MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
MODEL ANSWER SET FOR SEMESTER END THEORY EXAMINATION
B. Sc. (Agri.)

Semester : III (New)		Academic year :	2016-17
Course No : HORT-232		Title :	Production Technology of Vegetable and Flower Crops
Credits : 2 (1 + 1)		Total marks :	40
Day & date :		Time :	

Model Answer Paper

SECTION 'A'

Q. 1 Write in details about importance and scope of vegetable cultivation in India.

Ans. **Importance -**

1. Vegetables are important ingredient of balanced diet.
2. Vegetables as source of nutrients.
3. Vegetables as flavorings agents / taste / colour.
4. Vegetables – medicine value – disease prevention.
5. Economics importance
6. Export potential and earn foreign exchange.
7. More returns per unit area.
8. High employment generation
9. Some vegetables improves soil fertility
10. Tubers are used as staple food and industrial raw material.

Scope - Per capita consumption is less; Consciousness towards balanced food is increasing. Variety of soil and climate is available. Increased irrigation facility. Easy finance. Many promotional schemes are available. Good export potential. Availability of transport facilities and processing industries. Availability of trained manpower.

Q. 2 Enlist different types of vegetables classification and write in brief about classification on the basis of plant parts used for consumption.

Ans. **Different basis of classification are -**

1. Botanical classification
2. Classification based on hardiness.
3. Based on parts used for consumption.
4. Based on method of cultivation
5. Based on temperature requirement.
6. Based on method of planting.
7. According to lime requirement.

8. According to forcing.

9. According to rate of respiration.

10. Tolerance to soil pH/Soil reaction.

11. Classification based on salt tolerance.

Based on plant parts used for consumption -

1. Leafy vegetable – Amaranthus, Palak, Fenugrek.

2. Under ground vegetables –

   a. Root - Raddish, Carrot, beet root, turnip

   b. Bulb- Onion, Garlic

   c. Tubers- Potato, sweet potato, yams

3. Fruit – Tomato, Chilli, Brinjal, Okra, Peas

4. Flower – Cauliflower, Brussel's sprout

Q. 3 Write about cultivation of chilli on following aspects.

Ans. **1. Soil & climate – Soil** – Various types of soils are suitable which are well drained. Susceptible to water stagnation.

Climate- cultivated as rainfed and irrigation crop. Requires warm and humid climate, Susceptible to frost, Optimum temperature range – 20-25^{0}C.

2. Seed rate and spacing – Seed rate - 750 gm / ha – Improved varieties, 350-400 gm / ha – F1 hybrids. Spacing- Dwarf varieties – 60 cm x 45 cm, Tall varieties – 75 cm x 60 cm and 75 cm x 75 cm.

3. Varieties (any two) – Pusa Jwala, NP – 46 A, Punjab Lal, Solan Yellow, Agnirekha, Tejasvini, Konkan Kirti, Byadgi, Sankeshwari – 32.

4. Yield (Green and dry red chillies) – Green chillies – 10 – 12 t / ha., Dry red – 1.8 to 2.5 t / ha.

Q. 4 Write about cultivation of cauliflower on following aspects.

Ans. **1. Soil & climate - Soil** – Wide range of soils with good fertility and drainage are suitable. Soil selected should be sunny, well drained, rich in organic matter pH 6.5 -7.5.

Climate- It needs specific temperature and photo period for better curd development as produces best curd in temperature of 5°C to 25 °C. Early & mid season varieties tolerate higher temp but low temperatures are required for late varieties. High temperature at curd development makes curds ricey, leafy, loose and yellow.

2. Seed rate - 600 to 800 g/ha for early varieties.

500 to 550 g/ha for midlate varieties.

300 to 400 g/ha for late varieties.

Spacing- Depends upon soil fertility, season and cultivar

Early varieties- 45 cm x 30 cm

Mid late varieties- 45 cm x 45 cm

Late varieties- 60 cm x 60 cm

3. Manures and fertilizers – Doses varies according to fertility of soil: Recommanded dose is 120 kg N, 60-80 kg P and 60- 80 kg K. 1/3 N, full P and K as basal dose. Remaining N in two splits after 30 and 60 days after transplanting. Boron and molybdenum as per requirement.

4. Harvesting & yield – **Harvesting-** at proper time. Periodical harvestings are required. Over mature curds become loose and leafy, fetch less price in the market. Cutting of curds from stalk is done.

