2024 (NEP-2020) (3rd Semester) BOTANY (MAJOR) (Genetics and Plant Breeding) Full Marks: 75 Time: 3 hours The figures in the margin indicate full marks for the questions (SECTION : A-OBJECTIVE) (Marks: 10) Put a Tick (✓) mark against the correct answer in the brackets provided: 1×10=10 1. The gene which masks the effect of another gene is called (a) lethal gene (b) complement gene (c) hypostatic gene (d) epistatic gene 2. The strength of linkage between the two genes is determined by (a) the distance between them (b) the number of chromosomes in a cell (c) the position of centromere (d) the frequency of crossing-over 3. The gene interaction occurring between the two alleles of a single locus is known as (a) inter-genic (b) intra-genic (c) complementary (d) epistatic

	7. In	e terminal end	of a linear cl	nromosom	e is known a	.5		
	(a)	chromatid	()	(b)	centromere	()	
	(c)	telomere	()	(d)	kinetochore	()	
	5. The	e condition in w own as	hich entire c	hromosom	e set exceeds	the dip	oloid leve	el is
	(a)	monoploidy	()	(b)	polyploidy	()	
	(c)	aneuploidy	()	(d)	hypoploidy	()	
	(a) (b) (c) (d) The (a) (b) (c)	meshift mutation of substitution of substitution of substitution of addition or delease chromosome comparatively substitution of delease chromosome comparatively substitution or delease chromosome comparatively substitution of delease chromosome comparatively substitution almost the same almost the same substitution of the substitution of the substitution of the substitution of su	pyrimidine verification of a base of	due to vith purin another p vith anoth se (e ()) (,	
8.	(a) (b) (c) (c)	conjugated protone gene-one erone gene-one po one gene-one po one gene-one po All of the above	naracter hypo nzyme hypoth olypeptide hyp	thesis esis (upports the () () ()			
9.	The to	endency of F_1 hy	brid to show t	he quality	superior to bot	h paren	ts is	
		nbreeding depre				()		
		ybrid vigour	. ,		bridization	()		
10.	soil, t	hysiological ada emperature or a	ptation of pla altitude is kno	own as		such as	light,	
	100	daptation ()	3.38	nestication	()		
	(c) in	troduction	()	(d) acc	limatization	()	

(SECTION	:	B-SHORT	ANSWERS
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(Marks: 25)

Answer/Write short notes on five of the following, taking at least one from each
Unit:

5×5=25

UNIT-I

- 1. Explain Mendel's law of dominance.
- 2. Differentiate between complete and incomplete linkages.

UNIT-II

- 3. Chromosome structure
- 4. Aneuploidy

UNIT-III

- 5. One gene-one character concept
- 6. Sex chromosome

UNIT-IV

- 7. Mass selection
- 8. Significance of plant breeding in evolution

(SECTION : C-DESCRIPTIVE)

(Marks: 50)

Answer four of the following, taking one from each Unit:

UNIT—I

10×4=40

- Describe in detail the cytological basis of crossing-over and support your answer with a suitable diagram.
- 2. Write notes on the following:

5+5=10

- (a) Non-Mendelian inheritance giving an example
- (b) Linkage and crossing-over

Unit—II

- Describe the different types of structural aberrations that can occur in chromosomes.
- 4. Write notes on the following:

5+5=10

- (a) Karyotype
- (b) Physical mutagens

UNIT-III

- Explain the sex chromosomal mechanism of sex-determination with appropriate examples.
- 6. Write notes on the following:

5+5=10

- (a) One gene-one enzyme concept
 - (b) Concept of sex-determination

UNIT-IV

- Define hybridization. Give a detailed steps on the procedures of hybridization.
- 8. Write notes on the following:

5+5=10

- (a) Heterosis
- (b) Pureline selection

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2 0 2 4 (NEP—2020) (3rd Semester)

BOTANY (MAJOR)

(Genetics and Plant Breeding)

Full Marks: 75

Time: 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A-OBJECTIVE)

(Marks: 10)

Put	a Tick (✓) mark against the correct answer in the brackets provided: 1×10=10
	The gene which masks the effect of another gene is called (a) lethal gene () (b) complement gene () (c) hypostatic gene () (d) epistatic gene ()
2.	The strength of linkage between the two genes is determined by (a) the distance between them (b) the number of chromosomes in a cell (c) the position of centromere (d) the frequency of crossing-over (e)
3.	The gene interaction occurring between the two alleles of a single locus is known as (a) inter-genic () (b) intra-genic () (c) complementary () (d) epistatic ()

•••	The terminal end of a fillear enrolliosome is known as
	(a) chromatid () (b) centromere ()
	(c) telomere () (d) kinetochore ()
5.	The condition in which entire chromosome set exceeds the diploid level is known as
	(a) monoploidy () (b) polyploidy ()
	(c) aneuploidy () (d) hypoploidy ()
6.	Frameshift mutation may occur due to (a) substitution of pyrimidine with purine () (b) substitution of purine with another purine () (c) substitution of pyrimidine with another pyrimidine () (d) addition or deletion of a base ()
~	• •
7.	The sex chromosome X is
	(a) comparatively smaller than Y ()
	(b) comparatively larger than Y ()
	(c) exactly the same size as Y ()
	(d) almost the same size as Y ()
8.	The conjugated protein haemoglobin (Hb) supports the
	(a) one gene-one character hypothesis ()
	(b) one gene-one enzyme hypothesis ()
	(c) one gene-one polypeptide hypothesis ()
	(d) All of the above ()
9.	The tendency of F_1 hybrid to show the quality superior to both parents is
	(a) inbreeding depression ()(b) dominance ()
	(c) hybrid vigour () (d) hybridization ()
١٥.	The physiological adaptation of plants to climatic changes such as light, soil, temperature or altitude is known as
	(a) adaptation () (b) domestication ()
	(c) introduction () (d) acclimatization ()

(SECTION : B—SHORT ANSWERS)

(Marks: 25)

Answer/Write short notes on *five* of the following, taking at least *one* from each Unit:

5×5=25

UNIT-I

- 1. Explain Mendel's law of dominance.
- 2. Differentiate between complete and incomplete linkages.

UNIT—II

- 3. Chromosome structure
- 4. Aneuploidy

Unit—III

- 5. One gene-one character concept
- 6. Sex chromosome

UNIT-IV

- 7. Mass selection
- 8. Significance of plant breeding in evolution

(SECTION : C-DESCRIPTIVE)

(Marks : 50)

Answer four of the following, taking one from each Unit:

10×4=40.

UNIT-I

- Describe in detail the cytological basis of crossing-over and support your answer with a suitable diagram.
- 2. Write notes on the following:

5+5=10

- (a) Non-Mendelian inheritance giving an example
- (b) Linkage and crossing-over

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- Describe the different types of structural aberrations that can occur in chromosomes.
- 4. Write notes on the following:

5+5=10

10

- (a) Karyotype
- (b) Physical mutagens

UNIT-III

- Explain the sex chromosomal mechanism of sex-determination with appropriate examples.
- 6. Write notes on the following:

5+5=10

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- (a) One gene-one enzyme concept
- (b) Concept of sex-determination

UNIT-IV

- Define hybridization. Give a detailed steps on the procedures of hybridization.
- 8. Write notes on the following:

5+5=10

- (a) Heterosis
- (b) Pureline selection

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