MODEL ANSWER PAPER

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

Semester	V (New)	Term : I	Academic Year : 20019-20
Course No.	H/MAP-351	Title :	Medicinal and Aromatic Plants
Credits	3 (2+1)	Time :	3.00 hrs Total Marks: 80
Day & Date			

Note:
1. Solve "**ANY EIGHT**" Questions from "**SECTION-A**".
2. All question from '**SECTION-B**' are compulsory.
3. All question carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION `A'

Q.1. Write in detail about importance and scope of aromatic and medicinal plants in India

Ans.: **1) Importance of medicinal plants and aromatic plants:** In India almost all the known medicinal plants can be cultivated which have a great demand in the country as well as in abroad, ISM is predominantly a plant, based making use of most of our native plants. It caters almost entire rural population mainly due to the scarcity of modern allopathic health care, ISM offers most appropriate therapy against many diseases, Due to side effects of allopathic medicines western societies are showing increasing interest and prefers organic drug.

Aromatic plants are those plants which possess essential oil in them, These essential oils are used in perfumery, cosmetic and pharmaceutical industries, The aromatic plants and aroma chemicals contained in them, play a vital importance in our day to day living, Due to varied climate conditions and suitable soil exists in one or other part of the country it must be possible to grow almost any type of essential oil bearing plant, India has enjoyed a pre eminent position as the suppliers of natural perfumes the world over, besides this aromatic plants or utilization of essential oils from aromatic plants are so many uses like manufacture of soaps, cosmetics, perfumes, medicines, pharmaceuticals, confectionary, biscuits, paper writing pads, cards etc. citral, an isolate of lemon grass oil is used in the preparation of vitamin `A'.

2. Scope : Cultivation of medicinal and aromatic plants offers considerable scope for rural employment and export for foreign-exchange earnings, Many species of medicinal and aromatic plants in our country have become extinct. This should be prevented and herbal gardens and gene, banks covering important medicinal and aromatic plants should be established to conserve them, The natural essential oil have the potential of being very safe insecticides, growing of these crops are much better earners and, value-wise, there that why not these crops get a high priority, next to food. Besides this their bye-products can be converted into boards and, it nothing else, can be used as a mulching material or ploughed buck into the soil to improve its tilth.

Q.2 Write cultivation practices of `Shatavari' on following aspects

a. Soil and climate : Variety of soils including medium black, well drained, pH 7-8, subtropical and sub-temperature agro-climatic regions, upto 1400 m above mean sea level.

b. Nursery raising and planting : Seeds sown on raised beds in the month of May, germination starts 6 to 8 days, seedlings 40-50 days old are transplanted in the months of July at a distance of 60 x 60 cm or 90 x 90 cm.

c. Harvesting : Harvesting after 18-21 months, light irrigation is required before digging, tuberous roots are dug out, clean broken in piece, removal of mid rib to facilitate drying.

d. Yield : The average yield of 10-12 q dried tuberous roots per hectare.

Q.3 **Write in brief about 'Citronella' cultivation on following points**

Ans **a) Soil and climate :** Sandy loam to loamy soils, acidic to alkaline soils, pH ranges from 5.8 to 8.5. Warm, humid, plenty of sunshine, sufficient rainfall, high temperature and sunshine are conducive.

b) Propagation and planting : Propagation by rooted plant slips. Planting is done on ridges and furrows, planting distance 60 X 45 cm, or 90 X 60 cm, time of planting is June, July, one to two segments placed into each hill.

c) Varieties : Manjusha, Mandakini, Bio-13-Jalpallvi, RRL, TOR-3, IW-31273.

d) Harvesting and yield : 3-4 harvesting of grass, 1st harvesting 120 days after transplanting, grass is cut 10-12 cm above ground level, to check oil yield loss, crop should not be allow to flower. Yield: 25-30 t fresh grass, 110-125 kg. oil/ha. From 4 cuttings.

Q.4 **Write commercial cultivation practices of `Ashwagandha' on following points .**

Ans. **1. Soil and climate :** Variety of soils with good drainage, having pH 7.5 – 8.0, between 600-1200 m altitudes, 500-750 mm rainfall, suitable under rainfed condition, require dry season during its growing period.

2. Propagation and planting : Propagation by seed, season of planting, August-September months, crop is sown by broadcasting or line to line sowing method with the spacing 30 x 30 cm, seed rate 10 kg /ha.

3. Varieties : Jawahar Asganth- 20, 134 and poshita.

4. Harvesting and yield : Crop is ready for harvest at 150 to 180 days after sowing i.e. January-March. The maturity of crop is judges by drying out of leaves and yellow, red coloured berries. The plant is uprooted for roots and grading of roots is done.

