MASTER OF SCIENCE (MICROBIOLOGY) (CBCS - 2018 COURSE)
M.Sc. (Microbiology) Sem-II :SUMMER- 2022
SUBJECT : QUANTITATIVE BIOLOGY

Day : Tuesday
Date : 19-07-2022

S-18592-2022

Time : 03:00 PM-06:00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of statistical table and non-programmable **CALCULATOR** is allowed
4) Assume suitable data if necessary.

Q.1 Enlist various gene interactions that produce new phenotype. Explain in detail epistasis with suitable example. **(15)**

OR

What is Analysis of variance test? In a project for class, 15 sunflower seeds were randomly assigned to and planted in pots whose soil had been subjected to one of three fertilizer treatments. Twelve of the seeds germinated and the table below shows the height of each plant (in cm) two weeks after germination. Are there significant differences in height among the treatments?

Treatment 1	Treatment 2	Treatment 3
23	26	25
27	28	26
32	33	33
34	35	38

Q.2 a) Measurement of serum cholesterol (mg/ 100ml) and arterial calcium deposition (mg/ 100 g dry weight of tissue) were made on twelve animals. Is there any correlation between serum cholesterol and arterial calcium deposition? **(08)**

Calcium (x)	59	52	42	59	24	24	40	32	63	57	36	24
Cholesterol(y)	298	303	233	287	236	245	265	233	286	290	264	239

b) State Mendel's principles of segregation and explain in brief how test cross is used to confirm the correctness of the results. **(07)**

Q.3 Attempt **any THREE** of the following. **(15)**

a) Write Hardy Weinberg's principals and its use in study of population genetics.
b) Explain effect of multiple gene in ABO blood grouping.
c) Briefly explain how evolution takes place as a two-step process.
d) The traffic police recorded an average of 3 accidents per week. The number of accidents are distributed according to Poisson distribution. Calculate the probability of exactly 2 accidents per week.
e) In an orchard of 2000 trees, a record was made on the number of shaded and unshaded trees and in each of these classes the frequency of high and low yielding trees was noted. The results are as follows:

	Shaded	Unshaded
High yielding	700	410
Low yielding	500	390

Q.4 Write short notes on **any THREE** of the following **(15)**

a) Statistics in bioassay
b) Co- dominance
c) Arithmetic
d) Lethal genes
e) Standard error

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