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

23-0009-AC

TEST BOOKLET
AGRICULTURE
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 **16(sixteen) 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)

Instructions for Questions 1 to 50:

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

1. Which of the following is not enlisted in the four principles of heredity?
   (a) Principle of Paired Factors
   (b) Principle of Co-Dominance
   (c) Law of Segregation or Law of Purity of Gametes
   (d) Law of Independent Assortment

2. Find the incorrect statements on prokaryotic cell from the following -
   1. They are generally uni-cellular
   2. Cell division is by mitosis and meiosis
   3. Possess only one envelope system
   4. They lack nucleus and chromosomes

   Select the correct answer using the codes given below:
   (a) 1 and 3
   (b) 1, 2, 3 and 4
   (c) 1, 2 and 4
   (d) 1, 3 and 4

3. The main function(s) of cell wall is/are -
   1. It determines the shape and size of a cell
   2. It provides protection to the inner parts of a cell from the attack by pathogens
   3. It provides mechanical support to the tissues and act as a skeletal framework of plants
   4. It helps in transport of substances between two cells

   Select the correct answer using the codes given below:
   (a) 1 and 3
   (b) 1 only
   (c) 1, 2 and 4
   (d) 1, 2, 3 and 4

4. Find the correct sequence of the general process of sexual reproduction in fungi -
   (a) Plasmogamy – Karyogamy – Meiosis
   (b) Plasmogamy – Meiosis – Karyogamy
   (c) Meiosis – Karyogamy – Plasmogamy
   (d) Plasmogamy-Mitosis-Karyogamy

5. The main function(s) of plasma membrane is/are -
   1. Primarily the plasma membrane provides mechanical support.
   2. It delimits the protoplasm from the exterior.
   3. It checks the entry and exit of undesirable substances.
   4. It transmits necessary materials to and from the cell

Select the correct answer using the codes given below:
   (a) 1 and 3
   (b) 1 only
   (c) 1, 2 and 4
   (d) 1, 2, 3 and 4

6. Which one of the following is correctly matched?
   (a) Rice (chromosome number 2n) - 24
   (b) Wheat (chromosome number 2n) - 42
   (c) Human (chromosome number 2n) - 23
   (d) Garden pea (chromosome number 2n) - 14

7. Which is the most commonly used selection approach in plant breeding?
   (a) Directional selection
   (b) Disruptive selection
   (c) Stabilizing selection
   (d) Growth selection

8. Which of the following is/are the salient features of double helix structure of DNA?
   1. The DNA molecule consists of two polynucleotide chains wound around each other in a right-handed double helix.
   2. The two strands of a DNA molecule are oriented anti-parallel to each other
   3. Each polydeoxyribonucleotide strand is composed of many deoxyribonucleotides
   4. The half steps of one strand extend to meet half steps of the other stranded the base pairs are called complementary base pairs.

Select the correct answer using the codes given below:
   (a) 1 and 3
   (b) 4 only
   (c) 1, 2 and 3
   (d) 1, 2, 3 and 4

9. The crossing of F1 to either of the parents is known as?
   (a) Test cross
   (b) Back cross
   (c) F1 cross
   (d) Monohybrid cross

10. How does Protein Energy Malnutrition (PEM) affect Carbohydrate Metabolism?
    1. Fasting blood sugar levels are lower.
    2. Severe hypoglycaemia is seen.
    3. The glycogen stores are depleted which leads to fluctuation in the blood sugar levels.
    4. Rate of gluconeogenesis is altered.

Select the correct answer using the codes given below:

(a) 1 and 3
(b) 3 only
(c) 1, 2 and 3
(d) 1, 2, 3and 4

11. Which one of the following statements is incorrect about DNA??
    (a) The process by which a DNA molecule makes its identical copies is called DNA duplication.
    (b) The process of separation of DNA strands by heating is known as denaturation.
    (c) The double helix of DNA was described by Watson and Crick
    (d) Reunion of the separated or denatured DNA strands on cooling is called annealing

12. The first reported case of aneuploidy was
    (a) Globe mutant of oenothera
    (b) Gigas mutant of datura
    (c) Gigas mutant of oenothera
    (d) Globe mutant of datura

13. Three codons do not code for any amino acid and hence they are called nonsense codons. Which are they?
    1. UUA, UAG and UGA
    2. UAA, UAG and UGA
    3. UAA, AUG and UGA
    4. UAA, UAG and UGG

Select the correct answer using the codes given below

(a) 1 and 2
(b) 2 only
(c) 1, 2 and 3
(d) 1, 2, 3 and 4

14. The most commonly used breeding method for the production of transgressive segregation in self-pollinated crops is?
    (a) Pedigree method
    (b) Backcross
    (c) Bulk method
    (d) Hybridization

15. Find the incorrect statement from the following -
    (a) Cistron is a sub division of gene which acts as a unit of function with a gene.
    (b) Muton is a sub division of gene which is the site of mutation.
    (c) Recon is the smallest subunit of gene capable of undergoing recombination or a sub unit of gene which is the site of recombination.
    (d) Zenon is the sub division of gene which is the site of ZDNA

