DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

23-0009-AF

TEST BOOKLET

BOTANY

PAPER – II

Time Allowed: 3 hours

Maximum Marks: 300

INSTRUCTIONS TO CANDIDATES

Read the instructions carefully before answering the questions: -

1. This Test Booklet consists of **12(twelve) pages** and has **75 (seventy-five) items (questions)**.
2. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
3. **Please note that it is the candidate's responsibility to fill in the Roll Number and other required details carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet and the Separate Answer Booklet. Any omission/discrepancy will render the OMR Answer Sheet and the Separate Answer Booklet liable for rejection.**
4. Do not write anything else on the OMR Answer Sheet except the required information. Before you proceed to mark in the OMR Answer Sheet, please ensure that you have filled in the required particulars as per given instructions.
5. Use **only Black Ball Point Pen** to fill the OMR Answer Sheet.
6. This Test Booklet is divided into 4 (four) parts – **Part – I, Part – II, Part - III** and **Part – IV**.
7. All three parts are **Compulsory**.
8. **Part-I consists of Multiple Choice-based Questions.** The answers to these questions have to be marked in the **OMR Answer Sheet** provided to you.
9. **Part-II, Part-III and Part-IV consist of Conventional Essay-type Questions.** The answers to these questions have to be written in the separate **Answer Booklet** provided to you.
10. In Part-I, each item (question) comprises of 04 (four) responses (answers). You are required to select the response which you want to mark on the OMR Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose *ONLY ONE* response for each item.
11. After you have completed filling in all your responses on the OMR Answer Sheet and the Answer Booklet(s) and the examination has concluded, you should hand over to the Invigilator *only the OMR Answer Sheet and the Answer Booklet(s)*. You are permitted to take the Test Booklet with you.
12. **Penalty for wrong answers in Multiple Choice-based Questions:**

THERE WIL BE **PENALTY** FOR WRONG ANSWERS MARKED BY A CANDIDATE.

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to the question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to the question.

(iii) If a question is left blank. i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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PART-I
(Multiple Choice-based Questions)

Instruction for Questions 1 to 50:

- ***Choose the correct answer for the following questions.***
- ***Each question carries 3 marks.*** ***[3x50=150]***

1. Which gene cause colour blindness by mutation in males?
   (a) X- Chromosome
   (b) Y- Chromosome
   (c) Both X and Y Chromosomes
   (d) None of the above

2. Which of the following statements is true about the cell wall?
   (a) The cell wall is mainly composed of starch
   (b) The cell wall is mainly composed of proteins
   (c) The cell wall is mainly composed of cellulose
   (d) The cell wall is mainly composed of lipids

3. Which of the following is recombinant plasmid?
   (a) pBR 322
   (b) pBR 320
   (c) pBR 321
   (d) pBR 500

4. Protein sorting and lipid sorting functions are performed by which organelle?
   (a) Chloroplast
   (b) Smooth ER
   (c) Golgi apparatus
   (d) Rough ER

5. The internal skeleton of a cell is composed of -
   (a) Micro tubules
   (b) Intermediate filaments
   (c) Microfilaments
   (d) All of the above

6. Name the scientist who gave the term Protoplasm.
   (a) Purkinje
   (b) Fontana
   (c) Charles Bonnet
   (d) A. Corti

7. A point mutation involves -
   (a) Duplication
   (b) Deletion
   (c) Insertion
   (d) Change in single base pair

8. Which gene provides instructions for making sex determining protein by 'Y' chromosome in humans?
   (a) DPY-3
   (b) SRY gene
   (c) INSR gene
   (d) CYP -35-a gene

9. Which of the following activities does molybdenum deficiency affect?
   (a) Nitrogenase activity
   (b) Nitrate reductase activity
   (c) Chlorate reductase activity
   (d) All of these

10. Biological nitrogen fixation is the process of converting -
   (a) Nitrogen to Ammonia
   (b) Ammonia to Nitrate
   (c) Ammonia to Nitrite
   (d) None of these

11. Photo respiration helps in-
   (a) Producing precursors of proteins, nucleotides etc
   (b) Using energy in the form of NADPH
   (c) Protection against photo-oxidation and aerobic oxidation
   (d) All of the above

12. The Cohesion Theory was first proposed by -
   (a) Briggs & Shantz
   (b) Boehm &Turpen
   (c) Dixon & Joly
   (d) None of the above

