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SEMESTER END THEORY EXAMINATION

B.Sc. (Hons.) Agriculture

MODEL ANSWER PAPER

Semester	:	**VI (New)**	**Term**	:	II	**Academic Year**	:	2020-21
Course No.	:	**ELE- HORT 368**	**Title**	:	**Hi tech Horticulture**			
Credits	:	(2+1)						
Day & Date	:	**17/6/2021**	**Time**	:	3.00 – 5.00 p.m.	**Total Marks**	:	80

Note : 1) Solve ANY EIGHT questions from SECTION-A
2) Solve ANY TWELVE questions from SECTION-B
3) ALL questions from SECTION-C are compulsory
4) Send the PDF file of answer sheet to the email id of respective course teacher

SECTION-A

(Write the answers in 4-5 sentences only. Each question carries 4 marks)

Q 1. Define Hi-tech Horticulture. Give the importance of hi-tech horticulture.

Defination- Use of advance technologies like integrated pest management, integrated nutrient management, hybrids seeds, genetic modified planting materials, protected cultivation , plasticulture, micro-propagation, micro-irrigation, fertigation, hydroponics, precision farming, high density planting, advance mechanization etc. for the management & qualitative production of horticulture produce for high economic return is called as hi-tech horticulture.

Importance-

1. Production of qualitative produceis possible
2. Higher production per unit area by increasing productivity of crops
3. Higher income or high return from horticulture produce can be achieved.
4. Use of biotechnologies for increasing shelf life of crop
5. Use of biotechnologies for controlling the pest & disease problems
6. Use of tissue culture technologies in micro propagation for getting true to type, qualitative & disease free planting materials .e.g. Banana
7. Efficient use of nutrients by fertigation technology
8. Efficient use of water and efficient weed management to increase crop productivity.

Q.2 Define Nursery & give the benefits of raising seedlings in Hi-tech Nursery.

Ans:

Definition: A nursery is a place where plants are grown, nurtured and sold out.

Benefits :

1. It is very convenient to look after the tender seedlings
2. It is easy to protect the seedlings from pests and diseases
3. Economy of land usage (duration in the main field is reduced)
4. Valuable and very small seeds can be raised effectively without any wastage

5. Uniform crop stand in the main field can be maintained by selecting healthy, uniform and vigorous seedlings in the nursery itself.

Q-3. What is micropropagation?Enlist the stages of micropropagation.

Ans:

Vegetative or clonal propagation for mass multiplication in controlled condition of laboratories by using biotechnological methods is called as micropropagation.

Stages of micropropagation

1. Selection of explant 2.Surface sterilization 3.Media selection
4. Multiple shoot bud induction 5. Shoot elongation 6.Rooting & hardening.
7. Plants in field.

Q.4. Give the management practices of Hi-tech field preparation.

Ans:

1. Select the desirable media with a good balance between physical,chemical & biological properties.
2. Medium should be well drained with sufficient water holding capacity.
3. The media reaction (pH of 5.0 to 7.0) and the soluble salt (EC) level of 0.4 to 1.4 dS/m is optimum for most of the greenhouse crops.
4. A low pH & high pH of the growth media should be adjusted to a desired level by using amendments like lime (calcium carbonate) and sulphur or gypsum respectively.
5.Preparation of planting beds or potting mixture with soil disinfection treatments like soil solarization , soil pasteurization ,soil fumigation and soil by fungicides or chemicals.
6. Designing & application of irrigationsystem like drip irrigation & then poly-mulching for weed & water management.

Q-5. Give the constraints of Protected cultivation.

Ans:

1. Protected cultivation technology is high cost investment
2.It required skilled persons &labours also.
3. It required 24 hours electricity & water.
4. It required tomanage the ideal environmental condition in protected structure which has become the tremendous problems in some hot area like Vidharbha.
5. Covering materials required to change as an torn or damage which becomes hectic and increase the input cost.
6.Local market prices & governmental export policies may sometimes affects on getting the profitable market rates.

Q-6. Enlist the factors of environmental control in Green house. Explain Fan- and Pad active summer cooling system.

Ans-

Factors-Light, Temperature, Relative Humidity&Carbon di-oxide.

Fan-and Pad cooling system

This system is used for lowering high temperature in green houses. It is achieved by evaporative cooling process. Along one wall of the greenhouse, water is passed through a pad that is usually placed vertically in the wall. Traditionally, the pad was composed of excelsior(wood shreds),but today it is commonly made of across-fluted-

cellulose material some what similar in appearance to corrugated card board. Exhaust fans are placed on the opposite wall. Warm outside air is drawn in through the pad. The supplied water in the pad,through the process of evaporation, absorbs heat from the air passing through the pad as well as from surroundings of the pad and frame, thus causing the cooling effect. Khus-khus grass mats can also be used as cooling pads.