16. Occurrence of more than one embryo in seed is known as -
    (a) Polysomy
    (b) Polyembryony
    (c) Apogamy
    (d) None

17. The moisture content for safe storage of cereals is -
    (a) 12-14%
    (b) 14-16%
    (c) 16-18%
    (d) 18-20%

18. A sound seed certification programme requires -
    (a) Direct participation of breeder
    (b) Use of sophisticated equipment
    (c) Classification of seed
    (d) Support of law

19. The rudimentary root of the seed or seedling that forms the primary root of the young plant is known as–
    (a) Rachis
    (b) Radicle
    (c) Rachilla
    (d) Raceme

20. When the pathogen is loosely mixed with seed in the form of sclerotia, galls etc it is called–
    (a) Infection
    (b) Infestation
    (c) Contamination
    (d) Concomitant contamination

21. An example of slow drying seeds is–
    (a) Cereals
    (b) Rapeseed and mustard
    (c) Grass
    (d) Pulses

22. The tendency of an offspring to resemble its parent is known as?
    (a) Variation
    (b) Heredity
    (c) Resemblance
    (d) Inheritance

23. The alternate form of a gene is called?
    (a) Alternate type
    (b) Recessive character
    (c) Dominant character
    (d) Allele

24. The genotypic ratio of a monohybrid cross is?
    (a) 1:2:1
    (b) 3:1
    (c) 2:1:1
    (d) 9:3:3:1

25. An exception to Mendel's law is?
    (a) Independent assortment
    (b) Linkage
    (c) Dominance
    (d) Purity of gametes

26. Which of the following pairs of plant disease- microorganisms is correct?
    1. Citrus Canker- Virus
    2. Rust of wheat- Fungi
    3. Downy mildew- Algae
    4. Powdery mildew- Fungus

Select the correct answer using the codes given below:
    (a) 1 and 2
    (b) 4 only
    (c) 2 and 4
    (d) 1, 3 and 4

27. Which of the following statements about leaf curl of papaya disease is/are correct?
    1. *Papaya leaf curl virus* (PaLCuV) is a DNA virus
    2. The genus is *Begomovirus*
    3. The family is *Geminiviridae*
    4. It is transmitted by beetle

Select the correct answer using the codes given below
    (a) 1 and 2
    (b) 4 only
    (c) 1, 2 and 3
    (d) 1, 2, 3 and 4

28. Pungency in radish is due to a volatile compound
    (a) Erucic acid
    (b) Isothiocyanates
    (c) Allopropyl disulphide
    (d) Diallyl disulphide

29. Haustoria are found in which of the genera?
    1. Powdery mildew fungi
    2. Downy mildew fungi
    3. Albugo
    4. Magnaporthe

30. Which of the following is/are asexual fruiting body/bodies?
    1. Pycnidia (Phomopsis)
    2. Acervulus (Colletotrichum, Gleosporium)
    3. Sporodochium (Myrothecium)
    4. Sporodochium (Fusarium)

Select the correct answer using the codes given below:
    (a) 1 and 2
    (b) 4 only
    (c) 1, 2 and 3
    (d) 1, 2, 3 and 4

31. In leguminous plants leghemoglobin protects _____ activity.
    1. Nitrogenase
    2. Protease
    3. Nitrate reductase
    4. Nitrate oxidase

32. Which is the best light for stomatal opening?
    1. Red
    2. Blue
    3. Yellow
    4. Green

33. The C4 mechanism in plant was discovered by -
    (a) M Davidson Hatch and Charles Roger
    (b) M David and Morger
    (c) Morrinson and Teresa Charles
    (d) Borris and Andrew Charles

34. In the plant number of stomata present per cm^2 of a common leaf is about -
    (a) 2 million
    (b) More than 100000
    (c) 10000
    (d) Less than 1000

35. Xenia refers to effect of pollen genotype on the characteristics of which of the following?

(a) Embryo
(b) Endosperm
(c) Fruit
(d) Ovary

36. RATNA variety of mango is a cross of -
(a) Neelam x Dashehari
(b) Totapari x Neelam
(c) Neelam x Alphanso
(d) Alphanso xTotapari

37. There are several types of ground layering. Find the incorrect one from the following -
(a) Tip layering
(b) Temple layering
(c) Trench layering
(d) Stool layering

38. Virus disease free plants in micro propagation can be obtained through -
(a) Anther culture
(b) Meristem tip culture
(c) Embryo culture
(d) Cell culture

39. Which of the following refers to making an incision below a bud to retard its growth?
(a) Ringing
(b) Nicking
(c) Notching
(d) Thinning

40. Which one of the following is incorrect about Public Distribution System (PDS) in India?
(a) The Revamped Public Distribution System (RPDS) was launched in June, 1992.
(b) In June, 2007, the Government of India launched the Targeted Public Distribution System (TPDS) with focus on the poor.
(c) AAY was a step in the direction of making TPDS aim at reducing hunger among the poorest segments of the BPL population.
(d) In second expansion of AAY, all primitive tribal households are included.

