

MAHARASHTRA AGRICULTURAL UNIVERSITY EXAMINATION BOARD,
PUNE

SEMESTER END EXAMINATION

B. Sc. (Agri.)

Semester	:- VI (New)	Academic year	:- 2022-23
Course No.	:- ELE-HORT-368	Title	:- Hi-Tech Horticulture
Credit	:- 3 (2+1)	Total Mark	:- 80
Day & Date	:-	Time	:-

- Note : 1) Solve **ANY EIGHT** questions from **Section 'A'**
2) All questions from **Section 'B'** are compulsory.
3) All questions carry equal marks.
4) Draw neat diagrams wherever necessary.

Section –A

Q.1 Define Micro-irrigation. Enlist methods of micro – irrigation and Explain micro sprinkler system used in greenhouse. (3M)

Micro-irrigation : Frequent application of required and measured quantity of water directly to the rooting zone through different emitters is called Micro-irrigation.

Different systems of micro-Irrigation :

- Line source tubing
- Bubbler irrigation system
- Micro-jet irrigation system
- Micro Sprinkler system
- Mini Sprinkler system
- Mist/Fogger system

Micro Sprinkler system.

Micro-sprinklers are emitters commonly known as sprinkler or spray heads . These are of several types. The emitters operate by throwing water through in air, usually in predetermined patterns. Depending on the water throw patterns, the micro-sprinklers are referred to as mini-sprays, micro-sprays, jets, or spinners. The sprinkler heads are external emitters individually connected to the lateral pipe typically using "spaghetti tubing," which is very small (1/8 inch to 1/4 inch) diameter tubing. The sprinkler heads can be mounted on a support stake or connected to the supply pipe. Micro-sprinklers are desirable because fewer sprinkler heads are necessary to cover

	larger areas. The flow rates of micro-sprinkler emitters vary from 16 lph to 180 lph depending on the orifice size and line pressure
Q.2	<p>Write in brief scope and importance of hi-tech Horticulture in India.</p> <p>Scope-</p> <ol style="list-style-type: none"> 1. Varied and dynamic agro climatic conditions. 2. Markets facilities 3. Planting material availability 4. Employment 5. Labour availability 6. Cost of inputs like water, fertilizer pesticides, electricity. 7. Govt of India has identified floriculture as Extreme focus thrust area for export. 8. Production and productivity <p>Importance-</p> <ol style="list-style-type: none"> 1. High production per unit area. 2. Economy of land and water 3. Best quality produce 4. Production of high value crops 5. Production in offseason.
Q.3	<p>Describe in short different types of green house for environment control.</p> <p>Types of Green house</p> <ol style="list-style-type: none"> 1. Greenhouse type based on shape <ul style="list-style-type: none"> Lean-to type greenhouse Even span type greenhouse Uneven span type greenhouse Ridge and furrow type greenhouse Saw tooth type Greenhouse Quonset greenhouse 2. Greenhouse type based on utility <ul style="list-style-type: none"> Greenhouses for active heating Greenhouses for active cooling 3. Greenhouse type based on construction <ul style="list-style-type: none"> Wooden framed structures Pipe framed structures Truss framed structures 4. Greenhouse type based on covering materials <ul style="list-style-type: none"> Glass greenhouses Plastic film greenhouses Rigid panel greenhouses 5. Shading nets
Q.4	<p>Explain the need of greenhouse cooling. Explain the methods of greenhouse cooling.</p> <p>Ans.</p> <p>Need of greenhouse cooling: A need of greenhouse cooling arises whenever the greenhouse temperature exceeds the upper limit of crop tolerance. Failure to bring</p>

down the temperature effectively may result in either partial or total crop failure within only a very short time.

Methods of greenhouse cooling

1. Ventilation with roof and side ventilators : Top ventilators of 0.6 to 1.0 m depth, whereas, side curtain with the width of 1.5 to 3.0 m . The ventilation area should be at least 20 per cent of floor area for effective ventilation.
2. Roof shading
 - a) Application of white wash : like distemper or lime over glazing material.
 - b) Shading screen : Screens of material like PP, PE or polyester with different grades of shade like 20%, 25%, 30%, 50%, 75% and 90%.
3. Evaporative cooling
 - a) Fan and pad system : Pad made of gravel, straw, wood fibre, khus, honey comb paper and charcoal. (Size 1 m height for every 20 m of pad to fan distance. Pad should provide at least 6-9 lit water/min. Low velocity and large volume fans draw air through pad mounted on the opposite side.
 - b) High pressure misting : Water is sprayed into air above the plants at pressure 35-70 kg/m² from low capacity nozzles (1.9 to 2.8 lph)
 - c) Low pressure misting : Water is sprayed into air above the plants at pressure less than 7 kg/m²

