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5858

Your Roll No

B.Sc. (Hons.)/I

J

MICROBIOLOGY – Paper IV

(Concepts of Genetics)

(Admissions of 2004 and onwards)

Time 3 Hours

Maximum Marks 60

*(Write your Roll No on the top immediately
on receipt of this question paper)*

*Attempt five questions in all
Question No 1 is compulsory
All questions carry equal marks*

1 Define the following terms (any 12) –

Penetrance, lethal gene, Cistron, Isoallele, Pedigree,
Autotetraploidy, Back mutation, Holandric genes,
tandem repeats, Centromere, Gynandromorph,
Nucleosome, Epistasis (1×12=12)

2 Differentiate between the following (any four) –

(i) Broad sense and Narrow sense heritability

(ii) Nonsense and Missense mutation

P T O

- (iii) Dominant and Recessive Epistasis
- (iv) Test cross and back cross
- (v) Pleiotropy and Multiple alleles (3×4=12)
- 3 (i) Write the contribution(s) of the following scientists (**any 3**) –
- (a) Beadle and Tatum
- (b) Stern
- (c) Wilhem Johannsen
- (d) Beadle & Tatum (1×3=3)
- (ii) Explain Genomic Imprinting (3)
- (iii) Give the salient features of mitochondrial genome (4)
- (iv) What is karyotyping? (2)
- 4 (i) How does meiosis reduces the chromosome number in the gametes to half the number present in the body cells of an organism? (3)
- (ii) Comment on rRNA gene organisation (3)
- (iii) Why *Neurospora* is used as a model organism in genetic studies? (3)
- (iv) How do humans compensate for difference in number of X chromosomes in two sexes? (3)

5 Write short notes on (any four)

(i) SINES

(ii) Telomere

(iii) Tetrad analysis

(iv) Mutagenic effect of 5-Bromouracil

(v) Genic balance theory (3×4=12)

6 (i) A cross between an F1 female heterozygous for the sex linked genes vermilion (v), cut (ct), garnet (g) and their wild type produced the following F2 when back crossed to a v, ct, g male

	Phenotype	Number
1	Vermilion, cut, garnet	1015
2	Wild type	1370
3	Cut	249
4	Vermilion, garnet	254
5	Garnet	185
6	Vermilion, cut	159
7	Cut, garnet	8
8	Vermilion	9
	Total	3249

- (a) Construct a linkage map showing the correct order of the three genes
- (b) Estimate the distances between the three genes (6)
- (ii) What is Hardy-Weinberg Law and write the assumptions on which it is based? (3)
- (iii) Write the genotype of the following -
- (a) Turner Syndrome
- (b) Cri du chat Syndrome
- (c) Down Syndrome (1×3=3)