

Your Roll No.

Department of Botany
School of Chemical & Life Sciences
Jamia Hamdard, New Delhi 110062

M.Sc. Botany
Semester II Examination - May 2024
MBO-CC201: Genetics and Cytogenetics

Time: 2½ hrs.

Maximum Marks: 60

Note: Answer **ALL** questions as directed.

CLO 1: explain the principles and extension of Mendelian inheritance and various concepts of genes (understand /evaluate);
CLO 2: recognize the molecular mechanisms of linkage, crossing over, recombination, extra-chromosomal and polygenic inheritance (understand);
CLO 3: estimate the importance of polyploidy in plants(evaluate); and
CLO 4: understand the role of mutations in plants for the betterment (understand/apply).
BTL:1-Remember; 2-Understand; 3-Apply; 4-Analyse; 5-Evaluate; 6-Create

CLO: Course Learning Outcome
BTL: Bloom's Taxonomy Level

Q.No.	Question	CLO	BTL	Marks
1.	Write short notes on the following			10 x 1.5 = 15 M
a.	Linkage mapping	2	2	1.5
b.	Contribution of Muller, Sturtevant, and Morgan	1	2	1.5
c.	Metastasis	4	2	1.5
d.	Synaptonemal complex	2	3	1.5
e.	Copia elements	4	2	1.5
f.	Old world cotton	3	2	1.5
g.	<i>BRCA1</i> gene	4	1	1.5
h.	5 Bromouracil	4	1	1.5
i.	Pseudoallele	1	1	1.5
j.	Law of segregation	1	1	1.5

Please turn over

Q.No.	Question	CLO	BTL	Marks																		
2.	Female <i>Drosophilla</i> heterozygous for ebony (e^+/e), scarlet (st^+/st) and spineless (ss^+/ss) were test crossed, the following progenies were obtained: <table><thead><tr><th>Phenotype</th><th>Number</th></tr></thead><tbody><tr><td>Wild type</td><td>67</td></tr><tr><td>Ebony</td><td>08</td></tr><tr><td>Ebony, scarlet</td><td>68</td></tr><tr><td>Ebony, spineless</td><td>347</td></tr><tr><td>Ebony, scarlet, spineless</td><td>78</td></tr><tr><td>Scarlet</td><td>368</td></tr><tr><td>Scarlet, spineless</td><td>10</td></tr><tr><td>Spineless</td><td>54</td></tr></tbody></table> Are these genes linked? Justify your answer, ii) What are the orders of these genes? iii) What are the map distances iv) Measure the coefficient of coincidence, v) Is it positive or negative interference? Give your comment. OR What is sex linked character? List a few X and X-Y linked characters. How do these sex-linked characters differ from the sex-influenced traits?	Phenotype	Number	Wild type	67	Ebony	08	Ebony, scarlet	68	Ebony, spineless	347	Ebony, scarlet, spineless	78	Scarlet	368	Scarlet, spineless	10	Spineless	54	2	5	(2+2+4+4+3 = 15)
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3.	Describe briefly the principle of quantitative genetics. How is this different from qualitative genetics? Discuss broad sense and narrow sense heritability. OR Discuss different factors' role in determining sex. Describe the importance of Y chromosome in mammalian sex determination.	1	3	10																		
4.	Describe various types of allopolyploids. Discuss schematically the evolution of hexaploid wheat plant. Summarize the importance of allopolyploids in crop improvement. OR What is autopolyploid? Discuss various autopolyploids with examples. Describe the origin, meiotic behaviour and role of autopolyploids in developing crops.	3	2	10																		
5.	Define karyotype. Outline various types of structural aberrations in plants. Citing examples correlate structural alterations with cancers. OR Comment upon any four of the following: a) Translocation ring b) Tautomerism c) C-Onc d) Tumour suppressor genes e) Thymine-thymine dimers.	4	2	10																		

