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

Semester: V (New) **Term : II** **Academic year** : 2019-20
Course No : H/AGRO-351 **Title**: Organic Farming
Credits : 2 (1+1) **Time**: 2.00 hrs.
Day and Date : **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 What do you mean by organic farming? Mention the reasons for low adoption of organic farming. **4 marks**

Ans. Organic farming is a production system, which avoids or largely excludes the use of synthetic compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming system relies on crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests.

Reasons for low adoption of organic farming.

1. Concept of organic farming is not clear.
2. Non availability of quality planting materials and seeds.
3. Low availability of organic manures 70% of cow dung is used as fuel and 50% crop residue used as feed and fuel.
4. Organic matter requires per-processing.
5. Organic matter is bulky and difficult to handle and transport.
6. Unawareness about use of biofertilizers, biological control of pest and diseases and organic food production standards.
7. Organic matter available in constitute, difficult to standardize.
8. Negligible linkages between agencies dealing with different aspects of organic agriculture.
9. Absence of large scale processing units, post-harvest and value addition.
10. Non-identification of accreditation and certifying agencies on regional basis.
11. Limitation on control of pest disease occurrence.
12. Certification procedure is very complicated and expensive.
13. Lack of efficient quality control mechanism and organized marketing system for organically produced commodities.

Q.2. Highlight on biological intensive nutrient management and discuss about its components.

Ans: **Biological intensive nutrient management** **4 marks**

- An intensive but suitable combined use of different organic sources of nutrients
- It helps to restore and sustain soil fertility and crop productivity.
- Checks emerging deficiency of nutrients other than NP and K.
- Favorably affects the physical, chemical and biological environment of soil.

Components of biological intensive nutrient management

1. Organic manures- FYM, Compost, Oil cakes, green manures, poultry manures, etc.
2. Bio fertilizers
3. Vermicompost
4. Crop residues
5. Animal residues
6. Organic farm wastes
7. Industrial wastes

B. Cropping system:- Monocropping, crop rotation, intercropping, sequence cropping, mixed cropping

C. Mulching

Q.3. Explain types of soil amendments. Write in details about gypsum. **4 marks**

Ans. **There are three types of amendments**

1. Materials used for amending acidic soils. E.g. Lime

2. Materials used for ameliorating alkali soils. E.g. Gypsum and phosphogypsum.

3. Soil aggregating agents or soil conditioners to stabilise soil aggregates and to form granular structures. E.g. Poly-electrolytes, including polyvinylites, polyacrylates, cellulose gums, lignin derivatives and silicates.

1. Gypsum:

Gypsum is dehydrated calcium sulphate ($CaSO_4.2H_2O$) and used as a popular amendment for the reclamation of alkali soils. Pure gypsum contains 18.6% S and 23.2% Ca. Commercial agricultural grades (70-80%) contain 13-15% S and 16-19% Ca. The sulphur in gypsum is in plant available sulphate form and its solubility is comparable to that of SSP. Most of the gypsum mines are located in Rajasthan.

Q.4. Enlist different methods of pests control adopted in organic farming. Write the benefits of bio-control. **4 marks**

Ans: **Methods of pests control adopted in organic farming.**

1. Cultural methods

a. Managing the growth environment e.g. use of forecasting of pest outbreaks, trap crops etc.

b. Cultural alternatives

2. Physical and mechanical control

a. Direct control

3. Biological methods

a.Use of bio agents (parasitoids and predators)

b. Use of bio pesticides

4. Organically accepted chemical alternatives

a. Horticultural oils and soaps containing fatty acids
b. Botanicals-plant species which contain toxic substances to control pests e.g. pyrethrum, rynia.
c. Use of semio-chemicals e.g. pheromones
d. Inorganic and elemental compounds e.g. elemental sulphur, copper formulations.