Q.5

Write short note on following

(8m)

1. GIS and its components

Geographical Information System - GIS is a technology that provides the means to collect and use geographic data to assist in the development of Agriculture. A digital map is generally of much greater value than the same map printed on a paper as the digital version can be combined with other sources of data for analyzing information with a graphical presentation. The GIS software makes it possible to synthesize large amounts of different data, combining different layers of information to manage and retrieve the data in a more useful manner. GIS provides a powerful means for agricultural scientists to better service to the farmers and farming community in answering their query and helping in a better decision making to implement planning activities for the development of agriculture.

Components of GIS

The components of GIS such as software, hardware, data, people and methods are essential.

2. Remote sensing

Remote Sensing (RS) is a technology that provides the means to collect and use geographic data to assist in the development of Agriculture. Remote Sensing in the most generally accepted meaning refers to instrument-based techniques employed in the acquisition and measurement of spatially organized or geographically distributed

	<p>data on some properties such as spectral, spatial, physical of an array of target points of objects and materials from a define distance from the observed target. Remote sensing of the environment by geographers is usually done with the help of mechanical devices known as remote sensors. These gadgets have a greatly improved ability to receive and record information about an object without any physical contact. Often, these sensors are positioned away from the object of interest by using helicopters, planes, and satellites. Most sensing devices record information about an object by measuring an object's transmission of electromagnetic energy from reflecting and radiating surfaces.</p> <p>Remote sensing imagery has many applications in mapping land use and cover, agriculture, soils mapping, forestry, city planning, archaeological investigations, military observation, and geological surveying.</p>
Q.6	<p>write short note on following questions (8m)</p> <p>a. Different factors affecting the fertigation scheduling</p> <ol style="list-style-type: none"> Scheduling must be based on law of Minimum Cation exchange capacity Soil fertility & texture Soil PH & EC Salt tolerance of crops Fertilizers compatibility soil temperature <p>b. Advantages of micropropagation</p> <ol style="list-style-type: none"> Millions of plants of elite type can be produced All the plants are of the same physiological age and hence of uniform growth. Planting material can be made free from viral & bacterial diseases. A large numbers of plants can be produced in a short time & space. It is the continuous & reliable source of plants round the year irrespective of seasonal variation. Genetic and phenotypic uniformity can be maintained.
Q. 7	<p>Explain selection of site of hi-tech nursery and tools for hi - tech nursery management. (8m)</p> <p>Site is the basic requirement of a nursery</p> <p>Nearness of road Near a habitat Suitable climate Neither shady nor exposed area Sufficient sunlight Good irrigation facilities Good soil condition Good transport facility</p> <p>Tools for high-tech nursery management</p> <ol style="list-style-type: none"> Nursery calendars Plant development registers Nursery inventories Records of nursery experiments

Q.8	<p data-bbox="263 85 1029 123">Write precision farming techniques and its components. (8M)</p> <p data-bbox="263 168 694 212">Precision farming techniques</p> <p data-bbox="263 212 1436 683">Precision farming is a comprehensive information based farm management system to identify, analyse and manage variability within fields for optimum profitability, sustainability and protection of land resources. It basically means adding the right amount of treatment at the right time and the right location within a field. Precision farming calls for an efficient management of resources through location specific high tech interventions which includes fertigation, protected/ greenhouse cultivation, soil and leaf nutrient based fertilizer management, mulching for in-situ moisture conservation, micro-propagation, high density planting, drip irrigation etc. Precision farming integrates environmental health, economic profitability and social and economic equity by giving emphasis on crop management using technologies like GIS, GPS, remote sensing (RS) along with ground equipment like variable rate applicators (VRA), yield monitors and computers along with appropriate software.</p> <p data-bbox="263 705 758 750">Components of Precision farming</p> <ol data-bbox="263 750 869 996" style="list-style-type: none"> 1. crop characteristics 2. soil type 3. micro climate data 4. Surface and subsurface drainage condition 5. Irrigation facilities 6. Farm machinery and equipment's
Q. 9	<p data-bbox="263 1019 1436 1131">Explain in details High Density Planting in Mango and ^{enlist} different factors affecting on High Density Planting. (8M)</p> <p data-bbox="263 1131 710 1176">High Density Planting in Mango</p> <ol data-bbox="279 1198 1436 2004" style="list-style-type: none"> 1. High density orcharding appears to be the most appropriate answer to overcome low productivity and long gestation period for early returns and export quality mangoes . 2. To meet the challenge of high productivity, optimization of growth parameters and minimization of the unproductive components of trees without sacrificing the overall health of the tree and quality of the product are required. 3. Dwarfing rootstock like Amrapalli is useful for controlling the tree size of Mango The moderate planting density at a spacing of 7 x 7 m which accommodates 204 plants/ha (82 plants/acre) and high density planting at a spacing of 5 x 5 m which accommodates 400 plants/ha (160 plants/acre) should be followed. 4. To develop a strong trunk in mango, the trees training are allowed to grow to over 1 m height initially and then cut back to a height of between 0.6 and 0.7 m → 5. Unwanted new shoots should be regularly removed to maintain the tree canopy and to avoid re-crowding of branches.

