MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE

SEMESTER END EXAMINATION

B.Sc.(Hons.) Agriculture

Semester	: IV(New)	Academic Year	:2018-19
Course No.	: GPB-243	Title	:Principles of Seed Technology
Credits	: 3(1+2)		
Day &Date	:	Time :	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 Certified hybrid seed production of Pearl millet on following points

a) Planting Ratio 6 :2 (Female: Male). 1 each point

b) Seed rate: Female parent: 1.5 Kg/ha and Male parent- 0.75 Kg/ha.

c) Isolation distance : Certified seed: 200 Metre and
5 metre from other hybrid involving same male parent

d) Rouging : Timely rouging of off types, volunteer plants, pollen shedder before anthesis and objectionable weeds, diseased and infected plants must be removed.

Q.2 What is Seed Technology? Explain role and goals of seed Technology.

Ans: Seed Technology: Seed Technology is the discipline of study having to do with seed production, maintenance, quality and preservation. Feistritzer (1975) defined Seed Technology as a science dealing with the methods of improving physical & genetic characteristics of seeds. In its broadest sense, Seed Technology includes seed production, processing, storage, testing, certification, quality control, marketing, distribution & research on seed physiology. 1 mark

Roles of seed technology:

1. Improved seed is a carrier of new technology;
2. Improved seed is a basic tool for secured food supply;
3. Improved seed is the principle mean to secure crop yields in less favorable areas of production. 3 mark
4. Improved seed is a medium for rapid rehabilitation of agriculture in cases of natural disasters like floods & droughts.

Goals of seed technology:

1) Rapid multiplication
2) Timely supply of improved seed so that the planting schedule of farmer is not disturbed
3) Assured high quality of seeds to obtain expected dividends
4) Reasonable price: cost of high quality seed should be within reach of the average farmer.

Q.3 Define Intellectual Property Rights. Give the salient features and requirement of plant breeder rights.

IPR: It is a legal right provided to an Inventor / Scientist to derive economic benefit from his invention. 1 mark

PLANT BREEDERS RIGHT (PBR) :

It is also known as proprietary protection..

- **SALIENT FEATURES OF PBR :**
- 1) It is a legal right provided to originating plant breeder or a owner of variety to regulate production and marketing of his/her variety is known as **plant breeders right (PBR).** 3 mark
- 2) PBR are specialized patent like system for cultivated crop plants.
- 3) PBR are one of the most recent forms of IPR.
- 4) PBR provides legal rights to plant breeder to get benefit of his/her innovation or variety.
- 5) PBR differs from patent in the sense that the PBR allow farmers privilege, but the patent do not allow farmers privilege.
- 6) PBR protects the variety but not the standard breeding procedure that are used for development of variety.
- 7) PBR were first framed in 1961 in UPOV meeting held at Paris, which were further revised in 1972, 1978, 1991, 2001 and 2003.
- 8) PBR allows breeders exemption : Breeder is allow to use a protected variety in his breeding Programme.
- 9) PBR allows farmers priviiege : Farmer can use their own seed/product from a PBR protected variety without any obligation to holder of PBR title.
- **REQUIREMENTS OF PBR :**
- As per provisions of UPOV act 1991, the following requirements are to be fulfilled by a plant variety.
- **1) NOVELTY** : The variety must not have been exploited commercially for more than one year before granting of PBR.
- **2) DISTINCTNESS** : The new variety must be distinguishable from other varieties by one or more characters.
- **3) UNIFORMITY** : The variety must be uniform in appearance

5) **STABILITY** : The variety must be stable in appearance and it's claimed characteristics over generations under specified environment.

Q.4 Define seed. Describe in detail the stages/ classes of seed multiplication.

