Roll No.----------

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No. | | | | | | | |

K-1365

# B.Sc. (Biotech.) (Second Semester) Examination, 2025-26

**(NEP)**

## (BBT2002) BACK PAPER

## PLANT PHYSIOLOGY

| Paper Code |
| --- |
| BBT2002 |

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका सीरीज
Question Booklet Series
**B**

**Time : 1:30 Hours ]** **[ Maximum Marks-75**

**Instructions to the Examinee :**

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

**(Remaining instructions on the last page)**

**परीक्षार्थियों के लिए निर्देश :**

1. प्रश्न–पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न–पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर–शीट पर ही हल करना है, प्रश्न–पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न–पुस्तिका तथा OMR आन्सर–शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न–पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हो या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

**(शेष निर्देश अन्तिम पृष्ठ पर)**

1. The vascular bundles in dicot stem are:

   (A) Open

   (B) Closed

   (C) Scattered

   (D) Radial

2. Secondary growth is caused by:

   (A) Apical meristem

   (B) Intercalary meristem

   (C) Lateral meristem

   (D) Root cap

3. Growth rings are formed due to:

   (A) Seasonal variation

   (B) Mineral deficiency

   (C) Water shortage

   (D) Sunlight variation

4. Dorsiventral leaf is typical of:

   (A) Monocots

   (B) Dicots

   (C) Gymnosperms

   (D) Mosses

5. Isobilateral leaves are found in:

   (A) Dicots

   (B) Pteridophytes

   (C) Bryophytes

   (D) Monocots

6. Palisade parenchyma is present in:

(A) Lower epidermis

(B) Upper epidermis

(C) Mesophyll

(D) Cortex

7. Bulliform cells are present in:

(A) Dicot leaf

(B) Monocot leaf

(C) Stem

(D) Root

8. Water is essential for photosynthesis because it:

(A) Produces glucose

(B) Forms starch

(C) Produces ATP directly

(D) Provides electrons

9. Diffusion is the movement of molecules from:

(A) High concentration to low concentration

(B) Low concentration to high concentration

(C) Equal concentration

(D) Active transport

10. Osmosis involves movement of:

(A) Solute molecules

(B) Water molecules

(C) Proteins

(D) Minerals

11. Osmosis occurs through:

(A) Cell wall

(B) Semi-permeable membrane

(C) Cytoplasm

(D) Vacuole

12. A hypotonic solution causes plant cells to:

(A) Shrink

(B) Die

(C) Burst

(D) Become turgid

13. Example of imbibition is:

(A) Seed germination

(B) Transpiration

(C) Photosynthesis

(D) Respiration

14. Guttation occurs through:

(A) Stomata

(B) Hydathodes

(C) Lenticels

(D) Cuticle

15. Guttation occurs mainly during:

(A) Daytime

(B) Evening

(C) Afternoon

(D) Night or early morning

16. Loss of water in the form of vapor from plants is called:

(A) Diffusion

(B) Respiration

(C) Transpiration

(D) Guttation

17. Guard cells regulate:

(A) Photosynthesis

(B) Stomatal opening and closing

(C) Respiration

(D) Water absorption

18. Opening of stomata occurs due to:

(A) Loss of turgor in guard cells

(B) Increase in turgor pressure

(C) Plasmolysis

(D) Cell shrinkage

19. Potassium ions play role in:

(A) Translocation

(B) Respiration

(C) Photosynthesis

(D) Stomatal movement

20. Transpiration pull helps in:

(A) Food transport

(B) Cell division

(C) Respiration

(D) Water transport

21. A nutrient is considered essential if:

(A) Plant cannot complete life cycle without it

(B) It increases growth

(C) It is present in soil

(D) It is absorbed by roots

22. Which of the following is a macronutrient?

(A) Zinc

(B) Iron