Q-7.What is micro irrigation? Enlist the components of micro irrigation.
Ans:
Micro irrigation is a modern method of irrigation; by which water is irrigated through drippers, sprinklers, foggers and by other emitters on surface or subsurface to the root zone area of plants.
Components:
1.Control Head-i)Pump/Overhead tank ii)Fertilizer applicator- by venturi injector or direct injection system iii) Filters- a) Gravel or Media filter b) Screen filters c) Centrifugal filters d) Disk filters. iv)Pressure relief valves, regulators or bye pass arrangement v) Check valves or non-return valves
2. Water Distribution Network- i) Mainline ii) Submains iii) Laterals
3. Emitters / Drippers

Q-8. Give the basic principles of hi-tech canopy management in horticultural crops.
Ans:

1. Maximum utilization of light.
2. Avoidance of built-up microclimate congenial for diseases and pest infestation.
3. Convenience in carrying out the cultural practices.
4. Maximizing productivity with quality fruit production.
5. Economy in obtaining the required canopy architecture.

Q-9. Describe High Density Planting in Mango.
Ans-
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)Dwarfing rootstock like Amprapalli is useful for controlling the tree size of Mango.
3)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.

10. Describe the application of remote sensing in hi-tech horticulture.

Ans-

1. **Crop insurance:** Insurance companies can use the red and infrared bands of satellite images in combination of NDVI (Normalized Difference Vegetation Index) and verify seeded crops to catch fraud.
2. **Crop conditions:** Remote sensing can be a helpful tool to identify the crop condition using NDVI. Near-infrared radiation is being used to detect healthy vegetation in horticulture.
3. **Crop area estimation**: Horticultural crops usually face big ups and down both in its production and consumption as a result, it has a very unstable market and price. That's why reliable statistics regarding area and production of horticulture products is essential for market planning and export of produces. Remote sensing here plays a very important role to assess the supply scenario.
4. **Crop canopy measurement**: Crop canopy of horticultural crops is very important as its volume determines the amount of fertilizer, pesticide and any other chemicals to be applied besides canopy volume also indicates crop health condition as well as about the expected yield .It is possible by remote sensing techniques.
5. **Yield estimation**: Remote sensing is a very useful tool to estimate the yield of different annual crops but again so far its use has been very limited for fruit trees and vegetables.
6. **Detecting pest and disease occurrence**: Pest and diseases are the two main causes of production and consequently economic losses in horticultural industry. It has been proved that remote sensing can be a useful tool for early detection of diseases and identifying, managing pests and nematodes by detecting changes in plant pigments, leaf skeletonising caused by pest damage and identifying plant susceptible areas.

SECTION-B	
(Write the answers in one sentence only. Each question carries 2 marks)	
Q. 11	(Answer in one sentence/Do as directed/Define)

a)Define hydroponics.

Ans: The soilless cultivation which helps producers to grow plants in nutrient solution, without using the standard soil medium.

b)Give the components of hi-tech nursery.

1.Fence2.Roads & Paths3.Progeny block/ mother plant block4.Irrigation system5.Office cum stores6.Seed bed7.Nursery bed8.Potting mixture & potting yard9.Structures for model nursery-A. Shade houseB. Green house/ polyhouseC. Hot bedsD. Lath housesE. Miscellaneous.

c) Give any two horticultural crops suitable for micropropagation.

Ans: 1. Banana 2.Gerbera 3.Gladiolus 4.Cactus.

d) Define soil solarization.

Ans: The method of heating soil by covering it with transparent polythene sheet during hot periods to control soil borne diseases is called as soil solarization.

e)What is protected cultivation?

Ans- It is a cropping techniques wherein the microclimate surrounding the plant body is controlled partially or fully as per the requirement of plant species grown during their growth period.

f) Give the role of light in green houses.

Ans-Light with proper intensity & wavelength play the active participation in producing the carbohydrates by plants through photosynthesis.

g) Define fertigation.

Ans: Application of water soluble fertilizers through the drip irrigation system is called as fertigation.

h) What is hi-tech canopy management?

Ans-Hi-tech Canopy management is the manipulation of canopies of horticultural crops to optimize the production of quality fruits.

i)Define high density planting.

Ans-High Density Planting is defined as planting at a density in excess of that which gives maximum crop yield at maturity if the individual tree grows to its full natural size.

j) What is remote sensing in horticulture?

Ans-The science of obtaining information about objects or areas from a distance, typically from aircraft or satellites for the purpose of planning & estimation of horticulture policies.

k) Define precision farming in hi-tech horticulture.