Yield - Early Varieties – 15 to 20 t/ha., Late varieties – 25 to 30 t/ha.,

F 1 hybrids – 40 to 50 t/ha

Q. 5 Write short notes on (ANY TWO).

Ans. **1. Importance of ornamental horticulture** - 1. Emerging as a important commercial Agri. business 2. As an integral part of social, religious and cultural ceremonies 3. Used in garlands, decoration, bouquets etc. 4. Used for extraction of essential oils, perfumes and as loose and cut flowers 5. It is major foreign exchange earner for country 6. Ornamental horticulture gives higher returns than other crops 7. Generate employment as grower, supplier, consultant, gardener, nurseryman, entrepreneurs.

2. Bolting in onion - Premature seed stalks are produced before completion of normal life cycle of onion which is abnormal and not desirable. Such plants are not suitable for leafy as well as bulb purpose. Spraying of 0.5 % Maleic hydrazide 75 days after transplanting reduces bolting in onion.

3. Advantages of using true potato seed (TPS) – low disease transmission, high resistance to many diseases, low seed rate 150 g / ha., low transport and storage cost, it can be produced in all potato growing regions, yield is equal or more than the crops propagated through tubers.

Q. 6 Describe in brief the cultivation practices of potato on following points.

Ans. **1. Soil & climate – Soil** – Shape, appearance and yield depend on soil. It can be grown in all type of soils which are well drained. The best one are light, well drained and high in humus. pH range 5.2 to 6.4. Alkaline soil – scab disease. Excellent crop – river bed system of cultivation.

Climate – It is a cool season crop. Mean temperature is 18^{0}C Optimum temperature range is 15-25^{0}C. The maximum tuberization take place at 20^{0}C and it inhibits at 29^{0}C. The yields are higher in temperate region than tropics. It requires long day for growth

and short day for tuberization. It is moderately susceptible for frost.

2. Planting season & seed rate – **Planting season** – Plains – September to Janua Hills – March to April. Best time of planting when temperature is between 18-20^{0}C

Seed rate – Potato is propagated by tuber called seed potato and planted either whol cut in to pieces with 2-3 buds. (Size 40-50 g with 40-50 mm diameter.)

Quantity - 10-15 q/ha.

3. Earthing up – Timely earthing up is very important for healthy tuber . tuberization starts from 30-35DAP. At this stage earthing up should be done. In some cases 2nd earthing up is done 30 days after 1st one. If earthing up is not done properly exposed tubers turn green and become unmarketable.

4. Improved varieties – **Old cultivars** – Kurfi, Sinduri, Kurfi, Chandramukhi, Kurfi Jyoti, Kurfi Alankar, Kurfi Chamtkar, Kurfi Lauvkar, Kurfi Bahar, Kurfi Badshah.

New Cultivars – K. Swarna, K. Naveen, K. Sherpa, K. Megha, K. Jeevan, K. Dews, K. Ashoka, K. Jawahar, K. Sultej, K. Giriraj, K. Pukhraj, K. Tennamalai.

Suitable for chips – Kurfi Chipsona – 1, Kurfi Chipsona – 2, Kurfi Anand.

Q. 7 Write about cultivation of okra on the following aspects.

Ans. **1. Soil and climate** – **Soil** – Loose, friable, well manured, well drained soils. **Climate** - Requires warm and humid climate, susceptible to frost, Temperature required is 18-35^{0}C, Not grown in cool winter.

2. Seed rate and spacing –

Season	Seed rate	Spacing
Rainy	8-10 kg / ha	60 cm x 30 cm
Summer	15-20 kg / ha	45 cm x 30 cm

3. Manures & fertilizers – Varies according to soil fertility 20-25 ton FYM / ha, 100 kg N, 50 kg P and 50 kg K per ha is given for optimum yield, ½ N, full P and K is given as basal dose with all FYM. Remaining ½ N is given in two splits at 30 and 60 days after planting.

4. Harvesting & yield – **Harvesting** - started 45 days after planting, full grown tender pods are harvested. At least 3 harvestings in a week are done.

Yield – 150 – 200 Q/ ha. Rainy season, 100-200 Q/ha – Summer season.

Q. 8 Write about cultivation of jasmine in respect of following points.

Ans. **1. Soil & climate** – **Soil** – Loamy garden soils are best with application of manures and assured irrigation. It can be grown in sandy soils also. Clay soils are not suitable for cultivation of jasmine.

Climate – It prefer mild tropical climate, mild winter, Warm summer, moderate rainfall

and sunny days are ideal.

2. Propagation & spacing - Propagation - it is propagated by cuttings, budding or grafting. Cuttings and layerings are common. IBA @ 4000 ppm increases the rooting percentage.

