

PG**M.Sc. Semester-I Examination, 2021****GENETICS AND PLANT BREEDING**

PAPER: GPB 106 (Theory + Practical)

(BREEDING FOR BIOTIC & ABIOTIC STRESS RESISTANCE)**Full Marks: 65****Time: 4 Hours****THEORY****Answer any FOUR questions from the following:****4X10 = 40**

1. Define genetic resistance? Describe briefly the various sources of disease resistance in crop plants. Discuss about the different screening techniques commonly used for disease resistance? How does the hypersensitivity reaction play an important role in disease resistance? 1+2+ 5+ 2
2. Define non-preference type of insect resistance. 'Antibiosis' is a mechanism of insect resistance' – discuss. What are the biochemical factors associated with insect resistance in crop plants? 4+3+3
3. Differentiate between drought avoidance and drought tolerance. What are the various morphological and physiological characters associated with drought resistance? Discuss about different breeding methods which are used for drought tolerant varieties in crop plants. 2+4+4
4. What do you mean by stress in crop plant? What are different types of biotic and abiotic stresses? Explain 'gene-for-gene' hypothesis with suitable example. Name some functional proteins which function to protect cell from stress. 1+3+4+2
5. Define gene pyramiding. Briefly discuss about the methods of gene transfer from wild species to crop plants. Compare between vertical resistance and horizontal resistance. 1+5+4
6. What are the different types of disease resistance in crop plants. Give a detailed classification of disease resistance mechanism based on defense structure. Give a general outline of mutation breeding procedure for resistance to diseases & insects in autogamous crop plants. (2+3)+5
7. Write short notes on the following (any five) : 2×5
 - a. Gene deployment
 - b. Insect biotype
 - c. Durable resistance

(P.T.O.)

(2)

- d. Elicitor
- e. DREB-1A gene
- f. Vertifolia effect
- g. Common phenolics and phytoalexins
- h. Multiline variety

8. What is heat stress? Describe briefly the various mechanisms of heat stress? Describe briefly the various sources of chilling tolerance in crop plants? 1+5+4

PRACTICAL

Answer any ONE question from the following:

1X15=15

1. What is DNA finger printing? Polymorphic information content (PIC) calculation for two different markers? 15

Number of genotypes =5.

	M1						M2				
	G1	G2	G3	G4	G5		G1	G2	G3	G4	G5
500	-	-	-	-	-	500	-				
400				-	-	400	-	-	-		-
300	-	-	-			300					
200		-		-	-	200				-	
100	-		-	-	-	100	-	-			

2. What is the *process* for accurate and precise estimation or *measurement* of disease severity and disease incident? 10

OR

3. How to calculate AUDPC value. 15

Disease Score	PDI value 1	PDI value 2	PDI value 3
	30	45.3	60.1
	35.5	51.2	62.3
	40.3	52.3	65.3
	45.6	54.3	71.3

4. How to screen disease data from field experiment? 10
