

MIZORAM PUBLIC SERVICE COMMISSION
AGRICULTURE & ALLIED SERVICES (COMBINED TECHNICAL)
EXAMINATION, 2024 FOR RECRUITMENT OF
JR. GRADE OF MIZORAM HORTICULTURE SERVICE UNDER
HORTICULTURE DEPARTMENT, GOVERNMENT OF MIZORAM,
DECEMBER-2024

Time Allowed : 3 hours

FM : 200

HORTICULTURE SCIENCE PAPER-III

SECTION - A (Multiple Choice questions) (100 Marks)

All questions carry equal mark of 2 each. Attempt all questions.

This Section should be answered only on the OMR Response Sheet provided.

1. The process by which fruits and vegetables are briefly submerged in boiling water and then immediately cooled to stop further cooking is called-
 - (a) Exhausting
 - (b) Blanching
 - (c) HTST
 - (d) Pasteurization
2. Which is not a function of food packaging?
 - (a) To protect products from damage
 - (b) To provide key information
 - (c) To improve nutritional quality
 - (d) To improve storage effectiveness
3. Vinegar is produced through-
 - (a) fermentation of ethanol by acetic acid bacteria
 - (b) fermentation of ethanol by lactic acid bacteria
 - (c) fermentation of sugars by acetic acid bacteria
 - (d) fermentation of sugars by lactic acid bacteria
4. HACCP means:
 - (a) Hazard Analysis Critical Control Point
 - (b) Hazard Analysis and Critical Control Point
 - (c) Hazard Analysis Chemical Control Point
 - (d) Hazard Analysis and Chemical Control Point
5. As per FSSAI specifications, a fruit squash should contain
 - (a) Juice -25%, acidity – 1% and TSS-45%
 - (b) Juice -30%, acidity – 1% and TSS-45%
 - (c) Juice -35%, acidity – 1% and TSS-45%
 - (d) Juice -40%, acidity – 1% and TSS-45%

6. Maillard reaction in foods refers to:
- (a) the conversion of monophenolic compounds to polyphenolic compounds in presence of oxidative enzymes and oxygen.
 - (b) the chemical reaction that occurs in the presence of heat between amino acids and reducing sugars that results in food browning.
 - (c) the conversion of starch through gelatinization, liquefaction, and saccharification.
 - (d) the conversion of complex sugars to simple sugars.
7. 'Soft swell' of a food can refers to:
- (a) It is the can with both ends bulged, but one or both ends will stay concave.
 - (b) A can with both ends bulged, but the gas pressure is low enough to permit the ends to be dented by manual pressure.
 - (c) A can with a minute leakage that permits air to move in or out but does not necessarily allow micro-organisms to enter.
 - (d) A can containing product that has a sour odour and its acidity is much greater than that of the normal product.
8. HTST pasteurization is also known as:
- (a) Flash pasteurization
 - (b) Vat pasteurization
 - (c) Ultra-High-Temperature pasteurization
 - (d) Aseptic pasteurization
9. RTS beverage refers to:
- (a) Alcoholic beverage
 - (b) Lactic acid fermented beverage
 - (c) Acetic acid fermented beverage
 - (d) Non-alcoholic beverage
10. Codex Alimentarius was proposed by-
- (a) Food and Agriculture Organization (FAO)
 - (b) World Health Organization (WHO)
 - (c) FAO and WHO jointly
 - (d) FAO, WHO and US Department of Agriculture jointly
11. During modified atmosphere storage of horticultural produces-
- (a) Oxygen and CO₂ levels can be controlled throughout the storage period.
 - (b) Oxygen and CO₂ levels cannot be controlled throughout the storage period.
 - (c) Oxygen level can be controlled throughout the storage period, but not the CO₂ level.
 - (d) CO₂ level can be controlled throughout the storage period, but not the oxygen level.
12. Which is not true about preservation of horticultural produces by salt?
- (a) Osmo-dehydration of microbial cells happens through plasmolysis
 - (b) Chloride ion of the salt becomes harmful to microbes
 - (c) Reduces oxygen solubility
 - (d) Reduces CO₂ solubility
13. Characteristics of maturity indices of fruits and vegetables should be-
- (a) Simple
 - (b) Readily performed in the field
 - (c) Requires relatively inexpensive equipment
 - (d) Subjective rather than objective