Yield :7.89 roots/ha and 2-3 q/ha seed.

Q. 5 **Discuss about cultivation of Dioscorea on following point**

Ans. **1. Propagation:** By tuber pieces, commercial planting normally established by tuber pieces, weighing about 50-70 gm each.

2. Planting: Spacing 60 x 30 cm for one year crop and 60 x45 cm for two year crop. Season for planting June- July.

3. Fertilizer requirements: High organic matter/FYM 18-20 tonnes/ha. A complete fertilizer dose of 300 kg N,150 kg P and 150 kg of K should be applied per ha. Phosphorus and potassium should be applied in two equal doses.

4. Harvesting & uses: The best season for harvesting is February- March, harvesting manually with care

use: Diosgenin, obtained from Dioscorea tubers, is the major base chemical for several steroid, hormones, including sex hormones, cortisore, other corticosteroids and is the active ingredient in the oral contraceptive pill.

Q.6 Write commercial cultivation of 'Lemon grass' on following points. **(1 Mark for each)**

Ans.

1. Soil and Climate: It grows well in light to heavy type of soils with good drainage. It also grows best in well drained sandy loam soil. Lemon grass required warm and humid climate with plenty of sunshine and sufficient rainfall. High temperature and sunshine are conducive for the development of oil in the leaves.

2. Varieties: OD-19, OD-408, RRL-38, Pragati, Praman, Kaveri, Krishna and CKP-25 are improved varieties of lemon grass.

3. Manures/Fertilizers: A fertilizer dose of 100:60:60 kg NPK /ha is recommended. Basal dose of 30:60:60 kg NPK /ha should be applied and top dressing of N are done in 3 split doses during growing season and usually to be applied after each cutting.

4. Harvesting and Yield: The first harvest is generally possible after 120 days of planting and subsequent harvests take place at an interval of 60-75 days depending upon the fertility of soil and season. Under normal conditions three harvesting are possible during the first year and four ion subsequent years.

The plants being cut closed to their bases 10-12 cm. above ground level and allowed for drying in shade for few hours and then oil is extracted by distillation method. Crop should not be allowed to flower profusely to check the loss in oil yield. Yield: The herbage yield of 22-25 tons /ha. and from this herbage 100-120 kg oil/ha can be obtained per year. In the initial years the herbage yield is comparatively low which increases gradually in subsequent.

Q. 7 **Write in brief on following (Any two)**

Ans. **1. Medicinal uses of Sarpagandha :** In allopathic medicines, insomnia, epilepsy and asthama, in high blood pressure etc.

2. Cosmetic use of Aloe vera: 1.Used in skin cream, face cream, use in soaps. The Aloe gel (Muco-polysaccharides) gives chilling effect and also act as a moisturizing agent. It also has rolling rejuvenation of ageing skin. Aloe vera gel gloves improved the skin integrity, decries appearance of acne, wrinkle and decries erythema. The hardened skin cells become softer by the applied form of amino acid present in gel. Zinc proceeds as an astringent to tighten pores etc.

3. Oil extraction of khus (Vetiver): The essential oil is extracted from the roots by steam distillation. Freshly harvested roots on distillation give higher yield of oil than stored roots; the yield decreases progressively with the period of storage. The roots are soaked for 18-20 hours in water prior to distillation to render the root material soft and thereby further facilitate release of oil. Fresh roots when cut to lengths 2.5 cm to 5 cm increases recovery. As the most valuable quality constituents are contained in the high boiling fractions, the roots must be distilled for a prolonged period ranging from 20-24 hours. Considerable amount of which may escape before it gets cooled and collected in liquid phase. To avoid this loss a piece of marking cloth after cleaning is tied at delivery outlet in the swollen balloon shape in the receiver keeping it submerged in water. The lighter fraction that is likely to escape along with the steam/gas or running distillate water would be trapped in the cloth. As the distillation progress the heavier fraction will get deposited in the cloth and the lighter will pass through cloth and get collected in the receiver. At the end of the distillation the cloth is squeezed to get the oil. Traditionally copper vessel with S.S condenser is found good for vetiver since the oil react with free copper turns bluish in colour which fetches more prices in perfumery market. The traditionally distilled oil which often called "Ruhe khus" done in Kannauj type "Deg Vopka" although recovery is comparatively low fetches the highest price in perfumery market.

Q. 8 **Write in brief about cultivation of "Cinchona" on following points.**

Ans. **1) Soil & climate :** Cinchona prefers deep well drained, rich loamy to clayey loam acidic soil having PH about 4.5 to 6.0 most species prefer high humidity,well distributed rainfall about 150 cm. All species are succeptiable to frost & succume to water logged condition

2) **Propagation & planting** : It is propagated by seeds & vegetative methods by layering,budding.

