D) Gymnosperms show double fertilization or triple fusion whereas in angiosperms it is absent
20. The female strobilus is absent in :
- (A) *Pinus*
 - (B) *Taxus*
 - (C) *Zamia*
 - (D) *Cycas*
21. DNA replication starts at :
- (A) Fully Methylated origins
 - (B) Non-methylated origins
 - (C) Random location
 - (D) Hemimethylated origins
22. During initiation of translation in bacteria which factor prevents the large subunit of ribosome from binding to mRNA molecule ?
- (A) Initiation factor-1
 - (B) Initiation factor-2
 - (C) Initiation factor-3
 - (D) Initiation factor-4
23. In the presence of allolactose, the lac repressor :
- (A) Binds to the operator
 - (B) Cannot bind to the operator
 - (C) Binds to the promoter
 - (D) Binds to the regulator gene

24. What types of changes take place in rRNA processing ?

- (A) Methylation of bases
- (B) Cleavage of a larger precursor
- (C) Nucleotides are trimmed from the ends of rRNAs
- (D) Base addition

25. Who first used enzymes to release protoplast ?

- (A) Cocking
- (B) Hanstein
- (C) Klercker
- (D) Takebe

26. Choose the correct sequence for regeneration of somaclonal variation without in vitro selection ?

- (A) Explant → Explant derived callus → Shoot regeneration → Plant → Agronomic trials → Transfer to the field → Screening for desirable traits
- (B) Explant → Explant derived callus → Shoot regeneration → Plant → Transfer to the field → Screening for desirable traits → Agronomic trials

(C) Explant → Explant derived callus → Shoot regeneration → Plant → Agronomic trials → Screening for desirable traits → Transfer to the field

(D) Explant → Explant derived callus → Shoot regeneration → Plant → Transfer to the field → Agronomic trials → Screening for desirable traits

27. The pomato is a somatic hybrid that was first achieved by :

- (A) Lelivelt et al., 1976
- (B) Rokka et al., 1998
- (C) Kyojuka et al., 1989
- (D) Melchers et al., 1978

28. The virulence gene that binds single-stranded T-DNA and transports T-DNA into the plant cell nucleus is :

- (A) Vir A
- (B) Vir D2
- (C) Vir E2
- (D) Vir G

29. Protoplast transformation frequency can be increased by :

- (A) Polyethylene glycol
- (B) Poly L – ornithine
- (C) Polyvinyl alcohol
- (D) Diethyl amino ethyl

30. Insect resistant ipt gene is obtained from :
- (A) *Bacillus thuringiensis*
 - (B) *Agrobacterium tumefaciens*
 - (C) *Streptomyces*
 - (D) *Photobacterium luminescens*
31. Nutrients that are involved in redox reactions ?
- (A) K
 - (B) Na
 - (C) Cu
 - (D) Mg
32. Find out incorrect predictions emerge from the pressure-flow model :
- (A) True bidirectional transport in a single sieve element cannot occur
 - (B) Solutes within the phloem can move bidirectionally, but in different sieve elements or at different times
 - (C) The pressure-flow hypothesis demands the presence of a positive pressure gradient
 - (D) If P-protein or other materials blocked the pores, the resistance to flow of the sieve element sap would be too poor
33. Fick's first law equation accounts only for movement in response to :
- (A) Concentration gradient
 - (B) Pressure
 - (C) Electric fields
 - (D) None of these
34. In 1932, Robert Emerson and William Arnold performed a key experiment that provided the first evidence for the cooperation of many chlorophyll molecules in energy conversion during photosynthesis. Which plant is used for this experiment ?
- (A) *Chlorella vulgaris*
 - (B) *Chlorella pyrenoidosa*
 - (C) *Chlorella autotrophica*
 - (D) *Chlorella pituita*
35. Red drop and Emerson's enhancement effect have been instrumental in the discovery of :
- (A) Oxidative phosphorylation
 - (B) Photophosphorylation and cyclic electron transport
 - (C) Two photosystems operating simultaneously
 - (D) Photophosphorylation and non-cyclic electron transport