13. Living cells placed in an isotonic solution tend to retain their shape and size. This is based on principle of -
   (a) Transpiration
   (b) Diffusion
   (c) Osmosis
   (d) None of the above

14. Ribulose biphosphate is the first stable compound in which plants?
    (a) All plants
    (b) C-3 plants
    (c) C-4 plants
    (d) None of the above

15. The respiratory quotient for germinating carbohydrate rich seeds is -
    (a) One
    (b) Less than one
    (c) More than one
    (d) Variable

16. Regulation of stomatal closing involves -
    (a) Potassium ions
    (b) Chloride ions
    (c) Hydrogen ions
    (d) All of these

17. Abscisic acid causes-
    (a) Senescence and abscission
    (b) Stomatal closing
    (c) Inhibition of seedling and bud growth
    (d) All of the above

18. A commercial variety of cotton containing BT gene is called
    (a) Egyptian cotton
    (b) Killer cotton
    (c) Hairy cotton
    (d) Indigenous cotton

19. Commensalism includes -
    (a) Epiphytes
    (b) Lianas
    (c) Both (a) and (b)
    (d) None of the above

20. Plants which inhabit sandy soils are called -
    (a) Halophytes
    (b) Psilophytes
    (c) Psammophytes
    (d) Lithophytes

21. A stable population is represented by a/an -
    (a) Perfect erect pyramid
    (b) Bell-shaped pyramid
    (c) Urn shaped figure
    (d) None of the above

22. The transitional zone between two communities is known as -
    (a) Edge effect
    (b) Ecad
    (c) Ecotone
    (d) Ecotype

23. Which of these is not a quantitative character?
    (a) Frequency
    (b) Density
    (c) Sociability
    (d) Cover area

24. What type of ecosystem are the coral reefs?
    (a) Arid ecosystem
    (b) Aquatic ecosystem
    (c) Estuarine ecosystem
    (d) Marine ecosystem

25. According to Shelford's Law of Tolerance, the organism's wide environmental factor tolerance limit shows -
    (a) Wide distribution with high population size
    (b) Narrow distribution with low population size
    (c) Narrow distribution with high population size
    (d) Wide distribution with low population size

26. Which of the following statements is correct with respect to the food chain?
    (a) Interrelation between different food chains is known as 'food web'
    (b) Every component of the food chain forms a trophic level
    (c) All the chains formed by nutritional relations is used to understand energy flow
    (d) All of the above

27. What are the 'Sundarbans' are famous for?
    (a) Alpine vegetation
    (b) Grasslands
    (c) Mangroves
    (d) Xerophilous plants

28. Successful adjustment of a pioneer species in a new area is called -
    (a) Invasion
    (b) Ecesis
    (c) Dispersal
    (d) Xerosere

29. Which of the following cell organelles is involved in the breakdown of organic matter?
    (a) Golgi bodies
    (b) Mitochondria
    (c) Chloroplast
    (d) Lysosomes

30. Which of the following is used for synthesis of c-DNA?
    (a) DNA Polymerase
    (b) RNA Polymerase
    (c) Reverse Transcriptase
    (d) None of the above

31. Which of the following polymerases takes part in the initiation of transcription in eukaryotic organisms?
    (a) RNA polymerase -I
    (b) RNA polymerase-II
    (c) RNA polymerase- III
    (d) RNA polymerase – IV

32. Who proposed the three types of genes on the basis of their structure?
    (a) Benzer
    (b) Morgan
    (c) Muller
    (d) Khurana

33. Second aminoacyl tRNA enters the ribosome via which of the following sites?
    (a) A-site
    (b) E- site
    (c) S-site
    (d) P - site

34. On which of the following organisms did Jacob and Monad work to propose the 'Operon model'?
    (a) E.coli
    (b) Drosophila
    (c) Neurospora
    (d) None of the above

35. The cross between F1 generation and any of the parents is known as -
(a) Test cross
(b) F1 cross
(c) Both A & B
(d) Back cross

36. Okazaki fragments are joined by-
(a) DNA pol. III
(b) DNA pol. I
(c) Ligase
(d) DNA pol. II

37. Which of the following is an example of a homologous organ?
(a) Wing of an insect & wing of a bird
(b) Leg of a dog & leg of a spider
(c) The arm of a human & wing of a bird
(d) All of the above

38. Which of the following shows incomplete dominance?
(a) Blood groups in humans
(b) Pod colour in garden peas
(c) Flower colour in garden peas
(d) Flower colour in Snapdragon