Benefits of bio-control

1. Bio-control is exercised in a wide range of area and safe.
2. Highly specific and safe to non target species.
3. Application of bio agents is easy.
4. Bio agents survive in the nature till the pest is prevalent.
5. Farmers do not require any special treatment/procedure.
6. No waiting period for harvesting.
7. Bioagents viz., baculoviruses, parasitoids and predators may be multiplied at farmers' level.
8. No pollution. Environmental friendly.

Q.5. Explain four IFOAM main principles of organic production. **4 marks**

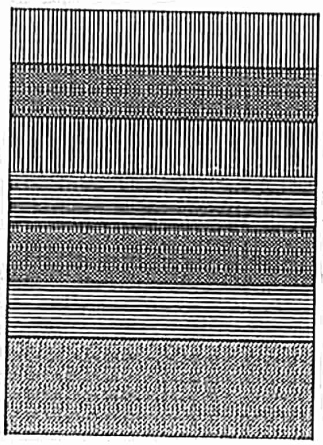
Ans. **The four IFOAM main principles of organic production**

1) **The principle of health**: Organic agriculture should sustain and enhance the health of soil, plant, animal and human as one and indivisible.
2) **The principle of ecology**: Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
3) **The principles of fairness**: Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
4) **The principle of care**: Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well being of current and future generations and the environment.

Q.6. Write the procedure for preparation of vermicompost.

Ans. **Preparation of vermicompost** **4 marks**

Prepare pit of size 10 m x 1 m x 0.3 m and then fill it in the following manner.



Crop residues → 15 to 10 cm thickness; Black soil → 3-5 cm; Other layers → 6 to 10 cm

- Apply water @ 30 to 60 litres for 16 days. Leave 1000 to 2000 worms of suitable species (*E. eugeniae*) at about 10 cm depth.
- Worm multiplication and compost production will be higher if sugarcane trash, sunflower or bajra residues are used.
- Keep the pit always moist (30-60% moisture) by daily watering (@ 50 lit) during summer or twice a week during rainy season. Provide shade to the pit.
- Vermicompost production is seen after 45 days of leaving worms to the pit. It will be complete in 80-90 days. Residue will be converted to vermicompost (75%).
- To collect / take vermicompost from the pit, leave the pit without watering for about 3 days. Worm will move to deeper layer due to lack of moisture in the upper layer. Take out the compost from the upper layer and sieve the compost and store it in a gunny bag under shade.
- About 2 to 4 t vermicompost will be produced from one gunta area in 3 months and 6 to 12 t vermicompost will be produced from one gunta in one year.
- Earthworm complete their life cycle within 90 days by which time they multiply about 40 to 50 times. In vermicompost, eggs, nymphs and adults (all forms / stages) are found.

Q.7. What do you mean by "Certification" in organic farming? Write the minimum requirements for certification of organic product. **4 marks**

Ans: **Certification" in organic farming**

It is the procedure by which a written assurance is given by the certification agency that a clearly identified production or processing system has been methodically assessed and confirms to the specified requirements. **OR**

The certificate would mean a document issued by an accredited agency declaring that the operator is carrying out the activities or the stated products have been produced in accordance with the specified requirements as per the National standards for organic products etc.

Minimum requirements for certification of organic products.

1. A certain degree of documentation for a clarity and consistency of farm and management of groups.
2. Soil fertility has to be maintained by crop rotation, adapted cultivation techniques and nutrient cycles.
3. Pest attacks must be minimized by means of healthy soil, natural enemies and adopted crop varieties.
4. Only those farm inputs (fertilizers, pesticides etc.) that are permitted may be used in organic farming.
5. Only certified organic seeds / planting material should be used.
6. All farm or processing activities must be documented at every stage, to ensure full traceability of products flow.
7. Conventional units must be clearly separated from organic units and the same product must not be mixed at any stage.
8. Farms converting to organic farming have to undergo 2years (annual crops) or 3 years (perennial crops) of transition period. After the first 12 months, the products can be marketed as 'in conversion to organic
9. Every farm, processor of exporter producing or handling organic produce needs to be inspected and certified once a year by an accredited certification agency.

Q.8. Define composting. Enlist different methods of composting and explain any one.

