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24-0004-AB

TEST BOOKLET

Time Allowed: 3.00 hours | **PAPER – II** | **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 (three) parts – **Part – I, Part – II, Part – III** and **Part – IV**.
7. All four parts are **Compulsory**.
8. **Part-I consist 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 to Part – IV consist of Conventional 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 QUESTIONS)

Choose the correct answer for the following questions: **(3x50=150)**

1. Select the correct order of the states arranged in descending order in terms of total area under organic certification process registered under National Programme for Organic Production as on 31st March 2023from the following-
   a) Madhya Pradesh, Maharashtra, Gujarat and Rajasthan
   b) Maharashtra, Madhya Pradesh, Gujarat and Rajasthan
   c) Gujarat, Maharashtra, Madhya Pradesh and Rajasthan
   d) Maharashtra, Gujarat, Madhya Pradesh, and Rajasthan

2. Shellac is produced from lac insects *Laccifer lacca*. It occurs in certain plants. Find the correct host combination of the lac insect from the following -
   a) Ber, Kusum, Brinjal
   b) Palas, Banana, Ber
   c) Palas, Ber, Kusum
   d) Kusum, Chilli, Banana

3. Which among the following is not the principle objective of organic farming?
   a) To produce food of high nutritional quality.
   b) To interact in a constructive and life enhancing way with natural system and cycles.
   c) To encourage and enhance biological cycles within the farming system.
   d) To maintain the soil in-fertility.

4. The Government is promoting organic farming in the country through different schemes. Find the scheme which does not deal with organic farming.
   a) National Project on Organic Farming (NPOF)
   b) National Horticulture Mission (NHM)
   c) Horticulture Mission for North East and Himalayan States (HMNEH)
   d) Horticulture Mission for South Indian States (HMSIS)

5. Fruits are broadly classified on the basis of their temperature requirement such as temperate, subtropical and tropical. Find the ***incorrect*** statement on the agro-climatic zones of India from the following.
   a) The ICAR, New Delhi has recognized eight agro climatic zones for effective land use planning.
   b) During 1985-90 the Planning Commission accepted 15 broad agro-climatic zones based on physiography and climate for effective planning.
   c) According ICAR agro climatic zones, the sub-humid Sutlez-Ganga consists of alluvial plains of Punjab, Delhi, UP plains & Bihar.
   d) According ICAR agro climatic zones, semi-arid lava plateaus and central islands consists of Eastern Madhya Pradesh, Orissa and Bihar.

6. India is the home of about 1,000 varieties of mangoes. Find the *incorrect* statement of mango variety character from the following-
   a) Totapuri is a regular and heavy-bearing mango
   b) Arka Puneet is a cross between Alphonso x Banganapalli
   c) Sindhu is a parentage of Ratna x Alphonso
   d) Pairi is native to coastal Karnataka including Goa

7. There are several methods for preparation of farm yard manures. Find the ***incorrect*** method from the following -
   a) Pit method and Trench method
   b) Heap method
   c) Heat method
   d) Box method

8. Following are the common name and scientific name combinations of nematodes-
   1) Lance nematode- *Hoplolaimus* spp.
   2) Lesion nematode - *Pratylenchus* spp.
   3) Needle nematode- *Rotylenchus*

   Select the ***incorrect*** combination using codes given below-
   a) 1 and 2 only
   b) 1
   c) 2
   d) 3

9. The outer body tube or body wall of nematode includes the cuticle, hypodermis, and somatic muscles. The body wall -
   1) Protect from the harsh external environment
   2) Serves as the endoskeleton
   3) Provides the mechanism for movement of the organism through the soil and plant tissue.

   Select the ***incorrect*** function of the body wall using codes given below -
   a) 1 and 2
   b) 1
   c) 2
   d) 3

10. The following examples are of the crops categorised on the basis of their salt tolerance -
   1) High salt tolerant: rice
   2) Medium salt tolerant: wheat
   3) Low salt tolerant: maize

   Using codes given below select the correct combination(s)-
   a) 1 and 2
   b) 1
   c) 2
   d) 3

11. Identify the disadvantage of Zero tillage from the following -

a) Zero tilled soils are homogenous in structure with more number of earthworms.
b) Organic matter content increases due to less mineralization.
c) Surface run-off is reduced due to presence of mulch.
d) Higher amount of nitrogen has to be applied for mineralization of organic matter in zero tillage.