Planting:- The seed are small a light & loose viability soon. About 50 gm of fresh seeds sown per Sq. meter during February- May produces about 10,000 seedlings. The nursery is provided with partial shade & kept moist free from weeds. Germination takes 25-40 days and seedlings grow in 4-6 months when they are transplanted at the spacing 10 x10 cm the seedlings grow 30-50 cm high for 4-5 months & are planted in the field.

3) Processing :- After removel of bark dried well in the space in sun and prepared its powder.Add calcium 1/3 rd of total weight 5 % coustie soda & mix it. This mixture add in a boiled carosin & separate the alkaloids by adding H2SO4 & rotating we can get Quinine sulphate.

4) **Medicinal uses :** The cinchona bark yields quinine used against maleria,quinine salts used for preparation of soft drinks as bitters & quindine sulphate used against heart troubles

Q.9 Write in brief about cultivation of "Belladona" on following points.

Ans. **1) Soil & climate :** It can grow on wide range of soils.The crop prefers well drained,slightly acidic,silty loam to clayey loam,soil rich in humus.It can not stand in water logged conditions. It is a crop of temperate climate,prefers a sunny location and clear weather. Perticularly preciding and during the harvesting of crop high humidity favours root rot

2) Propagation & planting : propagated by both seeds and vegetative methods commercially by seeds

Planting:- The seeds are very small, weighting about 700/gm .They should be treated with ethyl alcohol for 3 min. for improving germination. The treated seeds should be washed in the running water for few hours to remove the adhering chemicals. The seed are sown in rows in nursery during early spring. Germination takes pla in 10-21 days, and is 15-40 % for hectare 4 kg. seed are required. The seedling bearing 1-3 leaves are planted in the pit during August at 45 x60 cm . or 60 x60 cm spacing

3) Harvesting : The first picking of leaves is obtained in October and subsequent 3-4 leaf crop are obtained for next 3 years. Harvesting is done by cutting the plants 20 –25 cm on bright sunny days above the ground

Except at the time of autumn harvest when the plants are cut 3 cm above the ground. The stumps are put forth fresh growth during the succeeding spring and bear flower during June – August and the berries are produce in October.The alkaloids are synthesized in the root and translocate through the stem to leaves

4) Medicinal uses: The leaves and roots of belladona constitute the commercial drug. Which contain atropine hyocine used in pharmacy for dear mydriatic, analgesic and antispasmodic properties. The roots are used for external application only. It is also used in the preparation of medicines like tonic eye drops ointment as well as asthma cough.

Q.10 Describe in brief the cultivation practices of 'Isabgol'.

Ans. Rabbi season, irrigated crop. Grown well on light to medium soils with good drainage. Crops withstand a low level of salinity. It requires cool and dry weather. Sowing of seed in the month of Oct.-Nov. on flat bed. Plot size 1x3m is convenient at 30x5cm spacing. Seed rate is 4 to 5 Kg/ha. Sowing of seed with mixture of fine sand or sieved FYM then seed are covered with soil and immediate irrigation is required. 50-25-30 Kg NPK/ha. with adequate FYM is required N should be applied in two split doses. 4-6 irrigation is required. Downy mildew is measure disease problem. Control with fungicide. Crop became ready to harvest after 110-130 days after sowing on an average 8-10 qt. seed/ha. is average yield.

SECTION `B'

Q.11 Match the pair

A	B
1 Geranium	ह) *Pelargonium gravelons*
2 Senna	ब) *Cassia angustifolia*
3 Opium poppy	अ) *Papaver sominiferum*
4 Sandal wood	इ) *Santalum album*
5 Adulsa	ड) *Adhatoda vasica*
6 Panpimpali	क) *Piper lonum*
7 Behda	फ) *Terminellia bellrica*
8 Patchouli	ए) *Pogostemon cablin*

Q.12 Select the correct words and rewrite the statement.

1 Arjun (leaves / **stem bark)** is used for extraction of alkaloid.
2 Jasmine is mainly used for (medicinal / **aromatic**) purpose.
3 *Solanum khasianum* (**fruit**/leaf/stem) is more useful for medicinal purpose.
4 Bursera is (medicinal / **aromatic**) plant.
5 Qunine is extracted from (Bellodona / Asparagus/ **Cinchona**)
6 Senna leaves content (**Sennoside** / Piperine / Tannin) as active ingredient medicinal drug
7 Periwinkle leaves content (Steroid / **Alkaloid** / Tannin) as active ingredient.
8 Mentha oil content (Citronella/ Vetiverol / **Menthol**) as active ingredient.

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