MAHARASHATRA AGRICULTURE UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Sc (Hort.)

Semester	:	III (New)	**Term:** I	**Academic Year:** 2014-15
Course No.	:	H/VS 231	**Title :** Tropical and Subtropical Vegetables	
Credits	:	3(2+1)		
Day & Date	:		**Time :**	**Total Marks:** 80

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.

Model Answer

SECTION "A"

Ans.1: Importance and scope of growing tropical and subtropical vegetables is given below.
(4 marks for eight points)

Importance:

1) Nutritional importance of Vegetables.
2) More yield per unit area.
3) More net return per unit area per day
4) Role in Agro-forestry.
5) Source of Employment
6) Aesthetic value of vegetables.
7) Industrial importance
8) Export potential.

(4 marks for eight points)

Scope:

1) To meet the need of balanced diet.
2) Expand area under vegetable crops.
3) To take higher yield from vegetables
4) Present agricultural policies
5) To meet the increasing demand of vegetables
6) New irrigation projects
7) Increase in fertilizer industries.
8) Production of Improved and hybrid seed of vegetable crops.
9) Availability of cold storage facilities
10) Mode of transportation facilities.
11) Vegetable processing and preservation industry.

Ans.2: Different types of Vegetable farming are as follows.
(Two marks for enlisting types)

1) Home or kitchen gardening
2) Commercial vegetable farming
   i. Market gardening
   ii. Truck gardening
   iii. Vegetable forcing
   iv. Vegetable gardening for processing
   v. Vegetable gardening for seed production and
   vi. Floating vegetable garden

Kitchen gardening: (6 marks)

Utilization of bare land around the house for the purpose of growing vegetable crops is known as kitchen or home gardening. The main objective of this gardening is to produce the vegetables for family.

Advantages of kitchen garden:

i. Source of fresh and nutritious vegetables
ii. Reduces the expenditure of buying vegetables
iii. Best source of recreation and exercise
iv. Utilization of land, kitchen waste and water
v. Vegetables are free from infection and germs.

Ans.3: Cultivation of Tomato

1) Planting season, seed rate and spacing: (Two marks for each point)

Sowing is done in the month of May-June for kharif crop, August-Sept. for rabi crop and Dec-Jan for summer crop. Seed rate is 500 to 600 g/ha. Seedlings are transplanted at the spacing of 75 cm x 60 cm or 60 cm x 60 cm.

2) Nutrient Management:

Well decomposed FYM 20-25 tons/ha should be applied in the soil during field preparation. Fertilizer dose of 75-100:60:50 NPK kg/ha is recommended for better yield of tomato.

3) Improved varieties and hybrids:

Dhanashree, Rajashree, Phule Raja, Pusa Ruby, Sioux, Marglobe, Arka Vikas etc. Varietal description of any four varieties/ hybrids should be given.

4) Harvesting and yield:

Harvesting of tomatoes depends on the purpose and distance of market. Stages of maturity are green stage, pink stage, ripe stage and full ripe stage. Fruits are picked up from the plants by the hand. Yield varies form 160-200 q/ha.

Ans. 4: Cultivation of cluster bean

1) Importance and use: (Two marks for each point)

It is grown for it tender green pods. Being leguminous crop it is drought resistant and cultivated on large scale as a forage crop. Guar gum is highly mucilaginous and is being used in textiles, cosmetic, paper, food preservative industries.

2) Interculture operation:

It consists of removal of excess water from the field during rainy season as cluster bean does not tolerate water stagnation in the field. On or two weeding is essential in kharif season. Basaline can be used to control weeds.

3) Manures and fertilizers:

Being a leguminous crop, cluster bean does not require additional nitrogen. However, it is desirable to give 25:50:0 Kg NPK/ha for good yield.

4) Harvesting and yield:

Tender green pods are picked from the plant by twisting or by cutting. Good crop of cluster bean yields about 40-60 q of green pods per hectare.

Ans. 5: Cultivation of cucumber

1) Soil and climate: (Two marks for each point)

Thrives best in fertile sandy loam soil which are rich in organic matter, free from hard layers and have good drainage facility. It is a warm season crop and grows well in warm and humid climate. High temperature and long days increases the number of male flowers. It grows best at temperature range of 18-24^{0}C.