Spacing – *J. sambac* – 1.2 x 1.2 m, *J. grandiflorum* – 1.5 x 1.5 OR 1.8 x 1.5 m, *J.auriculatum* – 1.8 x 1.8 m, *J.multiflorum* – 1.2 x 1.2 m.

3. Pruning - Pruning encourage growth of new shoots which gives flowers yield. *J. grandiflorum* and *J. grandiflorum* are pruned in Dec and Jan which increases flower yield. *J. sambac* should be pruned first in October and then in March- April.

Prunning should be done 90 cm above ground level.

4. Harvesting & yield – Harvesting – Starts flowering 2nd year onwards. Economical yield obtained from 3rd year. It produces flowers till 12-15 years. Flowers are harvested in evening or morning. Fully developed buds before opening are harvested. For extraction of oil, fully opened flowers are harvesting.

Yield - Mogra - 40-50 q/ha, Jui - 60-80 q/ha

Q. 9 Write about cultivation of chrysanthemum in respect of following points.

Ans. **1. Soil & climate – Soil** – Well drained, sandy loam soils having good texture and aeration. Having pH 6.5 to 7.0. High organic content is ideal for good crop. It is shallow rooted plant and is very sensitive to water logging. Light soils are not suitable due to less water holding capacity.

Climate – It is a short day plant. Long day during vegetative phase and short day during reproductive phase. Optimum temperature 16-25^{0}C. Successfully cultivated up to altitude of 1200 m.

2. Different types of varieties – Flowers are classified by kind and arrangement of florets (Disc and Ray). Single – One or more ray flowers. Anemone – Disk floret are elongated. Pompons – Globular head formed by uniform ray florets. Decorative – Large size ray florets. Large flowered – Blooms greater than 10 cm length.

Varieties – Sonar Bangla, Alankar, Jubilee, Snow ball, Chandrama, Birbal Sahani etc.

3. Pinching & disbudding – Pinching – is also called as stopping. It is retardation of upward growth by removing soft veg. growth. It increases the number of flowering stems. Indirectly, it also control flowering date and bloom quality. Two types of pinching – 1. Soft pinching 2. Hard pinching.

Disbudding – It is performed for large and decorative flowers. In this, the largest terminal bud is reserved and all axillary buds are removed. Disbudding in spray varieties is very easy there large apical bud is removed and axillary buds are allowed to grow. Depending upon the no. of flowers to be harvested, no. of lateral branches is.

allowed to grow.

4. **Harvesting & yield** – Harvesting – As per variety harvesting starts 3-4 months transplanting. For cut flowers stems are cut above 10 cm from soil. Lower 1/3rd po should deeped in water.

Yield – Flowering season varies, Most of areas from July to February. About harvestings are done. Average yield – 10-25 tons/ ha loose flowers.

Q. 10 What are the different garden styles and types? Discuss in brief about formal garden.

Ans. **Styles of gardens**- 1. Landscape gardens

2. Formal gardens -
   - i. Mughal gardens
   - ii. Persian gardens
   - iii. Italian gardens
   - iv. French gardens

3. Informal gardens-
   - i. English gardens
   - ii. Japanese gardens

4. Wild gardens

Different types of gardens - are home garden, school garden, urban garden, national parks, industrial garden and arborium.

Formal garden-

It is laid out in symmetrical or geometrical pattern. Symmetry on both the sides or opposite to each other is also one peculiarity of this style. Trimmed formal hedges, Asoka trees and topiary are typical features of formal garden. The different formal gardens are-

1. Mughal gardens - Gardens laid out during the rule of mughal emperors in India. They are largely borrowed from the Persian garden.

The main features are walls & gates, terraces, rutting water, Baradari are the important features.

e.g.- Taj Mahal garden.

2. Persian gardens - It is the oldest style garden and based on idea of heaven. These are strictly formal & symmetrical. Masonary, carved, pierced marble stones and highly polished stones are the features.

e.g.- Royal hunting gardens, paradise gardens.

3. Italian gardens - These are characterized by heavy masonary work which is different from mughal/ persian one.

e.g.- Villa medic at Fiesole

Villa a esta at Tivali.

4. French gardens -

SECTION 'B'

Q. 11. Fill in the blanks.

1. Pungency in chilli is due to capsaicin.
2. Truck gardening is an extensive type of vegetable cultivation.
3. Tuberose is propagated by bulbs.
4. Fenugreek/Methi is a leguminous leafy vegetable.

Q. 12 Match the pairs.

"A"		"B"	
1.	Sweet potato	b.	Konkan Ashwini
2.	Bougainvillea	d.	Climber
3.	Garlic	a.	Godavari
4.	Marigold	c.	*Tagetes species*

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