MODEL ANSWER SHEET

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE

SEMESTER END EXAMINATION

B.Sc. (Hons.) Agriculture

Semester	**: IV (New)**	**Term**	**: II**	**Academic Year**	: 2022-23
Course No.	**: HORT-243**	**Title**	**: Production Technology for Fruit and Plantation Crops.**		
Credits	**: 2 (1+1)**				
Day & Date	**:**	**Time**	**: 2 hrs**	**Total Marks : 40**	

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 Write the importance of fruit and plantation crops in India. (4 marks)

1) Per unit area yield are high.
2) High net profit
3) Source of raw material for agro based industries
4) Efficient utilization of resources
5) Utilization of waste and barren land for production
6) Ability of earning foreign exchange
7) One time capital investment
8) Continuous flow of money
9) Generate employment

Q.2 Write the cultivation of mango *on* following points. (1 mark each)

a) Soil and Climate : Mango can be grown on a wide variety of soils under varied climatic conditions. It can be grown from alluvial to lateritic soils except in black cotton soil having poor drainage. It grows well in soils with slightly acidic pH. It does not perform well in soils having pH beyond 7.5. Soils having good drainage are ideal for mango. Mango is a tropical fruit, but it can be grown up to 1,100m above mean sea level. There should not be high humidity, rain or frost during flowering. The temperature between 24 and 27°C is ideal for its cultivation. Higher temperature during fruit development and maturity gives betterquality fruits. The areas experiencing frequent showers and high humidity are prone to many pests and diseases. Thus it can be grown best in regions with a rainfall between 25cm and 250cm. Regions having bright sunny days and moderate humidity during flowering are ideal for mango growing.

b) Propagation : lnarching: It is one of the most widely practiced methods of grafting. One can get a big-sized plant material for planting with over 95% success rate. Veneer and side grafting: These can be utilized for preparing a grafted plant material or for insitu grafting, i.e. for the rootstocks which are already planted. Epicotyl /stone grafting: This method is widely practiced in the Konkan region of Maharashtra. The germinated seedlings of 8-15 days old are used for grafting.

c) Improved Varieties : Amrapali, Dashehari, Neelum, Alphonso, Kesar, Totapuri, etc

d) Harvesting and yield : Mangoes should be harvested with pedicel. Injury to the fruits during harvesting brings down their quality and also makes them prone to fungal attack. An average mango tree yields 8 tonnes /ha. The number of fruits per tree doing its bearing age generally

various from 1000 to 2000 fruits.

Q.3. Describe in brief the cultivation of coffee on the following points. . (01mark each)

Ans - **a) Soil and Climate**- Red & lateritic soils of sandy loam to clay loam texture,deep,well drained. Climatic requirement - Elevation-100-1000MSL, Rainfall-1000-2500mm,Temp.-150–300C, Rh.-70-90%

b) Propagation & planting : Propagated by both seed and vegetative propagation (rooting green wood into soil & grafting)

c) Varieties.: Arabica & Robusta coffee, Cvs., Old chicks,Coorgs,Kent,S-288,S-795,S-1935and Sel.1R to 3R and Sel.3,4,5,6,7,10,12 .

d) Processing.- Inner parchment – Removal of outer hult of bean (wet or dry method) - Drying of beans - Dehulling of beans.

Q.4 Describe the cultivation of coconut in respect to the following points. (1 mark each)

a) Soil and Climate : Coconut is grown in different soil types such as laterite, coastal sandy, allu-vial and also in reclaimed soils of the marshy lowlands. It tolerates salinity anda wide range of pH from 5.0 to 8.0. Proper drainage, good water holding capacity, optimum soil moisture and absence of rock or any hard substratum within 2 m of the surface are ideal for better growth and performance of the palm.

It requires an equatorial climate with high humidity. The ideal mean annual temperature is 27°C with 5-7°C diurnal variation. All well distributed rainfall of 1300-2300 mm per annum is preferred.

b) Propagation: Seed using nursery

c) Improved Varieties: T X D, D X T, Ganga Bondam, Chandrasankara, Kalpa Sankara, Kalpa Samrudhi

d) Harvesting and yield: Usually 11-12 month old nuts are harvested. Coconuts are harvested at varying intervals in a year. The frequency varies depending upon the yield of palms. Usually, the nuts are harvested 6 to 10 times in a year. In well maintained and high yielding gardens, bunches are produced regularly and harvesting is done once in a month. Yield: 100 to 150 nuts/palm/year.

Q.5 Write cultivation practices of grapes on the following points. (1 Mark each)

a) **Soil and climate** : Well – drained rich loamy soil with pH of 6.5-7.0. Soil depth should be almost 1 m.