39. In a mutational event, when adenine is replaced by guanine, it is called -
(a) Transversion
(b) Transcription
(c) Transition
(d) Frame-shift mutation

40. Cri-du-chat syndrome disease is a -
(a) X- chromosome linked disease
(b) Y- chromosome linked disease
(c) Chromosome-5 linked disease
(d) Chromosome -22 linked disease

41. Which among the given options is the first plant whose somatic hybrid was prepared?
(a) Withania somnifera
(b) Capsicum annuum
(c) Mangifera indica
(d) Nicotiana glauca

42. The number of fruits in a tree is a/an -
    (a) Discrete variable
    (b) Quantitative variable
    (c) Continuous variable
    (d) Absolute variable

43. In F2 generation, 9:7 phenotypic ratio represents -
    (a) Epistasis
    (b) Co- dominance
    (c) Complementary interaction
    (d) Incomplete dominance

44. Single stranded DNA is present in -
    (a) TMV
    (b) Salmonella
    (c) Bacteria
    (d) Φ x 174

45. Which of these restriction enzymes produce blunt ends?
    (a) Eco R l
    (b) Bam H l
    (c) Hind III
    (d) Alu 1

46. Which of the following is the full form of the abbreviation RFLP?
    (a) Rare Fragment Length Polymerase
    (b) Restriction Fragment Length Polymorphism
    (c) Restriction Fragment Length Polymerase
    (d) Random Fragment Length Polymorphism

47. The commercial variety of tomato that shows delay in ripening is named as -
    (a) Round-up ready
    (b) High lauric
    (c) Endless summer
    (d) Flavr-Savr

48. The portion of soil water that can be absorbed by plants for its growth is called -
    (a) Holard
    (b) Chresard
    (c) Echard
    (d) None of the above

49. The branch of biostatistics that deals with testing of hypothesis and making predictions using data collection is called -
    (a) Descriptive biostatistics
    (b) Inferential biostatistics
    (c) Comparative biostatics
    (d) None of the above

50. The nuclear enzyme topoisomerases is involved in -
    (a) Producing RNA primer
    (b) Joining of DNA segment
    (c) Separation of DNA strands
    (d) Producing nick in DNA and resolving tension

PART - II
(Short Answer-type Questions)

Instructions for Questions 51 to 63:

- ***Write the answers in short for any 10 (TEN) out of the thirteen questions.***
- ***Each question carries 5 marks.*** ***[5x10=50]***

51. What are thylakoids? In which organelle are they found?

52. Briefly bring about the functions of Peroxisomes.

53. Explain the molecular structure of plasma membrane through diagrams according to fluid mosaic model.

54. Explain Chi-square test in brief with its formula.

55. What do you mean by aneuploidy?

56. Critically examine the Intellectual Property Rights.

57. Describe inheritance of blood groups in men.

58. Explain clover- leaf model of tRNA with a suitable diagram.

59. Write a note on Wobble hypothesis.

60. Explain plant quarantine in brief.

61. Discuss the role of leghemoglobin in nitrogen fixation.

62. Explain the basic features of plasmid vector pBR322.

63. Briefly describe the vegetation of temperate forest of India.

PART - III
(Long Answer-type Questions)

Instructions for Questions 64 to 71:

- ***Answer any 5 (FIVE) out of the eight questions.***
- ***Each question carries 10 marks.***
- ***Candidates are required to give their answers in their own words as far as practicable.***

[10x5=50]

64. Describe in brief the mechanism of active transport in a cell.
65. What are zinc finger domains?
66. Write about the role of Colchicine in causing mutations.
67. Outline the evidences in favour of evolution from embryology.
68. Explain Sustainable Development Goals. What can you do, as a citizen, for development to be more sustainable?
69. What are the effects of salinity stress on plants?
70. Write a note on herbicide resistant transgenic plants.
71. What are the objectives of Environmental Protection Act, 1986? What according to you are its major drawbacks?

PART – IV
(Essay-type Questions)

Instructions for Questions 72 to 75:

- ***Answer any 2 (TWO) out of the four questions.***
- ***Each question carries 25 marks.*** ***[25x2= 50]***

72. Give a detail account about the chemical structure, physiological effects and mode of action of Auxins.
73. Discuss in detail about Raunkiaer's life forms with examples.
74. What is 'Lac Operon'? Explain the 'Lac Operon' model in E.coli.
75. Explain the ultra-structure of Cell Nucleus with a diagram and write about its functions.
