MODEL ANSWER

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Sc. (Hons.) Horticulture

Semester	: III (New)	**Academic Year:**	2019-20
Course No.	: H/VS-232	**Title:**	Tropical and Subtropical Vegetables
Credits	: 3 (2+1)	**Total Marks:**	80
Day & Date	:	**Time**	: 3.00 hrs.

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 Describe the scope and importance of tropical and subtropical vegetables in India.

Scope: (4 Marks)

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 project.
7) Increase in fertilizer industries.
8) Availability of cold storage facilities.
9) Production of improved and hybrid seed of vegetable crops.
10) Vegetable processing and preservation industry.

Importance: (4 Marks)

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

Q.2. Enlist the classification of tropical and subtropical vegetables on different basis and describe in detail based on season of cultivation.

Enlisting of the classification (4 Marks)

1) Classification based on botany
2) Classification based on plant parts used
3) Classification based on based on hardiness
4) Classification based on cultural requirements
5) Classification based on life cycle
6) Classification based on season of cultivation
7) Classification based on photoperiod
8) Classification based on methods of raising

Classification based on season of cultivation (4 Marks)

Winter season vegetables	Summer vegetables	Rainy season vegetables
Tomato, Hyacinth bean, Leafy vegetables etc.	Beans (mostly), Solanaceous vegetables, Cucurbits and all gourds, Pumpkin and squashes Okra, Amaranthus.	Okra, Chilli, Brinjal, Tomato, Cluster bean, Cowpea.

Q.3 Write the cultivation of okra on following points

a) Land preparation b) Varieties

c) Intercultural operations d) Post-harvest management

(2 Marks each)

a) Land preparation - field is ploughed thoroughly for 2-3 times for making soil to a fine tilth. Ridges and furrows or raised beds are prepared and seeds are sown by dibbling on sides of ridges or on raised beds.

b) Varieties

- Introduction: Perkins long green, Clemson's spineless.
- Selection: PDKV Pragati, Pusa Makhmali , Co 1, Gujrat bhendi 1& 2.
- Hybridization: Pusa Sawani, Sel 2-2.
- Interspecific hybridization by back cross: Parbhani Kranti, Punjab 7, Arka Anamika, Arka Abhay.
- Intervarietal crosses using pedigree sel: Varsha Uphar, Phule Utkarsh, Hissar Unnat.
- Mutation: MDU 1, Punjab 8.
- F1 Hybrid: Phule kirti.

c) Intercultural operations - regular and at weekly interval irrigation is required. Keep plot weed free by application of Basalin @ 1.2 lit/ha. Earthing up is necessary

d) Post-harvest management - fruits after harvesting are graded and filled in jute bags or baskets or perforated paper cartons and sprinkled with water. Pre-cooling of fruits before packing maintains turgidity of fruits and will save it from bruises, blemishes and blackening.

Q.4 Enlist various types of vegetable farming and describe in detail any one of them.

Enlisting types of vegetable farming (4 Marks)

I. Home or Kitchen/Nutrition garden:

a) Home garden having fruits and vegetables

b) Home garden having only vegetables

II. Commercial vegetable gardening:

i) Market gardening

ii) Truck gardening

iii) Vegetable forcing

iv) Vegetable growing for processing

v) Vegetable seed production garden

III. Floating vegetable garden

Description of any one of above (4 Marks)

Q.5 Write short notes on

a) Harvesting indices of muskmelon b) Varieties of amaranthus

(4 Marks each)

a) Harvesting indices of muskmelon

- Fruits are harvested at fully ripe stage for local market i.e "full slip stage".
- For distant market harvested at "half-slip stage"
- Ripening of melon can be judge by softening of rind & color changes from green to waxy.
- Fruits on maturity produce a nutty flavor.
- Fruit gets separated from peduncle easily by light touch.

b) Varieties of amaranthus-

Co-1	Co-2	Pusa kiran
Co-3	Co-4	Arka Saguna
Konkan Durangi	Pusa Chhoti chauli	Pusa Lal chauli
Pusa Badi chauli	Pusa kirti	Arka Arunima

Q.6 Explain in brief about capsicum with respect to following aspects.

a) Soil and climate b) Improved varieties

c) Intercultural operations d) Post-harvest handling

(2 Marks each)

a) Soil and climate

- Requires warm humid climate. Can't tolerate frost.
- Temperature 28-30°C is suited.
- Red loam to alluvial soil having pH 5.5-6.8.
- It is neither tolerate flooding nor drought.

b) Improved varieties

Arka Basant	Arka Mohini
Arka Gaurav	California wonder
Nishant-1	Yolo Wonder
Pusa Dipti (F1)	Bharat (F1)
Indira (F1)	Bull Nose

c) Intercultural operations

- Light and regular irrigation is required
- Shallow inter cultivation for aeration & weed control.
- Mulching is to be practiced.
- Staking is needed
- Application of Lasso @ 5 lit/ha as post plant application.

d) Post-harvest handling - after harvest, peppers are either hydro-cooled or air-cooled to improve shelf life. Before marketing, sort out under sized, deformed, discoloured, insect damaged and disease infected fruits. Fruits are packed in gunny bags, wooden boxes or plastic crates. Capsicum is sensitive to chilling injury. Optimum storage condition is 7-13 °C temperature and 90-95 % relative humidity.

