

**TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE AND
COMMERCE, BARAMATI, DIST – PUNE- 413 102**

P. G. Research Centre, Department of Botany

Question Bank : M.Sc. I, Semester- I

Paper BOT-4103: Genetics and Plant Breeding

Question 1 (2 marks):

1. Write the difference between Qualitative and quantitative traits?
2. State the Hardy-Weinberg law.
3. Explain the Mendel's law of Independent assortment
4. Mention the role of Polyploidy in Plant breeding
5. What is mutation?
6. What is crossing over?
7. Enlist the types of mutation.
8. What is mutagenesis?
9. Draw a neat labelled diagram of structure of chromosome
10. What is karyotype?
11. Enlist types of chromosome banding.
12. What is deletion?
13. What is inversion?
14. What is chromosomal translocation?
15. What is cytoplasmic Inheritance.
16. Write a definition of plant breeding
17. What is Hybridization?
18. Enlist any two examples of chemical mutagen.
19. Give any two examples of physical mutagen.
20. Write the examples of self-pollinated crops.
21. Write the examples of cross-pollinated crops.
22. Define Genetics.
23. What is trisomy?
24. What are quantitative traits?
25. What is probability?

Question 2 (4 marks):

1. Give an account of genetic markers.
2. Comment on Chi-square test.
3. Explain epistasis.
4. Write a short note on duplication?
5. Write a note on law of dominance with suitable example.
6. What are the causes of mutation?
7. Comment on marker assisted selection
8. Explain Law of segregation
9. Write a note on generalized transduction
10. Comment on Conjugation in bacteria
11. Give an account of transduction in bacteria.
12. Explain complementary gene interaction with suitable example
13. Explain lytic cycle in bacteria
14. What is Maternal effect in inheritance (*Limnaea peregra*)
15. Comment on Cob length in *Zea mays*
16. Write a short note on Homologous recombination
17. Write a short on Genetic markers
18. Explain Chromosome banding
19. What is Robertsonian translocation?
20. Write a note on genomic imprinting.
21. Give any example of Genetic disorder.
22. Comment on Pollination control mechanism.
23. Write in short on Plant genetic erosion.
24. What is Hybridization? add its role in crop improvement?
25. Comment on Pollination control mechanism.
26. Plastid inheritance in *Mirabilis Jalapa*.
27. Cytoplasmic Male Sterility in maize.
28. Comment on Nuclear Cytoplasmic interaction

Question 3 and 4 (6 Marks)

1. Write a mechanism of tetrad analysis in *yeast*
2. Comment on homologous and non-homologous recombination
3. Discuss the factor affecting on gene and genotypic frequency
4. Write a note on linkage and crossing over

5. What is mutation? Explain the types of mutation.
6. Comment on Interaction of genes
7. Explain cytoplasmic inheritance with mitochondrial genome
8. Explain cytoplasmic inheritance with chloroplast genome
9. Discuss on inheritance of chloroplast gene in *Zea mays*.
10. Write a note on chromosomal theory of inheritance
11. How male sterility occurs in plants? Explain with suitable example
12. Write about methods of mapping the bacteriophage genome
13. Explain Lytic and lysogenic cycles in phages
14. Explain in brief about bacterial conjugation
15. What is transformation? Write on its mechanism
16. Give brief account on transduction
17. Explain mutagenesis with its types.
18. Write a note on Structural alternations in chromosomes
19. Write a note on Numerical alternations in chromosomes
20. What is Euploidy? Give its types.
21. What is Aneuploidy? Give its types.
22. Comment on types of translocation in chromosomes
23. Write a note on principles of plant breeding and its applications
24. Write brief on induction of mutation in crop plants
25. What is pedigree analysis? Explain its role with suitable example
26. What are the methods of selection of cross-pollinated crops?
27. Explain the methods of selection of Asexually propagated crops
28. Write in brief on induction of polyploidy in crop plants

Question 5: (12 Marks)

1. Describe inheritance of mitochondrial genes in yeast. Add a note on mitochondrial genome.
2. Enlist different physical and chemical mutagens. Describe the action of mechanism of any two physical and chemical mutagens.
3. What is deletion? Explain types, cytology and genetic effect
4. What is karyotype? Add a note on preparation of chromosomes for karyotype. Comment on role of karyotype in plant species identification.
5. What are linkage maps? Explain LOD score for linkage testing. Add a note on 3 point test cross.