Microbiology (P.G.)
[CBCS]
M.Sc. Second Semester End Examination-2024
(Regular & Supplementary Paper)
PAPER-MCB-203
[Biomathematics and Bioinformatics]

Full Marks: 40   *Time: 02 Hrs*

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as
far as practicable
Illustrate the answers wherever necessary

Group A
[Biomathematics]

1. **Answer any two questions of the following:**   2x2= 4

a. What are meant by Population and Sample?

b. Find the value of mode from the series: 2,2,2,2,4,5,6,6,6,7,8,10

c. What is Pie diagram?

d. Calculate the mean if Median is 54 and Mode is 62.

2. **Answer any two questions of the following:**   2x4= 8

a. What are 'Skewness' and 'Kurtosis'?

b. During the cross of two curly-winged flies, a total of 95 progeny are formed, and among them 60 are curly and 35 are straight-winged. Through a chi-square test determine whether these numbers fit

Mendelian 3:1 ratio. (Given critical chi-square at p(0,05), df=1 is 3.84).

4

c. What is statistics? Write down the applications of statistics.(1+3)

d. Work out correlation coefficient between gill weight and body weight of ten carp fishes and test its significance at 95% confidence limit. Critical $t_{0.05(8)}=2.3$; $t_{0.05(9)}=2.26$.

Fish	1	2	3	4	5	6	7	8	9	10
Gill weight (gm)	0.15	0.11	0.19	0.30	0.13	0.20	0.25	0.28	0.16	0.22
Body weight (gm)	11.2	8.10	13.2	14.5	8.45	12.20	14.35	14	11.26	9.6

3. Answer any one question of the following: **1x8=8**

a. State the properties of normal distribution. Draw a normal curve showing area under the curve. Elaborate the types of correlation.

2+2+4

b. Determine the mean, standard deviation and variance of the following distribution of height (cm) of human: 3+3+2

Class	156-160	161-165	166-170	171-175	176-180
Frequency	5	13	26	11	5

Contd....

Group B
[Bioinformatics]

1. Answer any two questions of the following: **2x2= 4**

a. Write down the features of Biological Database.   2

b. Define Flat files.   2

c. Define Pharmacogenomics. Mention the benefits of pharmacogenomics.   (1+1)

d. What is phylogram? Currently what data is used to build phylogenetic tree?   (1+1)

2. Answer any two questions of the following: **2x4= 8**

a. Write a short note on (any one) (i) Gen Bank, (ii) Local Alignment.   4

b. What is E value? What are different types of biological database?   1+3

c. Write down the importance of bioinformatics in biological fields.   4

d. Definer genetic algorithm. Write down the features of algorithm.   (2+2)

3. Answer any one question of the following: **1x8=8**

a. Mention the name of two-sequence submission tool in NCBI? How can you identify a FASTA sequence format? What are the steps involved in BLAST alignment?   2+2+4

b. Mention the characteristics of phylogenetic tree? What is the basis of sequence alignment? What are the algorithms used for Multiple Sequence Algorithm? Give example of one metabolic pathway database and one-gene expression database.   3+2+2+1

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