36. How many CO_2 molecules are produced during oxidation of one molecule of pyruvate in the citric acid cycle ?
- (A) 1
(B) 2
(C) 3
(D) 4
37. Example of day-neutral plant ?
- (A) *Trifolium repens*
(B) *Campanula medium*
(C) *Cestrum nocturnum*
(D) *Phaseolus vulgaris*
38. The expression of the gene FLOWERING LOCUS C (FLC) is blocked in cold-requiring winter annual ecotypes of *Arabidopsis* by :
- (A) Vernalization
(B) Photoperiodism
(C) Phototaxis
(D) Phototropism
39. Auxin transport inhibitors are :
- (A) 1-N-naphthylphthalamic acid
(B) 1-naphthoxyacetic acid
(C) Quercetin
(D) All of these
40. During gibberellin biosynthesis, entkaurene is converted to GA_{12} or GA_{53} in :
- (A) Plastid
(B) Endoplasmic reticulum
(C) Cytosol
(D) Mitochondria
41. Compound that affects the cytoskeleton :
- (A) Aphidicolin
(B) α -Amanitin
(C) Anisomycin
(D) Phalloidin
42. The organelles that oxidize stored lipids as a source of carbon and energy for growth in plant seed :
- (A) Peroxisomes
(B) Lysosomes
(C) Glyoxysomes
(D) Golgi complex
43. Select the incorrect match :
- (A) Nucleolus – mRNA synthesis
(B) Nucleus – tRNA synthesis
(C) Peroxisomes – break down fatty acids
(D) Mitochondria – fatty acids synthesis

44. At which phase of cell cycle, the chromosomes are duplicated ?
- (A) M-phase
(B) S-phase
(C) G1-phase
(D) G2-phase
45. The enzyme recombinase is required at which stage of meiosis ?
- (A) Diplotene
(B) Zygotene
(C) Pachytene
(D) Diakinesis
46. β -barrel protein is not found in :
- (A) Bacteria
(B) Mitochondria
(C) Chloroplast
(D) None of these
47. Ceramide, which is synthesized in the ER, is converted to :
- (A) Sphingomyelin
(B) Glycolipids
(C) Phosphatidylcholine
(D) Both (A) and (B)
48. At which stage of meiosis, synaptonemal complex is disappeared ?
- (A) Zygotene
(B) Diplotene
(C) Pachytene
(D) Diakinesis
49. Condensins which drive chromatin condensation are activated by :
- (A) Cdk 2 / cyclin B
(B) Cdk 1 / cyclin A
(C) Cdk 1 / cyclin B
(D) Cdk 2 / cyclin A
50. Which of the following lipid is absent in cell membrane of rough endoplasmic reticulum ?
- (A) Phosphatidylcholine
(B) Phosphatidylserine
(C) Phosphatidylethanolamine
(D) Glycolipids
51. Mismatch repair in E. coli distinguishes between old and new strands of DNA on the basis of :
- (A) Methyl groups on the old strand
(B) Differences in base composition of the two strands
(C) Modification of histone proteins
(D) Base analogs on the new strand

52. In principal of segregation (Mendel's first law), alleles separate in equal proportions at which stage of meiosis ?
- Metaphase-I
 - Anaphase-I
 - Metaphase-II
 - Anaphase-II
53. For single crossovers, the frequency of recombinant gametes is half the frequency of crossing over because :
- A test cross between a homozygote and heterozygote produces $1/2$ heterozygous and $1/2$ homozygous progeny
 - The frequency of recombination is always 50%
 - Each crossover takes place between only two of the four chromatids of a homologous pair
 - Crossovers occur in about 50% of meiosis
54. Modern bread wheat, **Triticum aestivum** is a :
- $3n$
 - $4n$
 - $6n$
 - $8n$
55. If species I has $2n = 14$ and species II has $2n = 20$ then how many number of chromosomes are found in an allotriploid individual ?
- 21
 - 31
 - 34
 - 27
56. Variegative in the four-o'clocks plants is caused by :
- Defective gene in the chloroplast DNA
 - Defective gene in the mitochondrial DNA
 - Defective gene in the nuclear DNA
 - Environmental effects
57. In an individual heterozygous for a duplication, the duplicated chromosome loops out during pairing in :
- Prophase I
 - Metaphase I
 - Prophase II
 - Metaphase II

