



Register Number:

DATE:

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27.  
M.Sc MICROBIOLOGY - III SEMESTER  
SEMESTER EXAMINATION- OCTOBER 2019  
MB - 9418 BIostatISTICS AND BIOinformatics**

**Time: 2 1/2 hrs**

**Max Marks: 70**

**Answer section A and B in separate answer booklets**

*This question paper has ----2----printed pages and 4 parts each*

**SECTION A - BIostatISTICS**

**I. Answer any FIVE of the following**

**5x2=10**

1. Explain why using median is more useful, rather than mean, in certain cases.
2. Why is inter-quartile range better than range in some cases?
3. Give an example of a hypothetical research case and specify the dependent and independent variable.
4. What is a confounding variable?
5. What is the difference between a parametric test and a non-parametric test?
6. Write the formula for standard deviation.
7. Probability of finding an yeast colony in a sample testing exercise is 0.3, while that for a non-pathogenic bacterial colony is 0.3. For this exercise, what is the probability of finding an yeast or a non-pathogenic bacterial colony?

**II. Answer any TWO of the following**

**2x5= 10**

8. Describe 3 types of central tendency measures with one example each.
9. Describe the null hypothesis and the significance of P-value threshold (<0.05).
10. How is a one-tailed t-test different from a two-tailed t-test?

**III. Answer any ONE of the following**

**1 x10=10**

11. Write and explain any t-test formula with a hypothetical case study.
12. Write and explain any chi-square test formula with a hypothetical case study.

**IV. Answer the following**

**1x5=5**

13. What is a correlation coefficient? Explain in any microbiological experimental context.

## **SECTION B - BIOINFORMATICS**

### **I. Answer any FIVE of the following**

**5x2=10**

1. Differentiate between phylogram and cladogram.
2. Differentiate between TrEMBL and SwissProt databases.
3. Write a note on the different query features of PubMed.
4. How is next generation sequencing better than traditional sequencing?
5. Briefly write a note on the features of Entrez gene database.
6. Why 16s-ribosomal DNA is important in microbial research?
7. What are the 3 important components of Gene Ontology database?

### **II. Answer any TWO of the following**

**2x5= 10**

8. Differentiate between various features of PubMed and Google Scholar.
9. List different types of BLAST programs along with their specific applications.
10. What are the differences between RefSeq and GenBank databases?

### **III. Answer any ONE of the following**

**1 x10=10**

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

### **IV. Answer the following**

**1x5=5**

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