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(20321) Roll N

M.Sc. (Biotech.)-I Sem.

NP-3332

M.Sc. (Biotechnology)

Examination, Dec.-2020

Statistical Methods and Bioinformatics in Biology

(H-103)

[M.Sc. (Bio-Tech.)]

Time : Three Hours] *[Maximum Marks : 50*

Note : Attempt questions from **all** sections as per instructions.

Section-A

(Very Short Answer Questions)

Note : Attempt all the **five** questions. Each question carries 2 marks. Very short answer is required not exceeding 75 words. 2×5=10

1. Explain Cumulative frequency curves.

P.T.O.

2. Define Mode and how it is calculated.
3. Define paired t-test.
4. Explain randomization in Design of experiment.
5. Write the scope of Bioinformatics in molecular biology.

Section-B

(Short Answer Questions)

Note : Attempt any **two** questions out of the following **three** questions. Each question carries 5 marks. Short answer is required not exceeding 200 words. 5×2=10

6. Define the following terms :
   (i) Mean deviation
   (ii) Standard deviation
7. Describe "Randomized Block Design".
8. Explain molecular sequence alignments.

Section-C

(Detailed Answer Questions)

Note : Attempt any **three** questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. 10×3=30

9. (a) Find the mean deviation about median from the following data :

size of the items :	4	6	8	10	12	14	16
frequency :	2	4	5	3	2	1	4

(b) Calculate the standard deviation of the following marks obtained by 5 students in a test :

Marks obtained : 8, 12, 13, 15, 22

10. (a) Outline the steps in the BLAST Algorithm. What are the limitations for MULTIPLE SEQUENCE ALIGNMENT.

(b) When might you use FASTA align?

11. The frequency distribution of the digits 0, 1, 2, — —, 9 in a set of random numbers was to be :

Digit :	0	1	2	3	4	5	6	7	8	9
Frequency :	18	19	23	21	16	25	22	20	21	15

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Test the hypothesis that the digits are equally distributed in a set of random numbers.

[Given that $\chi^2_9(0.05) = 16.92$]

12. (a) Explain the complete statistical analysis of "Completely Randomized Block Design".

(b) Complete the following ANOVA Table

Source of variation	d.f.	S.S.	M.S.S.	Fcal
Treatment	?	48	?	?
Error	15	?	?	
Total	17	84		

13. Write short notes on any **four** of the following :

(a) Histogram

(b) Coefficient of variation

(c) Large sample test

(d) Replication

(e) NCBI

(f) Applications of Bioinformatics

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