Ans- Precision farming in hi-tech horticulture is use of advance technology about doing the right thing, in the right place, in the right way, at the right time for managing crop production inputs such as water, seed, fertilizer etc to increase yield, quality, profit, reduce waste and becomes eco-friendly.

l) Give the role of geographical information system(GIS) in horticulture.

Ans-Geographic Information System (GIS) is an important system which includes organised collection of computer hardware, software, geographic data and personal designed to efficiently captured, stored, update, manipulate, analyse and display all forms of geographically referenced information for the efficient application of precision farming as hi-tech horticulture.

m) Define pollarding.

Ans-This is a process in which the branch of a plant is cut off at certain height in order to produce a flush of new shoots.

n) What full form of HDP ?

Ans: Full form of HDP is high density planting.

SECTION-C			
(Choose the correct option. Each question carry 1 mark)			
1)GM technology increases the shelf life of_____.			
a)	Brinjal	**b)**	**Tomato**
c)	Watermelon	d)	Potato
2) _____ is successfully propagated by hi-tech micropropaation .			
a)	Sapota	b)	Mango
c)	**Banana**	d)	Apple

3) In hi tech horticulture,efficient weed & water management can be achieved by				
a)	**Plasticulture**	b)	GM Technology
c)	Soil treatment	d)	High density planting
4) _____ of planting material can be successfully achieved by using protected cultivation				
a)	Sterilization	b)	Solarization
c)	Chemical treatment	d)	**Hardening**
5)The ideal media for raising seedlings in Nursery is				
a)	Sand	b)	Saw dust
c)	**Cocopeat**	d)	Vermiculite
6) _____ is one of the tool for planning of hi tech Nursery.				
a)	Potting Yard	**b)**	**Plant development register**
c)	Nursery bed	d)	Hot bed
7) The plant tissue or organ excised and used for in vitro culture is known as				
a)	Twig	b)	Bud
c)	Plant	**d)**	**Explant**
8) Well known medium used in plant tissue culture technology is				
a)	US Medium	b)	UK Medium
c)	**MS Medium**	d)	SM Medium
9)A high pH media can be reduced by amendments				
a)	Lime	b)	Dolomite
c)	**Gypsum**	d)	Sodium nitrate
10) The development of glass house technology is on the basis of principle				
a)	Light effect	b)	Temperature effect
c)	**Greenhouse effect**	d)	RH effect
11) Potential crops for protected cultivation are				
a)	**Tomato & Capsicum**	b)	Brinjal & Bottle gourd
c)	Marigold & Gaillardia	d)	Potato & Sweet potato
12) The light intensity is measured by the international unit				
a)	%	b)	nm
c)	**lux**	d)	ppm
13)_____% relative humidity is desirable for plant propagation in Greenhouse.				
a)	10-30	b)	30-50
c)	50-70	**d)**	**70-90**
14) Desirable Co2 level in Greenhouses is				
a)	200-400 ppm	b)	400-600 ppm
c)	600-800 ppm	**d)**	**1000-1200 ppm**

Contd..

15) _____ is used to inject water soluble ferilizers through drip irrigation.			
a)	Sand separator	**b)**	**Ventury injector**
c)	Control valve	d)	Screen filter
16) _____ is most effective practice in hi tech canopy management.			
a)	Weed control	b)	Plastic mulching

	c)	**Training & Pruning**	d)	Use of growth retardant
	17) Genetically dwarf scion cultivar of Mango for high planting density is			
	a)	Keshar	b)	Totapuri
	c)	Mallika	**d)**	**Amrapalli**
	18) Dwarf variety of Papaya suitable for high density planting is			
	a)	Pusa Majesty	**b)**	**Pusa Nanha**
	c)	Pusa Gaint	d)	Pusa Delicious
	19) In high density of Mango, plant spacing _____ is more desirable.			
	a)	**5x5 m**	b)	7x7 m
	c)	10x10 m	d)	12x12 m
	20) Environment in hi tech Nursery is _____ controlled.			
	a)	Partially	b)	**Fully**
	c)	Naturally	d)	Slightly
	21) Integrated pest management is _____ in hi tech Horticulture.			
	a)	**Applicable**	b)	Partially applicable
	c)	Not applicable	d)	Not relevant s
	22)_____ is a part of Integrated nutrient management.			
	a)	Seed treatment	b)	Soil solarization
	c)	Crop development	**d)**	**Crop rotation.**
	23)_____ **nm** wavelength of light is ideal for plant growth in protected cultivation.			
	a)	200-300	b)	300-400
	c)	**500-600**	d)	750-850
	24)GIS,GPS& RS technologies are useful for managing			
	a)	Environment in polyhouse	b)	Hi tech canopy management
	c)	**Precision Farming**	d)	High density plantings

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