

Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :3

P1509

[5127] - 12

M.Sc. -I

MICROBIOLOGY

MB-502: Quantitative Biology

(2008 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Draw neat-labeled diagrams wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of statistical tables and scientific calculator is allowed.*
- 6) *Assume suitable data if necessary.*

Q1) Attempt any two of the following:

[16]

- a) Calculate the variance, standard deviation and the coefficient of variation of the following series data:

Yeast Biomass Yield/liter of medium = 17.0, 19.1, 20.0, 20.7, 21.2, 22.7, 22.7, 23.1, 25.2, 26.6.
- b) Describe the population models in biology?
- c) Explain in detail Non parametric test.

Q2) Attempt any two of the following:

[16]

- a) The result of IQ test are given below. Find out whether there is any change in IQ after the training programme.

Candidate	1	2	3	4	5	6	7
IQ before training	112	120	116	125	131	132	129
IQ after training	120	124	118	129	136	136	125

P.T.O.

- b) Explain the concept of stochastic model.
- c) The following data relate to the expenditure of the family per month. Represent data by pie diagram.

Items of Expend.	Food	Rent	Clothing	Education	Transport	Miscellaneous
Amount in Rs.	4000	1500	1000	1000	1200	1300

Q3) Attempt any two of the following: **[16]**

- a) Explain in detail survey design.
- b) Calculate the probability of following:

What is the probability of getting a joker and ace from a pack of 54 cards?

A person is known to hit the target in 4 out of 5 shots. Whereas another person is known to hit the target in 3 out of 4 shots. Find the probability of the target being hit at all when they both try.

- c) A new drug candidate was administered to 450 persons out of a total 800 persons in a locality where epidemic was prevalent to test its efficacy against malaria. The results are given below in the table. Find out effectiveness of drug against disease.

	Infection	No infection
Drug	200	300
No Drug	250	50

Q4) Write short notes on any four of the following: **[16]**

- a) Computer application in Systematics.
- b) Kurtosis.
- c) Distribution of Sample means.
- d) Factorial design.
- e) Normal Distribution.

Q5) Attempt any one of the following:

[16]

- a) Following is the data of Mean soil temperature and germination interval for wheat at 10 places are recorded below. Calculate the correlation and regression coefficient (b). Comment on your results.

Mean soil temp.	38	42	45	42	44	40	46	44	43	40
No. of days	21	29	27	27	19	18	19	31	29	33

- b) The three unidentified yeast strains were grown in liquid medium at three different incubation temperatures. The wet biomass yield per liter is given below in table. Test whether wet biomass yield depends on strain type and incubation temperature using two factor analysis.

	Yeast strain type		
Incubation Temperature (°C)	A	B	C
20	6	6	7
30	5	5	8
40	5	4	6

EEE