58. In his experiments on pea plants, Mendel did not use :
- Pod color
 - Pod shape
 - Pod length
 - Stem length
59. The term "linkage" was coined by :
- G. Mendel
 - T. H. Morgan
 - W. Sutton
 - T. Boveri
60. There are three genes a, b, c. Percentage of crossing over between a and b is 20%, b and c is 28% and a and c is 8%. What is the sequence of genes on chromosome ?
- a, b, c
 - a, c, b
 - c, b, a
 - b, a, c
61. In which year M. W. Beijerinck designated virus as 'contagium vivum fluidum' ?
- 1892
 - 1894
 - 1926
 - 1935
62. All viruses are :
- Obligatory intercellular parasites
 - Obligatory intracellular parasites
 - Facultative intercellular parasites
 - Facultative intracellular parasites
63. The bacteriophage that contains double-stranded RNA genome is :
- T-phages
 - Lamda-phages
 - Phi 6
 - MS2
64. A prophage is :
- The RNA of lytic phage
 - A phage RNA incorporated into the host genome
 - The DNA of lytic phage
 - A phage DNA incorporated into the host genome
65. Which of the following statement is not correct ?
- Archaea sensitive to chloramphenicol
 - Archaea sensitive to anisomycin
 - Archaea insensitive to rifampicin
 - In Archaea cell wall, peptidoglycan is absent

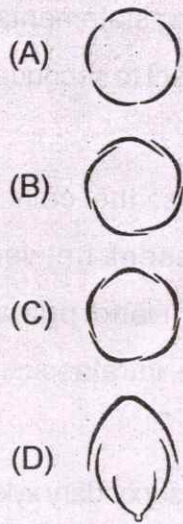
66. Which of the following is a thermophiles archaeobacteria ?
 (A) Cephalosporium
 (B) Pyrodictium
 (C) Bordetella
 (D) Corynebacterium
67. The largest known bacterium in terms of total cells volume is :
 (A) **Mycoplasma pneumoniae**
 (B) **Treponema pallidum**
 (C) **Thiomargarita namibiensis**
 (D) **Thermus aquaticus**
68. Zoogloea stage is found in the :
 (A) Algae
 (B) Fungi
 (C) Archaeobacteria
 (D) Eubacteria
69. Which of the following role is performed by a bacteriophage in transduction ?
 (A) Vector
 (B) Donar
 (C) Recipient
 (D) Episome
70. Lysogenic strains are also known as :
 (A) Temperate phage
 (B) Avirulent phage
 (C) Both (A) and (B)
 (D) T4-phage
71. The water present in the soil which can be utilized by plants called :
 (A) Hygroscopic water
 (B) Chresard
 (C) Gravitational water
 (D) Chemically bound water
72. Which of the following is not a true xerophytes ?
 (A) **Opuntia**
 (B) **Calotropis procera**
 (C) **Casuarina equisetifolia**
 (D) **Argemone maxicana**
73. A heterotrophic organism that obtain its nutrients by absorbing organic matter present in the solution is called as :
 (A) Osmotroph
 (B) Phagotroph
 (C) Detrivores
 (D) Saprotroph
74. Abyssal zone is :
 (A) The open ocean
 (B) The deepest part of the ocean
 (C) A continental shelf, extending outward to its edge to a water depth of about 200 m
 (D) The area underneath the pelagic zone

75. Montreal protocol became effective in :
 (A) 1997
 (B) 1989
 (C) 1987
 (D) 1985
76. Biological Oxygen Demand (BOD) of clean water is :
 (A) 4 mg/L
 (B) 3 mg/L
 (C) 2 mg/L
 (D) 1 mg/L
77. The accumulation of chemicals in organisms in increasingly higher concentrations at successive tropic levels is called :
 (A) Eutrophication
 (B) Bioremediation
 (C) Phytoremediation
 (D) Biomagnification
78. The climax pattern theory was proposed by :
 (A) R. H. Whittaker
 (B) Tansley
 (C) Frederic Clements
 (D) Ranganathan
79. The biogeochemical cycle that lacks an atmospheric components is :
 (A) Nitrogen cycle
 (B) Phosphorus cycle
 (C) Carbon cycle
 (D) None of these
80. The dominant plant in bog ecosystem is :
 (A) *Juncus* spp.
 (B) *Ulmus* spp.
 (C) *Sphagnum* spp.
 (D) *Fraxinus* spp.
81. In *Bougainvillea*, thorns are the modification of :
 (A) Stipules
 (B) Leaf
 (C) Petiole
 (D) Stem
82. Which type of phyllotaxy is found in *Calotropis* ?
 (A) Alternate
 (B) Opposite
 (C) Whorled
 (D) Ternate
83. Which one of the following is the leaves modification ?
 (A) Tendrils in pea
 (B) Tendrils in cucumber
 (C) Tendrils in pumpkins
 (D) Tendrils in watermelon
84. Flowers arranged only on one side of the rachis in :
 (A) Spike
 (B) Catkin
 (C) Secund
 (D) Spadix