14. 'GRAS' in food processing means:
- (a) Generally Recognized as Safe
 - (b) Generally Regarded as Safe
 - (c) Generally Regulated as Safe
 - (d) Generally Reformed as Safe
15. Multiple factor hypothesis or polygenic inheritance was proposed by-
- (a) G. J. Mendel
 - (b) Luis de Vilmorin
 - (c) Nilsson-Ehle
 - (d) Hugo de Vries
16. In Protandry-
- (a) Stamens mature before the pistils
 - (b) Pistils mature before stamens
 - (c) Pistils and the stamens mature at the same time
 - (d) Stamens cannot produce pollens
17. Self-pollination leads to-
- (a) Heterozygosity
 - (b) Homozygosity
 - (c) Unisexuality
 - (d) Bisexuality
18. In monoecy-
- (a) Male and female flowers are present in different plants
 - (b) Male flowers do not produce pollens
 - (c) Pollen tube is not functional
 - (d) Male and female flowers are present in the same plant
19. Fairchild's Mule was obtained by crossing Rose-
- (a) Horse and Ass
 - (b) Potato and tomato
 - (c) Sweet William and Carnation
 - (d) Wheat and Rye
20. A pureline variety is obtained from-
- (a) Cross pollinated crops
 - (b) Vegetatively propagated crops
 - (c) Self-pollinated crops
 - (d) Both self and cross pollinated crops
21. Somaclonal variation is generated in-
- (a) F_1 hybrids
 - (b) F_2 segregants
 - (c) GMOs
 - (d) Tissue culture
22. Synthetic varieties are produced in which of the following crops?
- (a) Rice
 - (b) Potato
 - (c) Brinjal
 - (d) Maize
23. NBPGR is located in-
- (a) Jaipur
 - (b) Chennai
 - (c) New Delhi
 - (d) Kolkata
24. Transgenic plants contain-
- (a) Genes from same organism
 - (b) Genes from wild plants
 - (c) Genes from other organisms
 - (d) Artificially produced genes
25. Protoplasts are the cells devoid of-
- (a) Cell membrane
 - (b) Cell wall
 - (c) Both cell wall and cell membrane
 - (d) Nucleus

26. Restriction enzymes protect bacteria against-
- (a) Temperature stress
 - (b) Nutrient stress
 - (c) Some antibiotics
 - (d) Some bacteriophages
27. Restriction endonuclease digested fragments of DNA are separated by the process of-
- (a) Centrifugation
 - (b) Filtration
 - (c) PCR
 - (d) Gel electrophoresis
28. Which type of restriction enzyme digests in palindromic sequences at the recognition sequence?
- (a) Type I
 - (b) Type II
 - (c) Type III
 - (d) Type IV
29. Which of the following produces multiple identical copies of a gene for basic research or for large-scale production of a gene product?
- (a) Gene cloning
 - (b) PCR
 - (c) Gel electrophoresis
 - (d) Restriction enzymes
30. A high cytokinin: auxin ratio in tissue culture medium-
- (a) Promotes generation of roots
 - (b) Promotes generation of shoots
 - (c) Promotes callus induction
 - (d) Promotes both root and shoot formation
31. To produce plants that are homozygous for all traits, the best choice is-
- (a) Cell suspension culture
 - (b) Callus culture
 - (c) Anther culture
 - (d) Plant organ culture
32. A recombinant DNA molecule is produced by joining together-
- (a) one mRNA with a DNA segment
 - (b) one mRNA with a tRNA segment
 - (c) two mRNA molecules from different sources
 - (d) two DNA segments of different origin
33. The production of secondary metabolites requires the use of-
- (a) Cell suspension culture
 - (b) Meristem culture
 - (c) Ovular culture
 - (d) Protoplast culture
34. Which of the following techniques is used in forensic science?
- (a) Bacterial cloning
 - (b) DNA foot printing
 - (c) DNA fingerprinting
 - (d) DNA cloning
35. Kranz anatomy is not found in which of the following plants?
- (a) Sorghum
 - (b) Maize
 - (c) Amaranthus
 - (d) Rice
36. Which of the followings is likely to bring about flowering in long day plants?
- (a) IAA
 - (b) GA
 - (c) Cytokinin
 - (d) ABA
37. Viviparous germination is found in-
- (a) Mangrove plants
 - (b) Xeric plants
 - (c) Hydrophytes of lakes
 - (d) Orchids