2) Planting season and seed rate:

Planted in kharif and summer season during June-July and January-February respectively with seed rate of 2.5 to 4 kg/ha.

3) Varieties:

The improved varieties grown in different parts of country are Himangi, Sheetal, Pune khira, Pusa Sanjog, Phule Prachi, Phule Shubhangi, etc. Varietal description of any four varieties may be given.

4) Use of growth regulators:

To increase the number of female flowers two sprays of ethrel 250 ppm, one at 2-leaf stage and second at 4-leaf stage is practised. Gynoecious lines may be maintained by inducing maleness by spraying gibberellic acid at higher concentration.

Ans. 6: Cultivation of Drumstick. (8 marks)

1) Propagation: (Two marks for each point)

Moringa tree is propagated by seed and also by vegetative method. Limb cutting or stem cutting is followed for vegetative propagation to a certain extent. To enhance germination seeds are soaked in water for 24 hours and sown.

2) Varieties:

PKM-1, PKM-2, CO-1, CO-2, Jaffna, Konkan Ruchira.

3) Training and pruning:

Moringa responses to annual pruning of the branches. It not only reduces the plant height but also facilitate harvesting of pods, it promotes the axillary branches and increases the yield. Trees are pruned after harvesting of fruits or pods to a height of 1 to 1.5 from the ground level.

4) Harvesting and yield:

The plant raised from cuttings comes to bearing in 5 to 6 month after planting. However after 2 years of growth Moringa gives yield of 500-600 fruits/ tree or 25-50 kg pods/year/tree.

Ans. 7: Cultivation of sweet potato

1) Varieties: (Two marks for each point)

Pusa Safed, Pusa Lal, Pusa Sunehri, Varsha, Sree Nandini,Sree Vardhini, Samrat, Konkan Ashwini. Varietal features of any four may be given in brief.

2) Propagation:

Sweet potato is mainly propagated by vine cuttings. Tubers with 2-3 cm diameter are used for producing vines. Approximately 40,000 to 50,000 vine cutting are required for planting one hectare area, vine cutting having 4 to 5 sound buds and length of 30 to 50 cm are used for planting.

3) After care:

It consists of weed control and turning of the vines.

Weed control: The crop should be kept weed free till the vines spread over the soil. Later on the crop itself suppresses the weed growth. Normally 2-3 weeding are needed.

Turning of vines: Sweet potato vine has tendency to form roots from the nodes which results in diversion of food energy for the development of roots. To save the nutrient loss, it is essential to turn the vines. This operation helps in better tuber growth and is to be followed during early stage of vine growth.

4) Harvesting and yield:

Crop is ready for harvesting after **120-135 days** of transplanting. At maturity, leaves start showing pale yellow colour. The surface of a mature tuber if cut and exposed to the air dries up soon. The crop is harvested by spades or dug out. Average yield of tubers is about 150-200 q/ha.

Ans. 8: Any two

1) Major pest and diseases of brinjal (Two marks for pests and two marks for diseases)

Brinjal is attacked by a number of pests and diseases. Some important pest and disease are given below.

Major pests:

i. Shoot and fruit borer: This is the most serious pest of brinjal. Initially it attacks the terminal shoots and bores inside later. It also bores into young fruits, leaving signs of infestation. The insect affected fruits become unfit for consumption.
Control measure - Insect affected parts should be clipped off along with insect and destroyed. Affected crop should be dusted with Carbaryl 10% dust @ 20 kg/ha or spray Cypermethrin 25% @ 2.4 ml in 10 litre water.

ii. Epilachna beetle: It is very serious during early stage of plant growth. The beetles and grubs eat the green portion leaving a skeleton of the vines.
Control measure- Hand picking of eggs and larvae and spraying of appropriate insecticides.