12. Removal of plants of a variety admixed with other variety of same crop is called -

a) Topping
b) Roguing
c) Propping
d) Harrowing

13. Which of the following relates to the importance of water to plants?

1) Water gives turgidity and keeps plants erect
2) Water is an essential part of protoplasm
3) It regulates the temperature of the plant system
4) It regulates the light of the plant system

Select the correct answer from the codes given below -

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

14. Identify the correct characteristic(s) of fungi from the following -

1) It is procaryotic
2) Achlorophyllus, nucleated, branched
3) It is non-vascular and non-motile

Select the correct answer from the codes given below -

a) 2 and 3
b) 1,2 and 3
c) 1 and 2
d) 1

15. The position and number of flagella varies with bacterial genera. Atrichous means without flagella. The atrichous flagella is found in -

a) Xanthomonas
b) Pseudomonas fluorescens
c) Erwinia
d) Xylella

16. The term luxury consumption is used to describe nutrient absorption by the plant -

a) That does not influence yield
b) That does influence yield
c) That increase yield
d) That reduce yield

17. Yield is severely affected when a nutrient is deficient. When deficiency is corrected, growth increases more rapidly. Under severe deficiency, rapid increase in growth with added nutrient can cause a small decrease in nutrient concentration due to dilution effect. This is called -
    a) The Stepberg effect
    b) The Steenberg effect
    c) The Standberg effect
    d) The Stuartberg effect

18. The economic viability of a project indicates whether the proposed project is likely to contribute reasonable returns on the investment which in turn will lead to economic development of the farmer. The economic viability can be measured by -
    1) Net Present Worth (NPW)
    2) Benefit-Cost Ratio (BCR)
    3) Internal Rate of Return (IRR)

    Select the correct answer from the codes given below -
    a) 2 and 3
    b) 1,2 and 3
    c) 1 and 3
    d) 2

19. Depreciation is the decline in the value of a given asset as a result of the use, wear and tear, accidental damages and time obsolescence. Which of the following is/are the methods of calculating annual depreciation?

    1) Straight-Line Method
    2) Sum-of-the-Year Digit Method (or) Reducing Fraction Method
    3) Declining or Diminishing Balance Method

    Select the correct answer from the codes given below -
    a) 2 and 3
    b) 1,2 and 3
    c) 1 and 3
    d) 2

20. Select the ***incorrect*** type of farm budgeting technique from the following -
    a) Partial Budgeting
    b) Enterprise Budgeting
    c) Cash flow Budgeting
    d) In-complete Budgeting

21. In *Mirabilis jalapa,* when plants with red flowers (RR) are crossed with plants having white flowers (rr), the hybrid F1 plants bear pink flowers (Rr). When these F1 plants with pink flowers are self-pollinated they develop red (RR), pink (Rr) and white (IT) flowered plants in the ratio of _____ in F2 generation.

a) 1 : 2 :1
b) 1 :4 :2
c) 1 :4 :2
d) 2 :4 :4

22. Identify the correct statement(s) on lethal gene from the following -
1) Gene which causes the death of its carrier when in homozygous condition is called lethal gene.
2) Lethal genes have been reported in both animals as well as plants.
3) Lethal genes have been reported only in animals.

Select the correct answer from the codes given below -
a) 2 and 3
b) 1,2 and 3
c) 1 and 2
d) 3

23. The following are the statements on monohybrid cross. Identify the correct one(s).
1) A cross is made between two true-breeding parents differing for a single trait, producing an F2 generation.
2) A cross is made between two true-breeding parents differing for a single trait, producing an F1 generation.
3) These plants are inter-crossed to produce an F2 generation.

Select the correct answer from the codes given below -
a) 2 and 3
b) 1,2 and 3
c) 1 and 2
d) 2

24. The dwarf variety of Papaya known as "Pusa Nanha" is developed through _____.
a) Mutation
b) Hybridization
c) Selection
d) Heterosis

25. Which of the following is the edible part of Litchi?
a) Pericarp
b) Kernal
c) Thalamus
d) Fleshy aril

26. In which of the following fruits is the 'Hen & Chicken' disorder observed?
    a) Banana
    b) Grape
    c) Mango
    d) Litchi

27. Male sterility may be conditioned due to cytoplasmic or genetic factors or due to interaction of both. Environment also induces male sterility. Depending on these factors male sterility can be classified into which of the following?
    1) Cytoplasmic Male Sterility (CMS)
    2) Environmental – Cytoplasmic - Genetic Male Sterility (ECGMS)
    3) Genetic Male Sterility (GMS)

    Select the correct answer from the codes given below -
    a) 2 and 3
    b) 1,2 and 3
    c) 1 and 3
    d) 2

28. Which of the following functions of nutrients in plants is correct?
    a) Manganese- Essential for nitrogen assimilation by plants and nitrogen fixation by bacteria.
    b) Molybdenum -Promotes seed germination and speeds plant maturity.
    c) Calcium- Plays a vital role in plant structure, because it is part of cell walls and holds them together.
    d) None of the above

29. From the following statements on nitrogen transformations in soil, find the correct one -
    1) Mineralization is the conversation of organic NH_4^+ to N as a result of microbial decomposition.
    2) Aminisation is the decomposition of proteins and the release of amines, amino acids and urea is called aminisation.
    3) Amines and Aminoacids produced during aminisation of organic N are decomposed by other heterotrophs with release of $NH4^+$ is termed Ammonifcation.