38. The cracking in tomato is caused due to deficiency of-
- (a) N (b) Ca
(c) Zn (d) B
39. At night, the cell sap of CAM plant is-
- (a) more alkaline (b) more acidic
(c) more sweeter (d) more bitter
40. Which of the following hormones replaces the low temperature requirement in certain plants?
- (a) Auxin (b) Ethylene
(c) Gibberellins (d) ABA
41. The chief form of sugars translocated from source to sink is-
- (a) Glucose (b) Fructose
(c) Sucrose (d) Starch
42. S-M-C-R-E model of Communication was propagated by-
- (a) Rogers and Shoemaker (b) Leagans
(c) Schramm (d) Berlo
43. The common toll free number for Kisan Call Centre is-
- (a) 1800-180-1661 (b) 1800-180-1551
(c) 1800-180-1771 (d) 1800-180-1881
44. The innovators consist of first _____ of adopter categories on the basis of their innovativeness.
- (a) 4.5% (b) 34%
(c) 13.5% (d) 2.5%
45. Agricultural Extension is a type of _____ education.
- (a) Formal (b) Non-formal
(c) Informal (d) Institutional
46. Method demonstration works on the principle of-
- (a) Seeing is believing (b) Learning by doing
(c) Learning by teaching (d) Seeing and doing
47. Match List I with List II:
- | <u>List I</u> | <u>List II</u> |
|-----------------------|--|
| A. Mouldboard plough | I. Operates at depth 45-75 cm |
| B. Chisel plough | II. Uses rotating blades |
| C. Rotavator | III. sets of rotating discs mounted on a common shaft. |
| D. Offset disc harrow | IV. Inversion of furrow slice |
- (a) A IV, B I, C II, D III (b) A II, B IV, C I, D III
(c) A III, B I, C IV, D II (d) A III, B IV, C II, D I

48. Given below are two statements —

Statement I: High volume (HV), Low Volume (LV) and Ultra Low Volume (ULV) spraying uses more than 150, 10–150 and 1–5 L/ha of spray solution respectively.

Statement II: Low volume (LV) spraying is a technique that can be used with drones to spray pesticides and other chemicals.

Considering the above statements, choose the most appropriate answer from the options given below:

- (a) Both Statement I and Statement II are correct
 - (b) Both Statement I and Statement II are incorrect
 - (c) Statement I is correct, but Statement II is incorrect
 - (d) Statement I is incorrect, but Statement II is correct
49. Which is not a feature of contract farming?
- (a) Contract farming opens up new markets for small farmers
 - (b) Contract farming promotes new technology and also enables farmers to learn new skills
 - (c) Farmers' price risk is enhanced
 - (d) Sponsoring companies may exploit a monopoly position
50. The Principle of Equi-Marginal Returns-
- (a) explains regional specialisation in the production of commodities
 - (b) guides in the allocation of resources under conditions of scarcity
 - (c) explains how losses can be minimized during the periods of price adversity
 - (d) guides in the determination of optimum combination of enterprises

SECTION - B (Conventional Type) (100 Marks)

This Section should be answered only on the Answer Sheet provided.

Marks for each question is indicated against it.

Attempt all questions.

1. Write short notes (any four): (2½ × 4=10)
- (a) Horticultural maturity
 - (b) Fortification of food
 - (c) Pasteurization
 - (d) Food quality
 - (e) Primary packaging
2. What is the significance of biodegradable packaging? Write briefly on the various types of biodegradable packaging materials including biodegradable plastics. (3+7=10)
3. What are the factors that influence the post-harvest losses of fruits? Write briefly on the post-harvest operations for extending shelf life of fruits? (5+5=10)
4. Give a brief description on Geographical indication and its importance in Indian context. (10)
5. What type of male sterility is extensively used in hybrid seed production? Briefly describe how is this male sterility used. (5+5=10)

6. Write a note on production of secondary metabolites using cell cultures with examples. (5)
7. What are restriction endonucleases? Discuss about the various types of cuts made by restriction endonucleases with examples. How restriction endonuclease and ligases are useful to create a recombinant DNA molecule? (1+2+2=5)
8. Explain the steps involved in micropropagation. Highlight its advantages and limitations in plant propagation. (3+7=10)
9. Elaborate on the following: (2½ × 4=10)
 - (a) Significance of photoperiodism in plants
 - (b) Absorption and translocation of water in plant
 - (c) Importance of plant nutrients in increasing agricultural productivity
 - (d) Photorespiration in plants
10. State five different methods of PRA (Participatory Rural Appraisal) and briefly describe any one of the methods. (5)
11. Write about the different elements involved in learning situation. (5)
12. "Tractors can be classified into three classes on the basis of structural design"- what are these three classes? Mention two major differences between a tractor and a power tiller (1½ + 3½=5)
13. What is a venture capital? Write about the aims and features of venture capital. (5)

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