Q.7 Describe the cultivation of pumpkin on following points.

a) Soil and climate b) Varieties

c) Seed rate and planting d) Harvesting and yield

(2 Marks each)

a) Soil and climate.- It is warm season crop. Ideal temperature for cultivation is 25-30°C. It can't withstand frost. It requires longer growing season than other cucurbits. It prefers well drained fertile sandy loam or silt soil.

b) Varieties

Arka Chandan	Arka Suryamukhi
Pusa Biswas	Pusa Vikas
Ambili	Suvarna
CO-1	CO-2

c) Seed rate and planting - Seed rate- 6-7 kg/ha. Planting- In areas where winter is not severe, pumpkin is grown throughout the year.

- Summer- Jan-Mar
- Rainy- May-June

Since vegetative growth is more, pumpkin is sown at wider spacing at 2.5 x 0.6 m or 3 X 2 m.

d) Harvesting and yield

- Fully mature fruits are harvested
- When color changes from green to yellowish brown.
- Crop becomes ready to harvest in 4-5 months.
- Yield varies from 30-35 t/ha.

Q.8 Describe the cultivation of cluster bean on following points.

a) Varieties b) Seed rate and sowing time

c) Manures and fertilizer d) Harvesting and yield

(2 Marks each)

a) Varieties

Pusa Mausami	Pusa Navbahar
Durgabahar	Pusa sadabahar
Pardeshi	Sharad Bahar

b) Seed rate and sowing time- Seed rate- 10-12 kg/ha. Seed treatment should be done with rhizobium culture before sowing and crop can be taken during rainy season –June-July and summer season also in the months of February- March.

c) Manures and fertilizer

- Incorporate well decomposed FYM at the time of land preparation @ 15-20 t/ha
- 25:75:60 kg NPK/ha.

d) Harvesting and yield

- Pods are harvested at tender stage.
- Green pods will be ready for harvest at 45 days after sowing..
- The total crop duration is 120 days.

Q.9 Write in brief about drumstick on following aspects.

a) Soil and climate
b) Propagation and planting
c) Varieties
d) Harvesting and yield

(2 Marks each)

a) Soil and climate-

- It is predominantly a crop of dry and arid track.
- The optimum temperature is 25-35°C.
- It is highly susceptible to frost, water logging and high temperature exceeding 40°C causes flower shedding.
- Sandy loam soils containing lime is the best suited for its cultivation.

b) Propagation and planting-

Propagation- The perennial types are propagated by limb cuttings. Limb cutting of 1-1.5m length obtained from selected trees are planted in situ during June-september. Annual types are propagated by seeds.

Planting-The limb cuttings are planted in well prepared pits of 60 cm^3 and plant at 4x4 mt spacing for perennial types. For annual types pits 45cm^3 are dug. The pits are filled with a mixture of top soil and FYM. Seeds can be either sown in situ in the prepared pits or can be transplanted at 2.0 x 2.5 m spacing.

c) Varieties- Jaffna, Moolanur Murungai, Chavakacheri Murungai, Chem Murungai, Palmurungi, Konkan Ruchira, PKM-1, PKM-2, GKVK-1, Dhanaraj, Oodisi, Vasant, Bhagya

d) Harvesting and yield- The annual drumstick comes to harvest in 6 months after sowing. Perennials types propagated through limb cuttings take 8-9 months for bearing. Fruits of sufficient edible maturity are harvested. The fruits are ready for harvest in 60 days after flowering. The period of harvest extends for 2-3 months and each plant bears 200-250 fruits or 30-40 kg fruits /plant/year) in annual types. In perennial types, the yield will be generally low 80-90 fruits in the first two year of bearing. Then it increases to about 500-600 fruits/plant/year in 4th and 5th year and the pods are harvested mainly in March-June. The ratooned crops will develop new shoots and will start bearing after six months. The trees of perennial types are retained for about 12-15 years.

(4 Marks each)

Q.10 Furnish the information in tabular form.

Sr. No.	Crop	Botanical name	Family	Seed rate (kg/ha)	Yield (t/ha)
1	Ridge gourd	*Luffa acutangula* Roxb.	Cucurbitaceae	3-4 kg/ha	8-10 t/ha
2	Bottle gourd	*Lagenaria siceraria* Standl.	Cucurbitaceae	3-5 kg/ha	40-50 t/ha

SECTION "B"

Q.11 Fill in the following blanks. (1 Mark each)

1. Carotene is a precursor of vitamin A.
2. In brinjal the maximum fruit setting occurs in long styled flowers.
3. Pungency in chilli is due to capsaicin
4. Botanical name of dolichos bean is *Dolichos lablab*
5. Sugar baby is a variety of watermelon.
6. The full form of NAA is Naphthalene Acetic Acid
7. Red colour of tomato is due to the presence of lycopene pigment.
8. India is the second largest vegetable producer in the world.

Q.12 Match the following pairs. (1 Mark each)

A	1	2	3	4	5	6	7	8
B	b	f	g	c	a	d	h	e