

Fundamentals of Plant Breeding

QUESTION BANK

A. Choose the correct option of following questions and write YES in side column

1		Primitive cultivars cultivated by farmers over generation and generation is known as.....		
	a)	Modern cultivar		
	b)	Obselete cultivar		
	c)	Land races	YES	
2	d)	mutants		
		How many center of origin were proposed by Vavilov initially		
	a)	6		
	b)	8	YES	
3	c)	12		
	d)	9		
		Seed collection that are disturbed only for regeneration are called as.....		
	a)	Base Collection	YES	
4	b)	Active Collection		
	c)	Working Collection		
	d)	Field Collection		
		Potato is a modified stem and is called as.....		
5	a)	Sucker		
	b)	Tuber	YES	
	c)	Bulb		
	d)	Corm		
6		Protandry occurs in which of the following		
	a)	Maize		
	b)	Sugarbeet		
	c)	Marigold		
7	d)	All of the Above	YES	
		In case of barley, the chief quality characteristics is.....		
	a)	Chapati Making		
	b)	Milling		
8	c)	Malting	YES	
	d)	Baking		
		Self-pollinated crops increases.....		
	a)	Homozygosity	YES	
9	b)	Homogeneity		
	c)	Heterozygosity		
	d)	Heterogeneity		
		Pigeon pea has chromosome number, $2n=$		

	a)	14		
	b)	22	YES	
	c)	28		
	d)	56		
9		Dominance hypothesis is given by.....		
	a)	Marther		
	b)	East and Shull		
	c)	Jones		
	d)	Davenport	YES	
10		In case of Disease, score 0 indicates.....		
	a)	Lack of disease symptom		
	b)	Resistance	YES	
	c)	Lack of contact		
	d)	Lack of Pathogen production		
11		Term horizontal resistance given by.....		
	a)	Browning		
	b)	Flor		
	c)	Vander plank	YES	
	d)	Marshall		
12		Stress Hormone is		
	a)	Gibberlin		
	b)	Auxin		
	c)	Abscisic acid	YES	
	d)	Cytokinin		
13		Donald in 1968 proposed ideotype in		
	a)	Maize		
	b)	Rice		
	c)	Wheat	YES	
	d)	Sorghum		
14		Single, Self pollinated, homozygous plant is called as.....		
	a)	Multiline		
	b)	Pureline	YES	
	c)	Isogenic line		
	d)	inbred		
15	 method is used for development of oligogenic trait.		
	a)	Pedigree		
	b)	Bulk		
	c)	Backcross	YES	
	d)	Mass selection		
16		Polycross test is most useful in		
	a)	Cleistogamous crops		

	b)	Clonal Crops		
	c)	Apomictic		
	d)	Crosspollinated crops	YES	
17		ICRISAT is situated at.....		
	a)	Syria		
	b)	Mexico		
	c)	India	YES	
	d)	Philippines		
18		The cross between inbred and open pollinated variety is called as.....		
	a)	Single cross		
	b)	Polycross		
	c)	Multicross		
	d)	Top cross	YES	
19		Adverse effect of host plant on development of insect pest which feed on plant is called as.....		
	a)	Antibiosis	YES	
	b)	Antixenosis		
	c)	Non preference		
	d)	Tolerance		
20	 is an example of primary introduction		
	a)	Kalyan Sona		
	b)	Sonalika		
	c)	Sonara-64	YES	
	d)	Jaya		
21		Source of cytoplasmic male sterile gene in sorghum is.....		
	a)	Tift 23 A		
	b)	Milo		
	c)	Kafir-60	YES	
	d)	CMS-T		
22		Ear to row method in maize is given by		
	a)	Lonquist		
	b)	Hopkins	YES	
	c)	Jones		
	d)	Jenkins		
23		The concentration of increases when the plants are exposed to drought condition.		
	a)	Proline	YES	
	b)	Auxin		
	c)	Gibberellin		
	d)	Cytokinin		
24		Source of Dwarfing gene in rice is found in which country		
	a)	Japan		

	b)	Taiwan	YES	
	c)	India		
	d)	Philippines		
25		The difference between population mean and mean of selected plants is known as.....		
	a)	Heritability		
	b)	Genetic Advance	YES	
	c)	Selection Differential		
	d)	Direction al Selection		
26		Which method is also known as evolutionary method of plant breeding?		
	a)	Bulk method	YES	
	b)	Backcross method		
	c)	Pedigree method		
	d)	Pureline method		
27		Wheat variety MLKS 11 was developed by mixing seeds of how many near isogenic lines?		
	a)	5		
	b)	7		
	c)	8	YES	
	d)	9		
28		Which is most widely used for rapid isolation of homozygous lines?		
	a)	SSD		
	b)	Double haploid	YES	
	c)	Gynogenesis		
	d)	Bulk method		
29		Selection for simple inherited traits starts from which generation?		
	a)	F ₂	YES	
	b)	F ₃		
	c)	F ₄		
	d)	F ₅		
30		Genetic Variation in clones may arise due to.....		
	a)	Segregation and recombination		
	b)	Mechanical mixture		
	c)	Somatic mutation		
	d)	All of the above	YES	
31		Term nobilisation is related to which crop?		
	a)	Sugarbeet		
	b)	Potato		
	c)	Ginger	YES	
	d)	Sugarcane		
32		Term "Heterosis" is coined by		
	a)	East		