It is a fruit of semi arid subtropical regions requiring warm dry summer and a cool rainy winter. During winter the grapes shed off their leaves and take rest. During spring they put forth new leaves and flowers. The fruits mature during summer when there is no rains. A long, warm dry summer is needed for proper maturity and ripening. Grapes do not thrive in the region of humid summer as it causes fungal diseases. The distribution of rains in more important than the total amount of rainfall.

b) Propagation: Propagated by hard wood cuttings prepared from matured canes (one year old shoot) of healthy, moderately vigorous, virus tree vines. Cuttings of 25-30 cm length are prepared by making the lower cut just below a bud and upper cut slightly above the bud. Cuttings should be tied and stored in moist sand for a month for callusing.

c) Training and Pruning : Tipping of shoots and tying of clusters in the pandal after the fruit set. Remove tendrils. Nipping the growing shoots of axillary buds and terminal buds at 12 to 15 buds. Thinning the compact bunches by removing 20% of the berries at pea stage. The clusters are dipped in a solution containing Brassinosteriod 0.5 ppm and

GA3 25 ppm at 10-12 days after fruit set to maintain vigour, yield and quality parameters.

d) Harvesting and yield: Grape is harvested almost all the year round. If not all the varieties, one or the other variety is always available at any given time of the year. However, in Thompson Seedless and its clones, major part of the produce is harvested during March-April from the hot tropical region contributing to more than 70% of the total harvest. Av. Yield 15-20 t/ha.

Q.6) Write the cultivation of guava on the following aspects. (1 Mark each)

a) Soil and climate.: It is a hardy fruit which can be grown in poor alkaline or poorly drained soils without any manuring or irrigation. It can grow in soils with pH ranging from 4.5 to 7.5 but the best soils are deep, friable and well drained. It is a subtropical and tropical fruit which requires a distinct winter for developing good quality. It can thrive in semi arid tracts of India and enjoys cooler climate upto an elevation of 1000 m but it cannot withstand frost.

b) Planting: Pits of 0:5 m x 0.5 m x 0.5 m size are dug at a spacing of 5m x 5m. The layers with the ball of earth are planted in the centre of the pit.

c) Varieties: L-49, Allahabad Safeda, Lalit, Arka Amulya

d) Harvesting and yield: Layered plants start bearing at the age of 2-3 years. Higher yield can be expected 5th year onwards. At maturity, fruits change colour from dark green to greenish yellow. It takes 5 months from flowering to maturing of fruits. Mature half ripe fruits are harvested by hand picking. On an average a mature orchard yields 12-13 tons fruits per hectare per year.

Q.7 Describe the cultivation of cashewnut on following points. (01 mark each)

a) Soil and climate: It can cultivated variety of soils like lateritic red and costal sandy soil. To a limited extent it is also grown on black soils. Avoid water logged or saline soils. It can grow well in places receiving rainfall from 250 cm and tolerate a temperature range of 250C to 490C. It requires a bright weather and does not tolerate excessive shade. It comes up well in plains as well as in elevation upto 700 m altitudes. b)

b) Propagation and planting: Seed propagation, but vegetative propagation by air layering by Clonal selection is beneficial to avoid the variation. Planting distance 7 x 7 m and best season for transplanting is June-July.

c) Varieties: Vengurla-1, Vengurla-2, Vengurla-3, Vengurla-4, Vengurla-5, BPP-1 - 6, VRI-1- 4.

d) **Harvesting and yield:** The cashew tree commences fruiting in the third or fourth year. Flowering starts, in November and extends upto February, harvesting month March-April. Yield differs widely upon many factors. Normally 375 kg of cashew nuts and 1250 kg of cashew apples are obtained from a hectare

Q.8 Describe the cultivation of mandarin on the following points. (1 Mark each)

a) Soil and Climate: Subtropical 500-1500 m MSL elevation. A rainfall of about 150 cm to 250 cm is required. The winter should be mild and there should be no strong or hot wind during summer. A medium or light loam with a pH 5.5 to 6.5 would be ideal to grow.

b) Propagation: Most of the Mandarin cultivars are propagated through seeds except kinnow and Nagpur mandarins; usual practice in coorg, Assam and North Eastern hills is to use seedlings as planting material. But with concerted efforts made to find out suitable rootstocks for different regions, orchardists hare shifted to vegetative methods, particularly T. budding because budded plants bear early, tolerant to biotic and abiotic stress. The seedling trees not only bear late but also tend to become thorny and grow tall and slender.

c) Improved Varieties : Nagpur mandarin, Coorg, Khasi, Kinnow, Ponkan, Desi

d) Harvesting and yield.: Generally, mandarins start bearing from the 4th year having 15-20 fruits/tree. However, its trees attain the level of full bearing at the age of 7-10 years. From flowering to maturity it takes 9 months. About 1000 – 1500 fruits can be harvested from a tree per year and 15 –20t/ha/year.

