DEPARTMENT OFAGRICULTURE ENGINEERING

AI8603-PROTECTED CULTIVATION

UNIT-I: PROTECTED CULTIVATION AND ITS TYPES

PART-A

TWO MARKS:

1. List greenhouse types based on covering material

Based on covering materials, the greenhouses are classified as

- Glass Greenhouses
- Plastic film Greenhouses
- Rigid Panel Greenhouses

2. State the term protected cultivation

Protected cultivation is the modification of the natural environment to achieve optimum plant growth. Modifications can be made to both the aerial and root environments to increase crop yields, extend the growing season and permit plant growth during periods of the year not commonly used to grow open field crops.

3. Based on frame how will you classify greenhouse?

Based on frame it is classified as

- Wooden framed structures
- Pipe framed structures

4. Write any 4merits of greenhouses.

- Moderates temperature & humidity.
- Plant propagation is effective.
- Helps to improve quality and quantity of produce.
- Reduces infestation of disease / pests.

5. What are the objectives of protected cultivation?

- Protection of plants from abiotic stress (physical or by non-living organism) such as temperature, excess/deficit water, hot and cold waves, and biotic factors such as pest and disease incidences, etc.
- Efficient water use with minimum weed infestation.
  Enhancing productivity per unit area.
- Minimising the use of pesticides in crop production.
- Promotion of high value, quality horticultural produce.
- Propagation of planting material to improve germination percentage; healthy, uniform, diseasefree planting material and better hardening.
- Year-round and off-season production of flower, vegetable or fruit crops.
- Production of disease-free and genetically better transplants.

6. What is the purpose of poly tunnels?

- Temperature, humidity and ventilation can be controlled by equipment fixed in the polytunnel or by manual opening and closing of vents.
- Polytunnels are mainly used in temperate regions in similar ways to glass greenhouses and row covers.
- The nesting of row covers and low tunnels inside high tunnels is also common.

7. Write the technologies involved in protected cultivation?

The technologies involved in protected cultivation are

- Greenhouses
- Shade nets
- Cooling Systems
- Heating Systems
- Artificial Lighting
- Irrigation Systems
- Pest and Disease control
- Growing media

8. What do you mean by protected nursery house?

A Protected nursery house is a structure designed to provide a controlled environment for the propagation of plants. It is similar to a greenhouse but is typically smaller and used exclusively for the production of young plants or seedlings.

9. Define greenhouse.

Greenhouse is framed structures covered with UV stabilized plastic films in which crops are grown under partially or controlled environment conditions.

10. Write short notes on cladding.

- Cladding refers to the application of one material over another to provide a protective or decorative layer.
- It is a common practice in construction and architecture and can be applied to various structures such as buildings, bridges, and vehicles.
- Cladding can be made from a wide range of materials, including wood, metal, stone, glass, and composite materials.
- The choice of material depends on factors such as durability, cost, aesthetics, and functional requirements.

11. What do you know about Hydroponics?

Hydroponics is a method of growing plants without soil, using a nutrient-rich solution as the growing medium instead. The word "hydroponics" comes from the Greek words "hydro" meaning water and "ponos" meaning labor, indicating that hydroponic systems use water as the main means of providing nutrients to plants.

12. List the merits of ventilation system.

The merits of ventilation system are

- Improved indoor air quality
- Reduced energy consumption
- Increased comfort
- Enhanced Productivity
- Reduced maintenance costs
- Improved building longevity
- Compliance with building codes

13. State the scope of protected cultivation.

- Cultivation in Problematic Agriculture Zones
- Greenhouse Complexes around Metropolitan and Other Big Cities
- Export of Agricultural Product

- Greenhouse for Plant Propagation
- Greenhouse Technology as Base for Other Biotechnology
- Cultivation of Rare and Medicinal Plants

14. List out the different types of surface cultivation farming.

The different types of surface cultivation farming are

- Conventional tillage
- Reduced tillage
- No-till farming
- Mulch farming
- Ridge-tillage
- Strip tillage

15. Write the various methods of protected culture in horticultural crops

The various methods of protected culture in horticultural crops are

- Greenhouse cultivation
- Shade net cultivation
- Polyhouse cultivation
- Hydroponics
- Aeroponics
- Vertical farming

16. Define the term protected cultivation.

Protected cultivation is the modification of the natural environment to achieve optimum plant growth. Modifications can be made to both the aerial and root environments to increase crop yields, extend the growing season and permit plant growth during periods of the year not commonly used to grow open field crops.

17. List out the merits of protected cultivation.

- The yield may be 10-12 times higher than that of outdoor cultivation depending upon the type of greenhouse, type of crop, environmental control facilities.
- Reliability of crop increases under greenhouse cultivation.
- Ideally suited for vegetables and flower crops.
- Year round production of floricultural crops.
- Off-season production of vegetable and fruit crops.

18. What are the different types of cladding materials?

The different types of cladding materials are

- Brick
- Stone
- Metal
- Wood
- Fiber content
- Vinyl
- Glass

19. Write the role of sensors in greenhouse.

Sensors play a crucial role in greenhouse production by providing growers with real-time data on environmental conditions, which allows for precise control over temperature, humidity, light, and other factors that affect plant growth and development. The use of sensors in greenhouse production allows for precise control over environmental conditions, which leads to increased plant yields, improved quality, and reduced costs. By providing real-time data on environmental conditions, sensors help growers to optimize their production processes, improve efficiency, and reduce waste.

20. State the term vigour.

The term "vigour" refers to the overall health, strength, and vitality of a plant. A plant with good vigour is typically characterized by strong, sturdy stems, healthy leaves, and vigorous growth.Plant vigour is influenced by a range of factors, including genetics, environmental conditions, nutrient availability, and pest and disease pressure. Plants with good vigour are better able to resist pests and diseases, tolerate stress, and produce higher yields.

PART – B

1. Describe the components of greenhouse.
2. Detail the advantages of greenhouse
3. What are requirements of good storage structure?
4. Explain shade house requirement for various vegetables.
5. Elaborate micro-irrigation components.
6. Elaborate the factors that are affecting crop productivity.
7. What are the advantages of green house? What is criteriafor selection of crops for green houses?
8. Brief about high-cost greenhouse technology.
9. Write short notes on canopy management
10. How will you increase green house system economy inrelation to increasing size?
11. Discuss about fertigation in green house.
12. Detail about poly house.
13. Compare and contrast different cladding materials
14. Elaborate general crop requirements in greenghouse.

PART-C

1. Explain about cultivation systems including nutrient filmtechnique hydroponics and aeroponic culture.
2. Compare micro irrigation and fertigation system.
3. Elaborate different types of growing media and its importance.
4. Detail the environmental factors that are influencing greenhouseproduction.