Ans : Seed 1: Seed is defined as a nature integument megasporangmm or 2:Seed is a mature ovule consisting of an embryonic plant together with a store of food all surrounded by a protective coat. From agricultural point of view, seed is any plant part-which is used for propagation or multiplication eg. true seed, tubers, suckers, bulbs, cuttings, setts, grafts etc. 1 mark

Classes: 1. Nucleus Seed 2. - Breeder Seed 3. - Foundation Seed 3 mark
4. - Certified Seed 5. Truthful Seed

Nucleus Seed: - Seed of progeny / individual plants take at random from a variety for the purpose of purifying that variety. Strictly examined by sponsoring Breeder.

Breeder Seed : - A class of seed in a certification programme directly controlled.

by the sponsoring breeding institution / firm / individual which is served as source for multiplication of seed. Golden yellow label

Foundation Seed: - Progeny of breeder seed so handed to maintain specific genetic purity & identity. White label

Certified Seed: - The progeny of foundation seed so handled to maintain satisfactory genetic purity and identity. It refers to seeds that fulfill all requirements for certification provided by the Seed Act and Rule. Blue label

Truthful Seed: - The seed which will full fill almost all the requirement of seed but lacking in some quality aspects and sold in the market with truthful label.Green label

Q.5 What is mean by seed processing? Enlist various steps in seed processing and describe its important.

Ans : Drying, cleaning, grading, treating, bagging and storage of the seed, obtained after harvesting and threshing is known as seed processing. 1 mark

In scientific seed processing, the seed is protected from all sources of contamination and identify of the seed lot is maintained during seed processing. So, seed processing is an important segment of seed industry.

Various steps in seed processing : 3 mark

i. Receiving seed in seed processing unit

ii. Conditioning or preparing the seed for processing

iii. Seed drying iv) Seed cleaning v) Separation and grading

vi) Seed treatment vii)Seed bagging viii)Seed storage

Importance of seed processing in seed industry :

i. Quality improvement, ii. Healthy seeds

iii. Store better iv. Higher yield

v. Low cost of seed production vi. Easy mechanical sowing.

Q.6 Certified seed production of Brinjal 1 mark each

a) Isolation: 100meter
b) Seed rate: 350 to 450 g/ha

c) Field inspection : 3 inspections. First before flowering, Second during flowering and third after fruit maturity and at harvesting

d) Harvesting & Seed extraction: The fruit harvesting is done when fruits are fully ripe and colour changesto yellow. After harvesting the outer fruit cover is peeled out fles with seed iscut into this slices. These slices are soaked into water till seeds are separated. After separation of seed are dipped into water and seed float on water is rejected. Later seed is dried in shade to 8%moist

Q7 Write short notes on (Any two)

a) **Field Inspection:** : The inspection of the standing crop in the seed field by the authorized certification officers to confirm isolation, genetic purity and timely rogueing of contaminants for fulfilment of prescribed standards or norms of certification is known as field inspection.. 2 mark each

OBJECTIVES :

1] To verify whether the seed field conforms to the prescribed land requirements or not.
2] To verify the seed source and identity of the variety.
3] To check the isolation distance.
4] To check whether the prescribed ratios of female (seed) and male (pollinator) plants had been planted in hybrid seed production programme.
5] To check crop cultivation conditions.
6] To check the incidence of seed borne disease.
7] To check the genetic purity of the variety and
8] To check whether seeds have been harvested at right time and properly to avoid mechanical mixture.

Stages: Inspectin is 1. At the time of sowing, 2. At preflowering, 3. At florering, 4. At pre- harvest stage , 5. At harvesting and 6. post harvest inspection

No. of inspection: **Two-** wheat, rice, soybean. **Three-** Varities of Bajra and Sorghum, hybrid cotton. **Four -** Hybrid Bajra, Sorghum, Maize etc.

b) Objects and features of Seed Act -1966.

Ans : Basic purpose of passing Seed Act is to regulate the quality of seed sold to farmers. In traditional agriculture it had only a little importance. In India, until 1966 there was no legislation governing quality of seeds. Introduction of hybrid and HYV' s necessitated the enactment. On December 29, 1966 the Seed Act was passed. It came in to force throughout the country on October 2, 1969.