(C) Nitrogen

(D) Copper

23. Which of the following is a micronutrient?

(A) Potassium

(B) Magnesium

(C) Iron

(D) Calcium

24. Nitrogen deficiency causes:

(A) Chlorosis of older leaves

(B) Necrosis

(C) Wilting

(D) Leaf curling

25. Magnesium is a component of:

(A) Cell wall

(B) Chlorophyll

(C) Protein

(D) DNA

26. Phosphorus deficiency leads to:

(A) Purple coloration of leaves

(B) Yellow leaves

(C) Leaf fall

(D) Stem breakage

27. Mineral nutrients are absorbed mainly through:

(A) Leaves

(B) Roots

(C) Stem

(D) Flowers

28. Active absorption of minerals requires:

(A) ATP

(B) Light

(C) $CO_2$

(D) Oxygen only

29. Food transport in plants occurs through:

(A) Xylem

(B) Epidermis

(C) Cortex

(D) Phloem

30. The main sugar transported in plants is:

(A) Glucose

(B) Fructose

(C) Sucrose

(D) Maltose

31. Translocation of food occurs from:

(A) Sink to source

(B) Source to sink

(C) Root to leaves only

(D) Stem to leaves

32. Loading of sugars into phloem requires:

(A) ATP

(B) Light

(C) Water

(D) Oxygen only

33. Bidirectional movement of food occurs in:

(A) Xylem

(B) Cortex

(C) Phloem

(D) Endodermis

34. Photoperiodism refers to:

(A) Growth due to light intensity

(B) Temperature response

(C) Nutrient uptake in light

(D) Developmental response to light duration

35. A short-day plant flowers when:

(A) Night is longer than a critical period

(B) Night is interrupted

(C) Day length is longer than a critical period

(D) Day length is constant

36. The light-dependent reactions occur in the:

(A) Stroma

(B) Cytosol

(C) Thylakoid membrane

(D) Inner chloroplast membrane

37. Oxygen is released during photosynthesis from the:

(A) $CO_2$ molecule

(B) Chlorophyll

(C) Water

(D) NADPH

38. The enzyme responsible for carbon fixation is:

(A) $NADP^+$ reductase

(B) ATP synthase

(C) Rubisco

(D) PEP carboxylase

39. Which product is NOT formed in the light reactions?

(A) ATP

(B) NADPH

(C) $O_2$

(D) Glucose

40. In C4 plants, initial $CO_2$ fixation occurs in:

(A) Bundle sheath cells

(B) Guard cells

(C) Mesophyll cells

(D) Stomatal cavity

41. The primary $CO_2$ fixing enzyme in C4 plants is:

(A) Rubisco

(B) PEP carboxylase

(C) Malate dehydrogenase

(D) Fumarase

42. Which of the following is a C4 plant?

(A) Wheat

(B) Rice

(C) Sugarcane

(D) Tomato

43. C4 plants reduce photorespiration by:

(A) Using more water

(B) Increasing temperature

(C) Spatial separation of $CO_2$ fixation and Calvin cycle

(D) Night-time fixation

44. CAM plants fix $CO_2$ at:

(A) Dawn

(B) Night

(C) Midday

(D) Evening

45. The adaptive advantage of CAM metabolism is:

(A) High temperature resistance

(B) Low $CO_2$ uptake

(C) Faster growth

(D) Water conservation

46. Which plant is a typical CAM plant?

(A) Maize

(B) Spinach

(C) Barley

(D) Cactus

47. The Calvin cycle is present in:

(A) Only C3 plants

(B) C4 and CAM plants only

(C) All photosynthetic plants

(D) None of the above

48. Leghaemoglobin is present in the root nodules of legumes. What is the function of leghaemoglobin?

(A) Oxygen removal

(B) Inhibition of nitrogenase activity

(C) Expression of *nif* gene

(D) Nodule differentiation

49. Pick the correct statement:

(A) Legumes do not fix nitrogen

(B) Legumes fix nitrogen independent of bacteria

(C) Legumes fix nitrogen through bacteria in their roots

(D) Legumes fix nitrogen through bacteria in their leaves

50. The organelles involved in photorespiration are chloroplast, peroxisome, and…….

(A) Mitochondria

(B) Nucleus

(C) Golgi apparatus

(D) Ribosomes