    Select the correct answer from the codes given below -
    a) 2 and 3
    b) 1,2 and 3
    c) 1 and 3
    d) 1 and 2

30. Find the correct pair of microbes associated with biological nitrogen fixation and their properties from the following-
    1) Azotobacter-Aerobic
    2) Rhizobium – Symbiotic
    3) Cyanobacteria- Photoautotrophic

    Select the correct answer from the codes given below -
    a) 1 and 3
    b) 1,2 and 3
    c) 2 and 3
    d) 1 and 2

31. Choose the correct relative tolerance of fruit trees to salinity from the following -
    a) Mangoes and bananas are sensitive to salinity
    b) Mangoes and bananas are tolerant to salinity
    c) Mangoes and bananas are not affected by salinity
    d) None of the above

32. From the following associated microorganisms used for metal remediation choose the correct pair -
    1) Cadmium - *Zooglea spp.*
    2) Copper - *Bacillus spp.*
    3) Cobalt - *Citrobacter spp.*

    Select the correct answer from the codes given below -
    a) 1
    b) 1,2 and 3
    c) 2
    d) 3

33. Cono Weeder is used for weeding between rows of -
    a) paddy crop
    b) maize crop
    c) cotton crop
    d) millet crop

34. Which of the following is/are aquatic weeds?
    a) Echhornia crassipes
    b) Phyllanthus niuriri
    c) Potamogeton
    d) Both A and C

35. Which of the following varieties of potato is correctly matched with its parents?

    a) KUFRI PUKHRAJ - Craig Defiance x Phulwa
    b) KUFRI SHEETMAN - Craig's Defiance x JEX/B-687
    c) KUFRI SHERPA - Ultimus x Adina
    d) None of the above

36. Soil provides _____ to the root system.
    a) Nutrients
    b) Moisture
    c) Anchorage
    d) All of the above

37. Which of the following is not an element/component of remote sensing?
    a) Transmission
    b) Prescription
    c) Interpretation
    d) Application

38. Papaya (*Carica papaya* L.) belongs to the family caricaceae having chromose number (2n). 2n denotes -
    a) 18 chromosomes
    b) 36 chromosomes
    c) 16 chromosomes
    d) 42 chromosomes

39. Select the correct statement on photosynthesis from the given options -
    a) During the process of photosynthesis, the light energy is converted into chemical energy and is stored in the organic matter, which is usually the carbohydrate. One molecule of glucose, for instance, contains about 686 K Calories energy.
    b) *Stephen Hales* (1887) first explained the relationship between sunlight and leaves.
    c) *Sachs* (1727) established that starch was the visible product of photosynthesis.
    d) All of the above

40. Select the correct statement(s) on Calvin cycle or C3 cycle from the following-
    a) It is a cyclic reaction occurring in the dark phase of photosynthesis.
    b) The Calvin cycle was first observed by Melvin Calvin in chlorella, unicellular green algae.
    c) Calvin was awarded Nobel Prize for this work in 1961.
    d) All of the above

41. Which of the following definitions about drought is ***incorrect***?
    a) The condition under which crops fail to mature because of insufficient supply of water through rains.
    b) The situation in which the amount of water required for transpiration and evaporation by crop plants in a defined area exceeds the amount of available moisture in the soil.
    c) A situation of no precipitation in a rainy season for more than 5 days continuously. Such length of non-rainy days can also be called as dry spells.
    d) None of the above

42. From the following characters of fungi based on reproductive structure, select the correct one-
    1) If the thallus is entirely converted into one or more reproductive structures, such thallus is called ectophytic.
    2) If the fungal thallus is present on the surface of the host plant, it is called holocarpic thallus.

3) If the thallus is differentiated into a vegetative part which absorbs nutrients and a reproductive part which forms reproductive structures, such thallus is called eucarpic thallus.

