



Register Number:
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ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27.
MSc MICROBIOLOGY - III SEMESTER
SEMESTER EXAMINATION- NOVEMBER 2020
MB - 9418 BIOSTATISTICS AND BIOINFORMATICS

Time: 2 ½ hrs

Max marks: 70

Answer section A and section B in two separate answer booklets

SECTION A - BIOSTATISTICS

I. Answer any Five of the following

5x2=10

1. Describe the difference between dependent and independent variables
2. The following are the probabilities of finding each of two types of bacteria in hospital beds in any sampling exercise: A – 0.2, & B – 0.4. What is the probability of finding any one of them during the same sampling exercise?
3. Explain why a linear curve is better suitable graph to represent bacterial growth pattern as observed by optical density, in a culture.
4. Give an example of a hypothetical research case and specify at least one confounding variable.
5. Why inter-quartile range is better in some cases than range?
6. Give one example set of 3 numbers for any two of the following: mode, median, mean
7. State two measures each of central tendency and dispersion in a dataset

II. Answer any Two of the following

2x5= 10

8. How is an independent/unpaired t-test different from a paired t-test?
9. What is the significance of P-values in biostatistical tests? Explain
10. List sampling methods, and write a note on each

III. Answer any One of the following

1 x10=10

11. Write and explain the formula for standard deviation. Give at least one example of a test where standard deviation assessment is an important component when assessing the significance of difference between two means.
12. Describe the difference between parametric and non-parametric tests. Also give an example of two commonly used tests for each type, and explain the logic of any one test.

IV. Answer the following

1x5=5

13. A correlation coefficient of 0.8 is considered to be significant. Explain why.

SECTION B - BIOINFORMATICS

I. Answer any Five of the following

5x2=10

1. Write a brief note on Entrez gene database.
2. Briefly write the advantages of next generation sequencing over traditional sequencing.
3. Write a note on the different features of HPRD database.
4. What are the differences between TrEMBL and SwissProt databases.
5. Write a note on the difference between a phylogram and cladogram.
6. Explain the 3 important components of Gene Ontology database with examples.
7. Write the importance of 16s-ribosomal DNA in microbial research.

II. Answer any Two of the following

2x5= 10

8. Differentiate between pairwise and multiple sequence alignment.
9. Differentiate between RefSeq and GenBank databases.
10. Write a note on different BLAST programs along with their specific applications.

III. Answer any One of the following

1x10=10

11. Describe the importance of protein-protein interactions in research and discuss various features of STRING database.
12. What are various applications of NGS? Write a note on the Illumina next generation sequencing platform.

IV. Answer the following

1x5=5

13. Write a note on the applications of metagenomics in microbial research.