85. Flowers are actinomorphic in :

- (A) Pea
- (B) Chilli
- (C) Bean
- (D) Cassia

86. Aestivation of petals in the flower of cotton is correctly shown in :



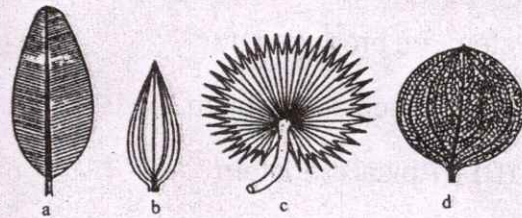
87. $\oplus \text{ } \overline{\text{K}}_{(5)} \text{ } \text{C}_{1+2+(2)} \text{ } \text{A}_{(9)+1} \text{ } \underline{\text{G}}_1$ is the floral formula of :

- (A) Chili
- (B) Onion
- (C) Tomato
- (D) Sweet pea

88. A tetradynamous condition of stamens is found in :

- (A) Cruciferae
- (B) Fabaceae
- (C) Solanaceae
- (D) Malvaceae

89. Which of the following is correct ?



- (A) a – Multicostate parallel
- (B) b – Unicostate parallel convergent
- (C) c – Multicostate parallel divergent
- (D) d – Unicostate reticulate convergent

90. Anthophore is a :

- (A) Elongated internodal part between calyx and corolla
- (B) Elongated internodal part between corolla and androecium
- (C) Elongated internodal part between calyx and androecium
- (D) Elongated axis between androecium and gynoecium

91. Initiation of lateral roots and vascular cambium during the secondary growth takes place in :

- (A) Endodermis
- (B) Epidermis
- (C) Casparian strips
- (D) Pericycle

92. Secondary xylem and phloem in dicot stem are produced by :
- Vascular cambium
 - Apical meristem
 - Axillary meristem
 - Phellogen
93. The cells of the endodermis in dicot root are rich in :
- Lipids
 - Starch
 - Proteins
 - Auxins
94. Which of the following statement is not correct ?
- The terminal cell of the two-celled proembryo divides by a transverse wall – Solanad type
 - The terminal cell of the two-celled proembryo divides by a transverse wall – Caryophyllad type
 - The terminal cell of the two-celled proembryo divides by a longitudinal wall – Crucifer type
 - The terminal cell of the two-celled proembryo divides by a longitudinal wall – Chenopodiad type
95. The cambium is generally more active on the :
- Outer side
 - Inner side
 - Periphery side
 - None of these
96. Which of the following statements is not correct with respect to secondary growth ?
- In dicot stems, the cells of cambium present between primary xylem and primary phloem is the intrafascicular cambium
 - The amount of secondary xylem produced is more than secondary phloem
 - Secondary growth occurs in stems and roots of gymnosperms
 - Secondary cortex also called as phellogen
97. A plate of archesporial cells are found in:
- Urginea**
 - Sansevieria**
 - Dionacea**
 - Boerhaavia**

98. Which of the following is a Plumbagella type embryo sac ?
- (A) Monosporic 8 nucleate
 - (B) Bisporic 8 nucleate
 - (C) Tetrasporic 8 nucleate
 - (D) Tetrasporic 16 nucleate
99. How much time is taken by pollen to germinate on the stigma in **Beta vulgaris** ?
- (A) 2 days
 - (B) 2 hours
 - (C) 3 days
 - (D) 3 hours
100. In which of the following genera, wall formation does not take place during nuclear divisions of endosperm ?
- (A) **Citrus**
 - (B) **Cochlospermum**
 - (C) **Xeranthemum**
 - (D) **Cardiospermum**
-

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