Q.9. Write Short notes on. **(2 marks each)**

1. High density planting: High density planting means to increase the plantation of the same species of plants per unit area without affecting the quality of fruits. It increases production and return per unit area, it is eco-friendly, efficient land use and resources like light, water and fertilizers, efficient pesticides application. The main aim of high-density planting is to meet essential productivity requirements by balancing vegetative and productive growth without affecting the quality of fruits. The basic principle is to maximize the use of vertical and horizontal space per unit time and maximum return per unit of inputs and natural resources.

Advantages of High Density Planting:

- Low cost per unit production
- Allow mechanization in fruit crops
- Improved fruit yield and quality
- Efficient use of applied and natural resources

The high-density planting requires canopy management includes pruning, training i.e., positioning limbs in specific ways to manage growth and maintain the tree growth for strong and healthy trees using growth regulators. It also helps to increase fruit production and improve fruit quality in the long term.

2. Papain extraction: The latex or milky juice of the unripe green papaya fruit contains a large amount of digestive enzyme called papain which is able to digest the protein in our feeds. Fully developed green large sized hard papaya fruits which are about three months old are selected for tapping. The latex is obtained by making scratches or shallow incisions on the skin of the fruit The incisions are about 0.3 cm deep. Usually not more than four incisions per fruit at equal distance are made every day. To cover the whole surface around the fruit not more than five tappings at intervals of four or five days would be necessary. Non-metallic instruments should preferably be used in tapping and collecting, as the juice acts upon metals and gets discoloured. An ivory blade or a sharp edge or piece of bamboo splinter may be used. The latex should be collected in porcelain glass or earthen containers. After about 2 to 4 hours, the latex is scraped out from the tray and dried in the sun. Tapping should be undertaken early in the morning so that drying in the sun can be done before mid-day. This makes the material sufficiently dry by the evening. When thoroughly dried, the latex becomes crisp and flaky. It may be then ground into a powder, preferably still warm. The dried papain is powdered and sieved in 10 mesh sieves. The cream coloured powder should be placed in air-tight bottles or poly bags. Papain can be also dried artificially at temperature of 50 to 55°c which will attain better colour and quality. Potassium metabisulphite (KMS) at 0.5% may be added to it for better colour and keeping quality. The papain production is influenced by certains factors such as fruit size, fruit maturity, varietal factor etc.

Q.10 Describe the cultivation of apple on the following points. (1 mark each)

a) Soil and climate: Apple is essentially a temperate crop and grown in temperate region of the wo subtropical zone at an altitude of 1600 – 2500 M above MSL also, apple can be grown. Very low temperature during the bud rest favours better crop production. The typical temperate types require 1000 hours of uninterrupted chilling below 7o C for winter rest. After the bud break, during the growth, long day hours with high light intensity, warm days (not hot days) viz., 12 – 15o C and cool nights (not freezing nights) viz., 7 – 8o C are favourable for production of quality fruits in large quantities. The freezing soil temperature can kill the trees. A well drained, slightly acidic (pH 6.5 – 6.7) loamy soil with good depth (45cm or more) is considered to be ideal for apple culture

b) Propagation: Apple varieties are propagated by whip and tongue method of grafting. The root-stocks are either related species such as Malus sylvestris (crap apple), M. prunifolia, M. sikkimensis or their hybrid derivatives or seedling progenies of cultivated varieties. The main aims in developing rootstocks are either to dwarf the trees, or to have resistance to below freezing soil temperature or high soil temperature, to wooly aphid, root knot nematodes etc.

c) Varieties : red Delicious, Jonathan, Golden Delicious, Jona Gold,

d) Harvesting and yield: Normally the apples are ready for harvest from September-October except in the Nilgiris where the
season is from April to July. The fruits mature within 130-150 days after the full bloom stage depending upon the variety grown. The ripening of fruits is associated with the change in colour, texture, quality and the development of the characteristic flavour. The fruits at the time of harvest should be uniform, firm and crisp. The colour of the skin at maturity ranges from yellow-red depending on the variety. The apple tree starts bearing from 4 year onwards. Depending on variety and season, a well managed
apple orchard yields on an average 10-20 kg/tree/year.

SECTION "B"

Q.11 Fill in the blanks.

1) Sindhu is the variety of **mango.**
2) Botanical name of plum is ***Prunus salicina.***
3) Pineapple is propagated by **suckers/slips.**
4) Salt resistance rootstock of grape is **Dogridge/Salt Creek**.

Q.12 Match the pairs.

"A"	"B"
1. Guava	**c)** Myrtaceae
2. Pomegranate	**b)** Punicaceae
3. Jackfruit	**d)** Moraceae
4. Rubber.	**a)** Euphorbiaceae

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