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

Enrollment No.....

Faculty of Agriculture
End Sem Examination May-2024
AG3CO48 Crop Improvement -II (Rabi Crops)

Programme: B.Sc. (Hons.) 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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. What term did Nikolai Vavilov use to describe regions where domestication of plants first occurred? **1**

(a) Center of domestication (b) Center of origin
(c) Vavilov regions (d) Origin points

ii. Wild relatives of rice are commonly found in which genus? **1**

(a) Oryza (b) Hordeum (c) Zea (d) Triticum

iii. What term refers to the collection of genetic material from plants, including seeds, tissues, and genetic information? **1**

(a) Plant biotechnology (b) Plant genetics
(c) Plant genetic resources (d) Plant genomics

iv. Conservation of plant genetic resources primarily aims to: **1**

(a) Create new plant varieties
(b) Preserve genetic diversity
(c) Increase crop yields
(d) Enhance plant growth

v. Which of the following is NOT a major breeding objective for crop improvement? **1**

(a) Yield improvement
(b) Pest resistance
(c) Seed size reduction
(d) Adaptability to diverse environments

vi. Which breeding method involves using molecular markers to identify and select plants with desired traits? **1**
(a) Pedigree breeding (b) Mutation breeding
(c) Pure-line selection (d) Marker-assisted selection

vii. What is a common source of genes for breeding drought-resistant crops? **1**
(a) Soil microorganisms
(b) Insects
(c) Unrelated plant species
(d) Wild relatives of cultivated crops

viii. Which step in hybrid seed production technology involves removing the male reproductive organs from the female parent plant? **1**
(a) Emasculation (b) Pollination
(c) Seed processing (d) Rouging

ix. Climate-resilient crop varieties are developed to withstand challenges posed by: **1**
(a) Soil erosion (b) Urbanization
(c) Climate change (d) Pesticide resistance

x. What is the emphasis of ideotype breeding on individual traits? **1**
(a) Maximizing yield-enhancing characteristics
(b) Increasing plant height
(c) Enhancing root system development
(d) Reducing leaf size

Q.2 i. Define geographical distribution of species. **1**
ii. What is primary centre of origin? **2**
iii. Explain the concept of "centre of origin" in relation to plant species. **5**
OR iv. Explain wild relative with suitable examples of cereal crops. **5**

Q.3 i. Expand NBPGR. **1**
ii. What are plant genetic resources? Why are they important in agriculture? **3**
iii. Describe the scientific process involved in exploration and collection of germplasm, highlighting the six important activities related to germplasm collection. **4**

OR iv. What is the gene pool system of classification? What components does it include? **4**

Q.4 i. What do you mean by chilling and freezing? **2**
ii. Describe the main mechanisms involved in conferring salt tolerance in plants through breeding efforts. **6**
OR iii. Define drought resistance. Explain briefly the various mechanisms to drought resistance. **6**

Q.5 i. Define Hybridization. **2**
ii. What is the primary objective of hybrid seed production technology? **2**
iii. What are the key steps involved in hybrid seed production technology for Rabi crops? **4**
OR iv. Explain the significance of hybrid seed production technology in enhancing the yield and quality of Rabi crops. **4**

Q.6 Attempt any two:
i. How does ideotype breeding contribute to improving crop productivity? **4**
ii. What physiological characteristics are exploited in ideotype breeding to increase crop yields? **4**
iii. Explain main features of ideotype breeding. **4**

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Marking Scheme

Crop Improvement -II (Rabi Crops) (T) - AG3CO48 (T)

Q.1 i. What term did Nikolai Vavilov use to describe regions where domestication of plants first occurred? **1**

b) Centers of origin

ii. Wild relatives of rice are commonly found in which genus? **1**

a) *Oryza*

iii. What term refers to the collection of genetic material from plants, including seeds, tissues, and genetic information? **1**

c) Plant genetic resources

iv. Conservation of plant genetic resources primarily aims to: **1**

b) Preserve genetic diversity

v. Which of the following is NOT a major breeding objective for crop improvement? **1**

c) Seed size reduction

vi. Which breeding method involves using molecular markers to identify and select plants with desired traits? **1**

d) Marker-assisted selection

vii. What is a common source of genes for breeding drought-resistant crops? **1**

d) Wild relatives of cultivated crops

viii. Which step in hybrid seed production technology involves removing the male reproductive organs from the female parent plant? **1**

a) Emasculation

ix. Climate-resilient crop varieties are developed to withstand challenges posed by: **1**

c) Climate change

x. What is the emphasis of ideotype breeding on individual traits? **1**

a) Maximizing yield-enhancing characteristics

Q.2 i. Define geographical distribution of species. **1**

definition= 1 Mark

ii. What is Primary centre of Origin? **2**

Primary centre of Origin = 2 Marks

iii. Explain the concept of "centres of origin" in relation to plant species. **5**

concept = 5 Marks

OR iv. Explain wild relative with suitable examples of cereal crops. **5**

wild relatives = 4 Marks

examples = 1 Marks

Q.3 i. Expand NBPGR. **1**

expand= 1 Marks

ii. What are plant genetic resources, and why are they important in agriculture? **3**

definition= 1 Marks

importance = 2 Marks

iii. Describe the scientific process involved in exploration and collection of germplasm, highlighting the six important activities related to germplasm collection. **4**

activities with explanation = 4 Marks

OR iv. What is the gene pool system of classification, and what components does it include? **4**

definition = 1 Marks

classification with detail 3 Marks

Q.4 i. What do you mean by chilling and freezing? **2**

chilling = 1 Marks

freezing = 1 Marks

ii. Describe the main mechanisms involved in conferring salt tolerance in plants through breeding efforts. **6**

mechanism = 6 Marks

OR iii. Define drought resistance. Explain briefly the various mechanisms to drought resistance. **6**

definition= 2 Marks

mechanism = 4 Marks

Q.5 i. Define Hybridization. **2**

definition = 2 Marks

ii. What is the primary objective of hybrid seed production technology **2**

objectives = 2 Marks

iii. What are the key steps involved in hybrid seed production technology for Rabi crops? **4**

steps with detail = 4 Marks

OR iv. Explain the significance of hybrid seed production technology in enhancing the yield and quality of Rabi crops. **4**

major significance with detail = 4 Marks

Q.6 Attempt any two:

i. How does ideotype breeding contribute to improving crop productivity? **4**

major contribution = 4 Marks

ii. What physiological characteristics are exploited in ideotype breeding to increase crop yields? **4**

physiological charecteristics = 4 Marks

iii. Explain main features of ideotype breeding? **4**

main features with detail = 4 Marks