Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Agriculture

End Sem (Even) Examination May-2019

AG3CO17 Fundamentals of Plant Breeding

Programme: B.Sc. (Ag.) Branch/Specialisation: Agriculture

Duration: 3 Hrs. **Maximum Marks: 50**

Note: All questions are compulsory. Internal choices, if any, are indicated.Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The area where maximum diversity is present in a wild species is known as: **1**

(a) Primary center of origin (b) Secondary center of origin

(c) Both (a) and (b) (d) None of these

ii. Based on the modes of pollination plant species can be categorized into: **1**

(a) Self pollinated (b) Cross pollinated

(c) Often- cross pollinated (d) All of these

iii. The process of bringing wild species under human management is referred to as: **1**

(a) Introduction (b) Domestication

(c) Hybridization (d) Acclimatization

iv. The mechanism of self-incompatibility is genetically controlled by: **1**

(a) Polygenes (b) Oligogenes

(c) Multiple alleles (d) All of these

v. The genetic base of a self-pollinated crop is predominantly: **1**

(a) Homozygous and homogenous

(b) Homozygous and heterogenous

(c) Hemizygous and homogenous

(d) None of these

vi. Pure line breeding method is basically applied to improve: **1**

(a) Self pollinated crops (b) Cross pollinated crops

(c) Both (a) and (b) (d) Often cross-pollinated crops

P.T.O.

vii. The major component/s of genetic variance is/are: **1**
(a) Additive genetic variance (b) Dominance variance
(c) Epistatic variance (d) All of these

viii. In a random mating population gene frequency and genotypic proportion remain same, provided there is no mutation, migration, genetic drift, selection, small population size and abnormal meiosis. This law was given by: **1**
(a) Gregor Johann Mendel (b) Hardy and Weinberg
(c) Sutton and Boveri (d) None of these

ix. A foreign gene/s introduced into an organism by genetic manipulation is called: **1**
(a) Transgene (b) Jumping gene
(c) Overlapping gene (d) None of these

x. The basis of Marker assisted selection in crop plants relates to: **1**
(a) Morphological features (b) Cytological features
(c) Biochemical features (d) DNA

Q.2 i. Enlist various objectives of plant breeding. **2**
ii. Write in brief major achievements of crop improvement and future role of biotechnology in plant breeding **6**
OR iii. Explain briefly concept of centers of origin and also mention the center of origin of wheat, maize and sugarcane **6**

Q.3 i. Define self-pollination, cross-pollination and often cross pollination. **2**
ii. Describe briefly various mechanisms that promote self and cross pollination. **6**
OR iii. Describe briefly the procedure of pure line selection and its merits and demerits. **6**

Q.4 i. Write names of two each of self-pollinated, cross-pollinated and often-cross-pollinated crops. **2**
ii. Enlist and explain breeding methods applied in improvement of self and cross-pollinated crops. **6**
OR iii. Outline procedure of back cross breeding and mass selection in self – pollinated crops **6**

Q.5 i. What are molecular markers? **2**
ii. Describe briefly the role of heritability in selection. **6**
OR iii. Enlist various molecular markers and discuss role of molecular markers in plant breeding. **6**

Q.6 Attempt any two:
i. (a) Intellectual property and intellectual property rights **4**
(b) Geographical indications (GI)
ii. (a) Patent and patent requirements. **4**
(b) Write the rules of parenting.
iii. (a) The protection of Plant Varieties and Farmer's Rights Act (PPVFR 2001) **4**
(b) Breeder's rights.

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Marking Scheme
AG3CO17 Fundamentals of Plant Breeding

Q.1	i.	The area where maximum diversity is present in a wild species is known as: (a) Primary center of origin	**1**
	ii.	Based on the modes of pollination plant species can be categorized into: (d) All of these	**1**
	iii.	The process of bringing wild species under human management is referred to as: (b) Domestication	**1**
	iv.	The mechanism of self-incompatibility is genetically controlled by: (c) Multiple alleles	**1**
	v.	The genetic base of a self-pollinated crop is predominantly: (b) Homozygous and heterogenous	**1**
	vi.	Pure line breeding method is basically applied to improve: (a) Self pollinated crops	**1**
	vii.	The major component/s of genetic variance is/are: (d) All of these	**1**
	viii.	In a random mating population gene frequency and genotypic proportion remain same, provided there is no mutation, migration, genetic drift, selection, small population size and abnormal meiosis. This law was given by: (b) Hardy and Weinberg	**1**
	ix.	A foreign gene/s introduced into an organism by genetic manipulation is called: (a) Transgene	**1**
	x.	The basis of Marker assisted selection in crop plants relates to: (d) DNA	**1**
Q.2	i.	Four objectives of plant breeding. 0.5 mark for each (0.5 mark * 4)	**2**
	ii.	Achievements of crop improvement Any three 1 mark for each (1 mark * 3) 3 marks Role of biotechnology in plant breeding Any three 1 mark for each (1 mark * 3) 3 marks	**6**
OR	iii.	Concept of centers of origin 3 marks Center of origin of wheat, 1 mark Center of origin of maize 1 mark Center of origin of sugarcane 1 mark	**6**
Q.3	i.	Define self-pollination, cross-pollination and often cross pollination.	**2**
	ii.	Mechanisms that promote self and cross pollination. Any three 2 marks for each (2 marks * 3)	**6**
OR	iii.	Procedure of pure line selection 3 marks Merits and demerits. 3 marks	**6**
Q.4	i.	Names of two each of self-pollinated, cross-pollinated and often-cross-pollinated crops.	**2**
	ii.	Breeding methods applied in improvement of self crops. 3 marks Breeding methods applied in improvement of cross-pollinated crops 3 marks	**6**
OR	iii.	Procedure of back cross breeding 3 marks Mass selection in self –pollinated crops 3 marks	**6**
Q.5	i.	Molecular markers	**2**
	ii.	Role of heritability in selection. Any six 1 mark for each (1 mark * 6)	**6**
OR	iii.	Enlist Molecular markers names 3 marks Role of molecular markers in plant breeding. 3 marks	**6**
Q.6		Attempt any two:	
	i.	(a) Intellectual property and intellectual property rights 2 marks (b) Geographical indications (GI) 2 marks	**5**
	ii.	(a) Patent and patent requirements. 2 marks (b) Write the rules of parenting. 2 marks	**5**
	iii.	(a) The protection of Plant Varieties and Farmer's Rights Act (PPVFR 2001) 2 marks (b) Breeder's rights. 2 marks	**5**

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