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PG AGRICULTURE

M.Sc. in Genetics and Plant Breeding

Semester-II Examination, 2023

PAPER: GPB 506 (THEORY)

(MOLECULAR BREEDING AND BIOINFORMATICS)

Full Marks: 50 **Time: 2 Hours**

GROUP-A

Answer any FIVE of the following questions: **2×5=10**

1. What is totipotency?
2. What is foreground selection?
3. Mention four software for DNA sequence analysis.
4. What do you mean by Global and Local alignment?
5. Write the function of blastn, blastx, blastp, tblastn.
6. Define gene pyramiding.
7. What do you mean by blunt cut and cohesive cut of restriction enzymes?
8. Distinguish between binary vector and co-integrate vector.
9. Difference between endonuclease and exonuclease.

GROUP-B

Answer any FOUR of the following questions: **5×4=20**

1. What is molecular marker? Differentiate between dominant and co-dominant marker. 2+3
2. Briefly explain Barnase-Barstar gene system of mustard.
3. Explain the direct method of gene transfer in plant.
4. What is the significance of quantitative trait loci (QTL) mapping in molecular breeding?
5. Describe the steps involved in marker-assisted selection (MAS) in molecular breeding.
6. Explain the concept of allele mining and its significance. 3+2
7. Mention the principle of PCR and briefly explain the gene cloning mechanism based on PCR. 2+3
8. What are the considerations for coexistence between GMO and non-GMO crop production systems?

GROUP-C

Answer any TWO of the following questions: **10×2=20**

1. Explain about different steps of Bulk Segregant Analysis (BSA).

(P.T.O.)

2. Mention the characteristics of ideal vector. Explain the molecular mechanism of blue white selection for pUC18 vector. Discuss the T DNA transfer mechanism. 2+3+5
3. Mention different sterilization method utilized in plant tissue culture. Schematically represents the protoplast culture and its utility in crop improvement. 3+4+3
4. How marker assistant backcross breeding is used in crop improvement.

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