	b)	Jones		
	c)	Shull	YES	
	d)	Davenport		
33		Heterobeltiosis is also known as.....		
	a)	Average heterosis		
	b)	Commercial heterosis		
	c)	Better parent heterosis	YES	
	d)	Standard heterosis		
34		Term Vertifolia effect is introduced by.....		
	a)	Vanderplank		
	b)	Barrus	YES	
	c)	Flor		
	d)	Pristley		
35		Grid Method was developed by.....		
	a)	Nilsson		
	b)	Jones		
	c)	Gardner	YES	
	d)	Johanseen		
36		Which of the following the most important stage for disease escape?		
	a)	Contact	YES	
	b)	Infection		
	c)	Establishment		
	d)	Reproduction		
37		Which plant part is used for mutagen treatment?		
	a)	Seed		
	b)	Pollen grain		
	c)	Vegetative propagule		
	d)	All of the above	YES	
38		Which of the following is not ionizing in nature?		
	a)	X ray		
	b)	Gamma ray		
	c)	UV ray	YES	
	d)	Fast neutrons		
39		Totipotency is a feature of which of the following?		
	a)	Plant Cell	YES	
	b)	Animal Cell		
	c)	Cancerous Cell		
	d)	All of the Above		
40		Geographical indication includes which of the following?		
	a)	Natural Product		
	b)	Agricultural Goods		

	c)	Goods of Handicraft		
	d)	All of these	YES	
41		Type of pollination exhibited pigeon pea.....		
	a)	SP		
	b)	CP		
	c)	OCP	YES	
	d)	None of these		
42		Breeding for disease resistance requires		
	a)	a good source of resistance		
	b)	Planned hybridisation		
	c)	Diseases test		
	d)	All of these	YES	
43		Polyploidy is induced through		
	a)	Irradiation		
	b)	Mutagenic chemicals		
	c)	Ethylene		
	d)	Colchicine	YES	
44		Heterosis is		
	a)	Appearance of spontaneous mutations		
	b)	Induction of mutations		
	c)	Mixture of two or more traits		
	d)	Superiority of hybrids over their parents	YES	
45		A scientist wants to study the viral effects on plants. Which of the following part of the plant should be excluded?		
	a)	pith		
	b)	shoot apex	YES	
	c)	phloem		
	d)	cortex		
46		Somatic hybridisation is achieved through		
	a)	Grafting		
	b)	Conjugation		
	c)	Protoplast fusion	YES	
	d)	Recombinant DNA technology		
47		Bagging is done to		
	a)	Avoid cross pollination		
	b)	Avoid self pollination		
	c)	Achieve desired pollination		
	d)	Prevent contamination from foreign pollen	YES	
48		A technique of micropropagation is		
	a)	Multiple root production		
	b)	Somatic embryogenesis	YES	
	c)	Growth of micro organisms on culture medium		

	d)	Multiple shoot production and embryo rescue		
49		Golden rice is rich in		
	a)	Vitamin C		
	b)	Protein		
	c)	B-carotene	YES	
	d)	Antioxidant		
50		For corrections of defects in any popular varietymethod is used		
	a)	Bulk method		
	b)	Backcross method	YES	
	c)	Pedigree method		
	d)	Pureline method		