6. For maintenance of bearing mango trees, pruning at pre flowering stage & after harvesting is useful for higher yield.

Factors Affecting on HDP

- Cultivar
- System of Planting
- Planting material
- Nutrition and moisture
- Economics of production

Q.10 Explain in details precision farming and describe the different objectives of precision farming. (8M)

Precision farming or precision agriculture is doing the right thing, in the right place, in the right way, at the right time. Managing crop production inputs such as water, seed, fertilizer etc. to increase yield, quality, profit, reduce waste and becomes eco-friendly. The intent of precision farming is to match agricultural inputs and practices as per crop and agro-climatic conditions to improve the accuracy of their applications.

Precision farming is a comprehensive information based farm management system to identify, analyse and manage variability within fields for optimum profitability, sustainability and protection of land resources.

Precision farming calls for an efficient management of resources through location specific high tech interventions which includes fertigation, protected/greenhouse cultivation, soil and leaf nutrient based fertilizer management, mulching for in-situ moisture conservation, micro-propagation, high density planting, drip irrigation etc.

Precision farming integrates environmental health, economic profitability and social and economic equity by giving emphasis on crop management using technologies like GIS, GPS, remote sensing (RS) along with ground equipment like variable rate applicators (VRA), yield monitors and computers along with appropriate software. Thus, precision agriculture is conceptualized by a system approach to re-organize the total system of agriculture towards a low-input, high-efficiency, and sustainable agriculture.

Objectives of Precision Farming.

1. To enhance productivity in agriculture
2. Prevents soil degradation in cultivable land.
3. Reduction of chemical use in crop production
4. Efficient use of water resources
5. Dissemination of modern farm practices to improve quality, quantity & reduced cost of production in agricultural crop.

Section –B

Q.11 Define following terms

(8m)

1. Micropropagation - Vegetative or clonal propagation for mass multiplication in controlled condition of laboratories by using biotechnological methods is called as micropropagation.
2. Hi-tech Horticulture - Use of advance technologies like integrated pest management, integrated nutrient management, hybrids seeds, genetic modified planting materials, protected cultivation, plasticulture, micropropagation, micro irrigation, fertigation, hydroponics, precision farming, high density planting, advance mechanization etc. for the management & qualitative production of horticulture produce for high economic return.
3. Ili-tech Nursery – A nursery is a place where the entire device, controlling the environment parameters, are supported to function automatically for raising or handling of young seedlings until they are ready for more permanent planting.
4. Mulching- it is a thin layer of farm waste, residues, wood chips, sawdust, ash, polyethylene or other similar material applied on the surface to conserve moisture in the soil.
5. Soil Solarization - Soil solarization is a method of soil-disinfestation based on its solar heating by mulching a soil with a transparent polyethylene during the hot season.
6. High Density Planting – it is a system wherein a higher number of plants are accommodated in a unit area as compared to the conventional planting.
7. Grading – it is the presentation of the produce on the basis of shape, size, weight, colour, defect or composition or a combination of features.
8. Sterilization - It is the process of destroying all forms of microbial life. Micro organism can be killed, inhibited for removal by exposing the material to lethal agents which may be physical, chemical and biotic in nature.

Q.12

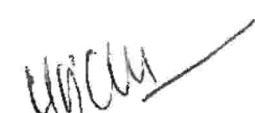
Fill in the blanks

(2M)

- 1 **Hydroponics** helps to grow plants in nutrient solution, without using the standard soil medium.
- 2 The medium on which plant cells and organs are cultured is known as **nutrient medium or culture medium or medium**.
- 3 O₃ gas of the atmosphere holds up UV rays
- 4 The practice of supplying plant fertilizers and nutrients via irrigational water is known as **fertigation**.
- 5 pH of soil can be raised by adding **Lime**
- 6 **Canopy management** is the manipulation of tree canopies to optimize the production of quality fruits.
- 7 **CO₂** called green house gas.
- 8 Seed treatment is done for control **seed born** disease


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