Major diseases:

i. Damping off- It is serious disease in nursery bed. Infected seedlings rot at ground level and plants fall over the ground. Seedlings die in patches.
Control measure – Sterilization of nursery beds and seed treatment with Thiram @ 3 g/Kg seed or Trichoderma @ 4 g/kg seed.

ii. Little leaf of brinjal - This is a serious disease caused by Mycoplasma and transmitted by leaf hoppers. Affected plants produce numerous tiny yellow leaves and do not bear fruits.
Control measure – Removal of affected plants and spray Metasystox 25 EC or Roger 30 EC @ 1 ml per litre to check the spread of this disease.

iii. Phomopsis blight and fruit rot- The fungus attacks all parts of the plant above ground. Brown irregular spots appear on leaves and fruits. Later on fruits start dropping.
Control measure - Use of disease free seed, seed treatment with fungicide, follow crop rotations and weekly spray with fungicides will help to control this disease.

Ans.8:

2) Crop Rotation: (Definition, advantages and example for four marks)

Crop rotation may be defined as growing of crops in a systematic manner in same piece of land covering a period of 2-3 seasons. It is the systematic arrangement of different crops on same land in irregular or regular sequence. There are several advantages of crop rotation like more yield, control of disease and pests. Ex.- Summer tomato or brinjal followed by kharif cluster bean or cowpea.

Ans.8:

3) Physiological disorders in vegetables crops: (Four marks each)

Adverse weather conditions, imbalance nutrition and some physiological factors during growth, harvest or storage of crop leads to physiological disorders. This physiological disorder affects the quality of vegetable crops. There are several physiological disorders in vegetable crops. For example, Blossom end rot of tomato, fruit cracking in tomato, whip tail, browning, buttoning and blindness in cauliflower.

Ans.9: cultivation of bitter gourd

1) Soil and climate: (Two marks for each point)

It can be grown on all types of soil, but well drained loam soil rich in organic matter is found to be suitable for its cultivation. It grows well on silty soil on river beds. It is a warm season crop. Hot and moist weather is favourable for its growth and development. Low temperature inhibits the germination of seeds.

2) Seed rate and sowing time:

Seed rate is 4 to 5 kg/ha. In plains two crops are grown i.e. summer as well as rainy season. Seed is sown in May-June for kharif while in Jan-Feb for summer crop.

3) Improved varieties:

Hirkani, Arka Harit, Phule Green Gold, Phule Priyanka, Konkan Tara, Coimbatore long, Pusa Do mousmi are the improved varieties of biter gourd. Features of any four varieties may be given in brief.

4) Harvesting and yield:

Harvesting is done when the fruits are still young and tender. Picking should be done carefully. On ripening fruits changes colour from green to yellow or orange. Such fruits are not accepted in the market. Yieid varies from 60 to 100 q/ha.

Ans.10: (8 marks)

(One mark for each point)

Sr. No.	Name the Crop	Botanical Name	Plant part used for propagation	Spacing	Two varieties
1	Tapioca	*Manihot esculanta*	Stem cutting	90 cm x 90 cm	Sree Prakash, Sree Vijaya
2	Curry leaf	*Murraya koenigii*	Seed, root suckers	3m x 3m	DWD-1(Suhasini), DWD-2

SECTION "B"

Ans.11 Fill in the blanks (One mark each)

1) Pungency in chilli is due to **capsaicin.**
2) Dioscorea belongs to the family **Dioscoreaceae.**
3) Ivy gourd is commercially propagated by **vine cutting**.
4) California wonder is the variety of **capsicum**.
5) Yellow vein mosaic is the viral disease of **okra**.
6) Red colour of tomato is due to the presence of **lycopene** pigment.
7) **Vegetable forcing** is the most intensive method of vegetable farming.
8) Konkan Durangi is the variety of **Amaranthus.**

Q. 12 State True or False (One mark each)

1) Ivy gourd is asexually propagated vegetable crop.**True**
2) Cow pea belongs to the family Malvaceae. **False**
3) Dasara and Deepali are the varieties of dolichos bean. **True**
4) Blossom end rot is the physiological disorder of brinjal. **False**
5) Gajendra is the variety of Amorphophallus. **True**
6) Portulaca is a leafy vegetable. **True**
7) Growing of minor vegetables in between the rows of main vegetable crops is called as relay cropping. **False**
8) Plant growth regulators are used to regulate sex expression in cucurbits. **True**

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