Select the correct answer from the codes given below -

a) 3
b) 1,2 and 3
c) 2
d) 1

43. Which of the following varieties of tomato and its characters is correctly matched?

a) Arka Vardahn - Indeterminate, resistant to root knot, nematode
b) Arka Shresta (BRH 2) - Indeterminate. resistant to cracking
c) Arka Vishal (FMH 1) - Determinate. Resistant to bacterial wilt
d) All of the above

44. What is the advantage of wax application on fruits during storage?

a) Improves appearances of fruit
b) Increases the sale value of the fruit
c) Prevents moisture loss and retards wilting and shrivelling during storage of fruits
d) Wax coating are used as carriers for sprout inhibitors, growth regulators and preservatives

45. The major factors useful in controlling enzyme activity during post harvest storage of fruits and vegetables are -

1) Temperature
2) Light
3) Water activity

Select the correct answer from the codes given below -

a) 1 and 2
b) 1, 2 and 3
c) 2
d) 1 and 3

46. Citrus Phytophthora gummosis is/are caused by -

1) Phytophthora nicotianae var. parasitica,
2) P. palmivora,
3) *P capsici*

Select the correct answer from the codes given below -

a) 1 and 2
b) 1, 2 and 3
c) 2
d) 1 and 3

47. The varieties such as Suprabha, Suruchi and Surabhi are example of -
    a) Turmeric
    b) Ginger
    c) Saffron
    d) Large cardamom

48. Find the ***incorrect*** combination of mushroom and its scientific name from the following -
    a) Button Mushroom - *Agaricus bisporus*
    b) Oyster mushroom - *Pleurotus sp*
    c) Shiitake - *Lentinula edodes*
    d) Paddy straw mushroom - *Lentinula spp*

49. Black leg of potato is a -
    a) Fungal disease
    b) Viral disease
    c) Bacterial disease
    d) Protozoan disease

50. Teliospore of rust fungi is produced in teleutosari. Among the five different types of black rust fungi, teliospore is designated as -
    a) Teliospres (0)
    b) Teliospres (I)
    c) Teliospres (II)
    d) Teliospres (III)

PART - II

Answer any 10 (ten) of the following questions: **(5x10= 50)**

51. Explain High Density Planting Technique of mango with the help of a suitable variety for it. How can mango malformation be managed?

52. Explain third party certification of organic certification system in India.

53. Define natural farming. Differentiate between natural farming and organic farming.

54. Explain the role of microbes in improving the physical properties of soil.

55. Explain the role of seed dispersal for plant disease with suitable examples.

56. Enumerate the importance and scope of extension education in the Indian context.

57. Explain the management practices for nematodes in vegetable crops.

58. Why is some nutrient deficiencies exhibited in older leaves while other nutrient deficiencies show up first on newer leaves?

59. Explain the back cross method of plant breeding for development of disease resistance variety.

60. Define mutation. Write about its importance and limitations.

61. What is a green house? Indicate the various sizes of single and multi span green houses.

62. Differentiate between tandem disc harrow and single action disc harrow.

63. Write a note on the organic package and practices for dragon fruit cultivation.

PART- III

Answer any 5 (five) of the following questions: **(5x10=50)**

64. Explain with suitable examples the principles involved in farm management decision.

65. Evaluate the role of National Horticulture Mission (NHM) in boosting the production, productivity and income of farmers.

66. Even after decades of modernization and mechanization drives, a large section of the farming community remains outside the benefits of farm mechanization. What are the reasons for this and what are your suggestions for improvement of mechanisation programmes?

67. What are the functions of seed drill? Differentiate between seed drill and seed planter.

68. Explain the role of gene bank in crop improvement.

69. Explain with suitable examples the problems and prospects of climate change in crop production.

70. Discuss the principles of canopy management and pruning methods in litchi.

71. Discuss how the National Watershed Project has helped in increasing agricultural production in water-stressed areas.

PART – IV

Answer any 2 (two) of the following questions: **(25x2= 50)**

72. (a) Explain Integrated Pest Management (IPM) practices under organic farming.
    (b) Enumerate the advantages and disadvantages of herbicide application in crop production.
    (c) Describe with suitable examples the role of plant growth promoters in vegetable production.

73. (a) What are the factors responsible for high prices of agricultural commodities. Suggest measures to minimise it.
    (b) Explain the management of soil borne diseases in pulse crops.
    (c) Explain the concept of sustainable agricultural practices with examples.

74. (a) Write a note on the increasing importance of cut flower enterprise in India.
    (b) Explain the production technology of Chrysanthemum.
    (c) Enlist the constraints in the marketing of cut flowers in Sikkim and suggest measures to address them.

75.(a) Discuss the innovative approaches in irrigation management of agricultural / horticultural crops and their application.
    (b) Suggest measures to improve water storage and irrigation system to make its judicious use under depleting scenario.
    (c) Describe briefly the different methods of soil erosion and explain how soil erosion can be managed effectively in a hilly terrain like Sikkim.

ADD/WDO

SPACE FOR ROUGH WORK