51. Plant growth is defined as :

(A) Cell signaling

(B) Irreversible increase in size and mass

(C) Cell metabolism

(D) Cell death

52. Growth curve in plants is generally :

(A) Sigmoid

(B) Linear

(C) Circular

(D) Exponential

53. Natural auxin is :

(A) IAA

(B) GA3

(C) ABA

(D) Zeatin

54. Auxins promote :

(A) Lateral bud growth

(B) Seed dormancy

(C) Leaf fall

(D) Apical dominance

55. Auxins are mainly synthesized in :

(A) Roots

(B) Shoot apex

(C) Hydathodes

(D) Seeds

56. Gibberellins promote :

(A) Stem elongation

(B) Root inhibition

(C) Leaf fall

(D) Senescence

57. Gibberellins were first discovered in :

(A) Rice plant disease

(B) Wheat plant

(C) Maize plant

(D) Tobacco plant

58. Cytokinins delay :

(A) Germination

(B) Senescence

(C) Flowering

(D) Dormancy

59. Natural cytokinin is :

(A) IAA

(B) ABA

(C) Zeatin

(D) Ethylene

60. Cytokinins promote :

(A) Apical dominance

(B) Lateral bud growth

(C) Leaf fall

(D) Dormancy

61. ABA promotes :

(A) Seed germination

(B) Stem elongation

(C) Cell division

(D) Seed dormancy

62. ABA helps in -

(A) Stomatal opening

(B) Flowering

(C) Stomatal closure

(D) Fruit ripening

63. Ethylene is synthesized in :

(A) Young tissues

(B) Leaves only

(C) Roots only

(D) Ripening fruits

64. Seed dormancy is :

(A) Active growth

(B) Temporary growth arrest

(C) Death

(D) Germination

65. Water absorption during germination is called :

(A) Imbibition

(B) Respiration

(C) Transpiration

(D) Diffusion

66. Photoperiodism is response to :

(A) Temperature

(B) Water

(C) Light duration

(D) Nutrients

67. Long day plants flower when :

(A) Day length is short

(B) Day length is long

(C) Temperature high

(D) Water available

68. Vernalization is :

(A) Water treatment

(B) Heat treatment

(C) Light treatment

(D) Cold treatment to induce flowering

69. Vernalization promotes :

(A) Flowering

(B) Dormancy

(C) Senescence

(D) Abscission

70. The primary photosynthetic pigment in plants is :

(A) Chlorophyll b

(B) Carotene

(C) Chlorophyll a

(D) Xanthophyll

71. Chlorophyll a shows maximum absorption in :

(A) Green and yellow region

(B) Blue and red region

(C) Yellow and orange region

(D) Infrared region

72. Carotenoids mainly function in :

(A) Photoprotection

(B) Carbon fixation

(C) ATP synthesis

(D) Water splitting

73. The two photosystems involved in photosynthesis are :

(A) PS I and PS II

(B) PS I and PS III

(C) PS II and PS III

(D) PS III and PS IV

74. The reaction center chlorophyll of Photosystem II is :

(A) P600

(B) P700

(C) P750

(D) P680

75. Water splitting occurs in :

(A) Photosystem I

(B) Photosystem II

(C) Both Photosystem I and II

(D) Calvin cycle

76. ATP formation during photosynthesis is called :

(A) Oxidative phosphorylation

(B) Reductive phosphorylation

(C) Substrate level phosphorylation

(D) Photophosphorylation

77. Non-cyclic photophosphorylation produces :

(A) ATP only

(B) NADPH only

(C) ATP and NADPH

(D) Glucose

78. The Calvin cycle occurs in

(A) Thylakoid membrane

(B) Grana

(C) Stroma

(D) Outer membrane

79. The first stable product of Calvin cycle in C3 plants is :

(A) Oxaloacetate

(B) Ribulose phosphate

(C) Glucose

(D) 3-phosphoglycerate

80. The enzyme responsible for $CO_2$ fixation in Calvin cycle is :

(A) Rubisco

(B) ATP synthase

(C) RuBP kinase

(D) Hexokinase

81. CAM plants open stomata during :

(A) Day

(B) Night

(C) Afternoon

(D) Morning

82. Photorespiration occurs due to :

(A) High $CO_2$ concentration

(B) High ATP

(C) Low temperature

(D) High $O_2$ concentration