Main features:- a)Applicability b)Sanctioning c) Regulatory legislation

Regulatory legislation : The Act provides for the provisions for notification of varieties to be brought under the purview of the Seed Act, regulation regarding the sale of seed and the establishment of suitable seed law enforcement machinery (e.g. appointment of seed inspector, notification of Central & State Seed Testing Laboratories, Seed analysts appellate authorities etc. & the penalties for the offencers). Under the Act the Central Govt. is empowered to make rules to carry out the purposes of the Act and to give directions to State Govt. if necessary, for carrying into execution, in the state concerned, the provisions of the Act or Rules.

c) Basic requirement of seed marketing

Ans: Marketing of seeds required special -skill. Those who are in charge of this operation should have a broad knowledge of agriculture and commerce & should be well aware of the new developments in agriculture. Implementation of sound marketing system, aiming at eventual improvement of agricultural production and productivity will depend upon following conditions.

a) A clear cut national policy for developing the seed industry, defining the task and responsibilities of public and private sectors involved.
b) Availability of well defined and adapted varieties.
c) Availability of official information on new varieties /hybrids that are been notified and released for crop production.
d) Ensured variety maintenance and basic seed supply for multiplication.
e) Effective legally enforced control procedure to ensure maintenance of uniform quality level, according to international standards.
f) Comprehensive marketing intelligence to indicate consumer requirements, appropriate production area. Location and size of market demand and costs.
g) Adequate production, storage, processing and testing facilities for producing and maintaining seed quantities & qualities in accordance to seed law standards.
h) Intermediate storage and transportation facilities for the wholesale and retail sales sectors.
i) Reliable information system to keep official and private institutions update on production and supply pattern.

Q.8 Describe the certified hybrid seed production of Maize on following points.

Planting ratio Female : Male	6 : 2 Single hybrid 4 : 2 Double hybrid (4:2)
Isolation Distance (Meter)	a) For different kernel colour = C: 300 b) For same kernel colour = C: 200 c) For Teosinate = C : 200 d) Same breed/hybrid field = C : 200 not confirming MSCS
Seed Rate	Female : 12 kg/ha. Male: 5 kg/ha
Detasselling	. Removal of male inflorescence from the female parent is known as Detasselling. At full emergence of tassel (before anthesis) the stalk of female plant is hold just below the tassel with left hand and the entire tassel is removed with right hand without making any injuri to the plant. Detasselling is done daily till all the seed parent plants are detasseled.

1 each point

Q.9 . Define varietal deterioration and explain genetic causes of deteriation of improved variety

Varietal deterioration: Decline of genetic purity of a variety OR Permanent reduction of either in genetic or agronomic value of variety. 1 mark

:Genetic causes of deterioration, 3 mark

1. Development variation. (**Explanation is necessary**)
2. Mechanical mixture
3. Mutations
4. Natural out crossing
5. Minor genetic variations
6. Selective influence of diseases
7. The techniques of plant breeder

Q.10 Define seed certification and describe procedure of seed certification? 1 mark

Answer: Seed Certification is legally sanctioned system for quality control of seed multiplication and production of seed.

Procedure: involve 6 different steps (**Brief description on following points**) 3

1. Registration of seed plot with SSCA
2. Verification of seed source
3. Field inspection to confirm the prescribed field standard
4. Supervision at harvesting and after harvesting.
5. Seed sampling and Testing in Seed Testing Laboratory
6. Tagging and sealing

SECTION "B"

Q.11 Define the following terms. 1 each

1) **Notified Variety**: The kind of variety of a crop approved for seed production under section No. 5 of Seed Act
2) **Pollen Shedder**: The presence of "B" line plants ie male parent plant in "A" line in hybrid seed production programme.
3) **Volunteer plants**: Unwanted plants growing from seed that remains in the field from a previous crop.
4) **Synchronization**: Simultaneous flowering of male and female parent in seed production.

Q.12 **Do as directed** 1 each

1. 400 seeds
2. GOT: Grow out Test
3. Kadam: Gave the genetic principles of seed production and factor responsible for varietal deterioration
4. MSCS: Minimum Seed Certification Standard