41. Baramasi, Chhatri, Jonna Valasa, Vavivalasa, Bangalore, Thagarampudi are the varieties of -
(a) Sapota
(b) Guava
(c) Ber
(d) Pomegranate

42. The mandatory mark found on all processed fruit products sold in India- such as packaged fruit beverages, fruit jams, crushes, and squashes, pickles, dehydrated fruit products and fruit extracts as per the Food Safety and Standards authority Act of 2006
    (a) FPO
    (b) BEE star rating
    (c) HALLMARK
    (d) ISO

43. Cycocel concentrations commonly used for spray applications are in the range of -
    (a) 500 to 1000 ppm
    (b) 50 to 100 ppm
    (c) 5 to 10ppm
    (d) 0.5 to 1ppm

44. Process of adding vitamins to milk is known as -
    (a) Flavoring
    (b) Fortification
    (c) Fermentation
    (d) Sterilization

45. The most used methods for exclusion of the pathogens are?
    (a) Chemical measures
    (b) Regulatory measures
    (c) Biological measures
    (d) Mechanical measures

46. The development of embryo from synergids or antipodal cells without meiosis and fertilization is known as -
    (a) Apospory
    (b) Apogamy
    (c) Monoecy
    (d) Autogamy

47. The most significant achievement(s) of NSC in development of seed industry is/are -
    1. Establishment of a scientific seed industry in the country
    2. Encouragement of Indian manufacturers for seed processing equipment.
    3. Development of field inspection methods and seed standards for seed certification and labeling
    4. Multiplication of pre-released varieties of all India importance

Select the correct answer using the codes given below:
    (a) 2 and 3
    (b) 3 only
    (c) 4 only
    (d) 1, 2, 3 and 4

48. Biological control for plant insect management is sustainable approach for crop production. The most commonly used biological agent(s) for insect management in agricultural crops is/are -
    1. Trichoderma
    2. Nuclear Polyhedrosis Virus (NPV)
    3. *Bacillus thruringiensis*
    4. Trichogramma

Select the correct answer using the codes given below:
    (a) 1 and 3
    (b) 3 only
    (c) 2, 3 and 4
    (d) 1, 2, 3and 4

49. The label on any seed sample should bear -
    1. S. No. and name of the sender with official designation
    2. Name of the person form when the sample has been taken
    3. Date & Place of taking the sample, kind & variety of the seed for analysis
    4. Nature & Qty. of preservative added if any

Select the correct answer using the codes given below
    (a) 1, 2 and 3
    (b) 3 only
    (c) 4 only
    (d) 1, 2, 3 and 4

50. Homozygosity and heterozygosity of an individual can be determined by?
    (a) Back cross
    (b) Self-fertilization
    (c) Test cross
    (d) Self-cross

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. Enumerate the duties of Seed Inspector as per Sector IX Rule 23 of the Seeds Rules, 1968.

52. Write in detail on the development of resistance variety using molecular markers against plant diseases.

53. Describe with schematic flow chart indicating the steps involved in the development of a variety.

54. Draw a clear picture of chromosome and explain its functions.

55. Describe the importance of mutagenesis in Agriculture.

56. Brief about the role of WTO, issues and its impact on Agriculture.

57. Provide the information on National Dietary Guidelines and food consumption pattern in India.

58. Explain the role of DNA finger printing in seed industry.

59. Describe the package and practices for the production of Apple.

60. Differentiate between interspecific and intergeneric hybridization.

61. Differentiate between interspecific and intergeneric hybridization.

62. What is heritability? Explain one of its types with suitable equation to measure it?

63. Describe in details on the methods of pedigree selection?

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.* *[10x5=50]*

64. Explain in details the role of GM crop in Indian agriculture with its advantages and disadvantages.

65. Describe in detail the structural aberrations of chromosome with suitable diagram.

66. What is seed certification? Write about the procedures of seed certification to be followed for the breeder seed production of rice?

67. Describe the package and practices for the production of Tea.

68. 'India can be one of the major potential hub for floriculture'- explain with suitable examples.

69. Write the details methods practices followed for the management of storage pests?

70. Plant quarantine plays a major role in Indian agriculture. Explain with suitable examples.

71. Explain the causes of post-harvest losses of horticultural crops and technologies to minimize it?

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. (a)What is the present situation of GM crops in India? Explain in detail the issues or challenges of GM crops.
(b)Describe the structural aberrations of chromosome with the aid of a suitable diagram.

73. (a)What is Respiratory Quotient? Explain the Tricarboxylic Acid Cycle with suitable chart.
(b)Describe the package and practices for the production of large cardamom and tea.

74. (a)What are auxins and what are their physiological roles? Describe the biosynthesis of auxins by different pathways?
(b)Differentiate between epidemiology and forecasting? Explain one of the forecasting models for prediction potato late blight.

75. (a)What is sexual incompatibility in plants? Explain its various types and cite their importance.
(b)Explain the process of breaking down of carbohydrate during glycolysis with suitable chart.