83. Photorespiration mainly occurs in :

(A) C4 plants

(B) CAM plants

(C) C3 plants

(D) Algae only

84. The enzyme responsible for biological nitrogen fixation is:

(A) Nitrate reductase

(B) Nitrite reductase

(C) Nitrogenase

(D) Glutamine synthetase

85. The symbiotic nitrogen-fixing bacteria in leguminous plants belong to:

(A) Azotobacter

(B) Rhizobium

(C) Clostridium

(D) Anabaena

86. Which of the following is a free-living nitrogen-fixing bacterium?

(A) Rhizobium

(B) Frankia

(C) Azotobacter

(D) Bradyrhizobium

87. Nitrate reductase converts nitrate into:

(A) Nitrite

(B) Ammonia

(C) Nitrogen

(D) Amino acid

88. Ammonium assimilation in plants mainly occurs through:

(A) GS-GOGAT pathway

(B) Urea cycle

(C) Glycolysis

(D) TCA cycle

89. Glutamine synthetase converts:

(A) Ammonia to nitrate

(B) Glutamine to glutamate

(C) Glutamate to glutamine

(D) Nitrite to ammonia

90. The energy requirement for nitrogen fixation is in the form of:

(A) NADH only

(B) ATP

(C) $FADH_Z$

(D) GTP

91. Leghemoglobin in root nodules helps in:

(A) Nitrogen transport

(B) Nitrate reduction

(C) Ammonia synthesis

(D) Oxygen regulation

92. Shoot apical meristem is responsible for:

(A) Primary growth

(B) Secondary growth

(C) Lateral growth

(D) Root formation

93. Root apical meristem is protected by:

(A) Epidermis

(B) Root cap

(C) Cortex

(D) Endodermis

94. The quiescent centre is present in:

(A) Shoot apex

(B) Cambium

(C) Leaf apex

(D) Root apex

95. Which of the following is a simple permanent tissue?

(A) Xylem

(B) Phloem

(C) Collenchyma

(D) Vascular bundle

96. Sclerenchyma cells are characterized by:

(A) Thin walls

(B) Living protoplasm

(C) Thick lignified walls

(D) Large vacuole

97. Xylem transports:

(A) Food

(B) Water and minerals

(C) Hormones

(D) Proteins

98. Phloem transports:

(A) Water

(B) Minerals

(C) Food

(D) Oxygen

99. Which of the following is a living component of xylem?

(A) Vessel

(B) Tracheid

(C) Xylem fiber

(D) Xylem parenchyma

100. Casparian strips occur in:

(A) Epidermis

(B) Cortex

(C) Endodermis

(D) Pericycle

******

**Rough Work / रफ कार्य**

4. Four alternative answers are mentioned for each question as – A, B, C & D in the question booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

**Example :**

**Question :**

Q. 1 (A) ● (C) (D)

Q. 2 (A) (B) ● (D)

Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer Sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the Instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

**Impt.** On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question booklet, then after showing it to the invigilator, get another question booklet of the same series.

4. प्रश्न–पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर– A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सही उत्तर छाँटना है। उत्तर को OMR आन्सर–शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

**उदाहरण :**

**प्रश्न :**

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उत्तर निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर–पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर–पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर–पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न–पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न–पुस्तिका के अन्त में, रफ–कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा–कक्ष में लॉग–बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

**महत्वपूर्ण :** प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न–पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न–पुस्तिका प्राप्त कर लें।