Ans. Composting is a process by which organic wastes are converted into organic fertilizers by means of biological activity under controlled conditions.

Methods of composting

a) Indore method, b) Activated compost, c) Bangalore method, d) NADEP method, e) Coimbatore method, f) Synthetic compost, g) Windrow composting (leaf compost), h) Accelerated composting and enrichment, i) Phospho-compost, j) Reinforced compost from sugarcane trash and press mud and k) Japanese method of composting.

(Explanation for any one above method)

Q.9. What do you mean by recycling of organic residues in organic farming? Write the practices of crop residue management.

Ans: **Recycling of organic residues in organic farming**

- Converting surplus organic wastes into useful products
- Organic recyclable wastes:- crop residues, animal wastes, farm/industrial waste, municipal and sewage waste
- Requires pre-processing e.g. composting.

Benefits of use of organic residues:-

- Meets nutrient requirement of crops
- Maintain soil productivity
- Improving ecological balance.

Limitations:-

1) Requires pre-processing e.g. composting
2) Availability of sufficient amount of organic residue

Practices of crop residue management.

1) *In-situ* burning
2) *In-situ* incorporation
3) Composting of crop residues
4) Crop residue as surface mulch

Q.10. Write short notes on (Any Two).

1) Green Manuring **2 marks**

Ans. The practice of ploughing or turning into the soil undecomposed green plant tissue for the purpose of improving physical condition as well as fertility of soil is referred to as green manuring and the manures obtained by this method is known as green manures. The use of green manure in crop production is recorded in China as early as 1134 BC.

Types of green manuring

1) **Green manuring *in situ***: Any crop or palnt (generally leguminous) grown and ploughed *in situ* is called green manuring *in situ.*
   e.g.: Sesbania (*Sesbania speciosa*), dhaindia (*Sesbania aculeate*), sunhemp (*Crotolaria juncea*), Phillipesara (*Phaseolus trilobus*), cowpea (*Vigna anguiculata*), greengram (Mungbean) (*Vigna radiata*), black gram (*Vigna mungo*), berseem (*Trifolium alexandrium*) etc.
2) **Green leaf manuring**: Consists of gathering green biomass (tender leaves and twigs) from nearby location (bunds, field boundaries) and adding it to the soil.

2) Biofertilizers **2 marks**

Ans. Biofertilizers (BF) (microbial nutrients) are the products containing living cells of different types of microorganisms which have an ability to mobilize nutritionally important elements from non usable to usable form through biological process. Although the advent of the phenomena is as old as a century, the need of its commercial exploitation was not felt in traditional agriculture. In recent years, biofertilizers have emerged as an important component of INSS (Integrated Nutrient Supply System) and hold a promise to improve the crop yields and nutrient supplies.

Benefits

1) Germination increase up to 20 percent, improves seedling emergence and growth.
2) Increase yield from 10 to 40 percent.
3) Improve the quality of fruit and keeping quality.
4) Saving of 25 to 35 percent inorganic fertilizers.

5) Increase the availability and up take of N and P in plants.
6) Improve the status of soil fertility maintain good soil health and crop productivity.

3) Benefits of integrated weed management in organic farming

Ans.

1. Effective method as left over weed controlled by other method can be control by another method.
2. Helps in reducing seed bank status in the field.
3. Shift in weed flora or resistance development in weed is avoided.
4. Environment friendly.
5. No danger of herbicide residues in soil or plant.
6. Suitable for high cropping intensity in organic farming.

SECTION 'B'

Q.11. Spell out the abbreviations. **4 marks**

Ans.

1) INSS (Integrated Nutrient Supply System)
2) NPOP (National Programme for Organic Production)
3) IFOAM (International Federation of Organic Agriculture Movement)
4) APEDA (Agricultural and Processed Food Products Export Development Authority)

Q.12. Match the following pairs 4 marks

'A'	'B'
1. Dhaincha	b) Green manuring
2. Devine	d) Mycoherbicide
3. Calcium oxide	a) Soil amendment
4.Spice Board	c) Accreditation agency

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