B. Fill in the Blanks:

- Term ideotype was proposed by _____ in 1968.
- Gene-for-gene hypothesis was given by Flor in Flax rust caused by _____ organism.
- Complete failure of vertical resistance is called _____
- An example of complete stem parasitic weed is _____
- Mechanism by which plant develops drought resistance through maintaining favourable water balance is _____
- International Crops Research Institute for Semi-Arid and Tropics is situated at _____
- Common name of striga is _____
- The mechanism of adverse effect of plant on development of insect pests which feeds on resistant plant is known as _____
- The concentration of _____ will increase in leaves of plants when subjected to draught.
- Vertical resistance shows _____ type of variation.
- The variance which is due to deviation from additive gene action resulting from intra-allelic interaction is _____
- For transfer of resistance gene governed by polygenes _____ method is used.
- Pigeonpea is _____ pollinated crop. (SP/CP/OCP)
- The 1st hybrid developed by C.T.Patel in cotton is _____
- An example of protandry is _____
- Source of male sterile gene in sorghum is _____
- _____ Kind of rights are provided to authors for safekeeping their literatures.
- _____ is the quickest method of crop improvement.
- FRI, Deheradun deals with introduction of _____
- Bulk method was given by _____
- _____ method is used for improvement of oligogenic traits.
- The source of dwarfing gene in dwarf rice is _____
- An example of plant having protandry condition is _____
- _____ is known as maintainer line. (A line/ B line/ R line).
- _____ parent is known as recurrent parent.
- _____ method provides breeder maximum opportunities to apply his skill and judgment during selection of plant.
- Complete failure of vertical resistance is called _____
- CSSRI is situated at _____
- _____ method is used for improvement of oligogenic traits.
- _____ and _____ variance is known as heritable fixable variance.

31. _____ is an example of non-ionizing mutagenic radiation.
32. _____ is an example of PCR based marker.
33. _____ is an example of autotriploid.
34. The total number of single cross hybrids can be developed is _____ where 6 inbred lines are used.
35. Full form of RAPD is _____
36. Seeds stored in active collection for _____ years.
37. _____ Sampling is essential for developing biotic stress resistance.
38. Small area within the centre of diversity exhibit tremendous genetic diversity known as _____
39. Term ideotype was proposed by _____ in 1968.
40. Gene-for-gene hypothesis was given by _____
41. Various features of host plant that make insect unattractive for living called _____
42. An example of complete root parasitic weed is _____
43. Common name of cuscuta is _____
44. Mechanism by which plant develops drought resistance through maintaining favourable water balance is _____
45. Central Soil Salinity Research Institute is situated at _____
46. Cereals are deficient in _____ amino acid.
47. Anti-nutritional factor present in rapeseed and mustard is _____
48. Overdominance hypothesis was given by _____
49. Heterosis calculated over better parent is called _____
50. _____ Ideotype performs best in genetically heterogenous population.

C. Match the followings:

1. Homozygous & Homogenous - Synthetics
 Homozygous & Heterogenous - Pureline
 Heterozygous & Homogenous - Multiline
 Heterozygous & Heterogenous - Inbreds
 Recurrent Selection for SCA – Clones
2. Cuscuta - Broom rape
 Striga - Manmade Cereale
 Loranthus - Witch weed
 Orobanche - Dodder

Triticale - Bird vine

3. Wheat – milo
Rice – Kafir 60
Sorghum – Norin 10
Bajra – Dee-geo-woo-gen
Maize – Tift-23A
4. IIPR – KARNAL
CSSRI – COIMBATORE
IISR – NEWDELHI
ICAR – KANPUR
SBI – LUCKNOW
5. Law of parallel variation – Painter
Gene- for - gene Hypothesis – Davis
Mechanism of insect resistance – Johansen
Pueline theory – Vavilov
Top cross – Flor

D. Write short notes

1. Additive genetic variance
2. IPR
3. Wheat ideotype
4. Drought Hardening
5. Classify and explain types of seed collection on the basis of use and duration of conservation.
6. Explain ideotype of Wheat.
7. Define multiline and briefly explain its utility towards durable resistance .
8. Draw Schematic flow chart for pureline selection.
9. Enlist the features of Recurrent Selection for GCA.
10. Different mechanisms of insect resistance.
11. Differentiate between Drought avoidance and Drought tolerance.
12. Explain regarding Modified Ear to Row method in Maize.
13. List out different types of maize along with their scientific name.
14. Explain different measures of conservation of heterosis.
15. Differentiate between synthetics and composites.

E. Long Questions

1. Explain about different mechanisms of disease resistance.
2. Explain genetic basis of heterosis.
3. Explain Hardy-Weinberg Law and factors affecting it.
4. Define Plant Breeding. Briefly describe various objectives of plant breeding with examples.
5. Outline the procedure for transfer of a dominant resistance gene through Backcross method. Mention the merits of this method.
6. Outline the procedure for transfer of a recessive resistance gene through Backcross method. Mention the demerits of this method.
7. Explain different activities in Plant Breeding.
8. Briefly describe the procedure of mutation breeding .
9. Explain about different mechanisms of drought resistance.
10. Write down steps for identifying suitable clone and hybridisation of the same.
11. Classify mutation on different basis of classification.
12. What is mutagen and Classify elaborately about physical and chemical mutagen.
13. Explain Regarding polyploidy Breeding with suitable examples.
14. Draw a schematic diagram of pedigree method. Briefly explain its merits and demerits.
15. Explain in details about the steps involved in RAPD.