**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27**
**B. Sc (Statistics)– VI SEMESTER**
**SEMESTER EXAMINATION: APRIL 2023**
(Examination conducted in May 2023)
**ST 6118 – APPLIED STATISTICS**
**(For current batch students only)**

Time: 2½ Hours                                                         Max Marks: 70
**This paper contains TWO printed pages and THREE parts**

## PART – A

I.   **Answer any __FIVE__ of the following**                          **3 X 5 = 15**

1. Explain the difference between regression and correlation.

2. Estimate regression coefficients using least square estimates in the model $Y = X\beta + \epsilon$.

3. Explain the difference between seasonal and cyclic component in time series data.

4. Briefly explain the estimation method to estimate National Income using income method.

5. Explain the difference between Observational and Cross-sectional studies.

6. Explain Monte Carlo method. Discuss its advantages and disadvantages.

7. How can simulation be applied in the field of business and various industries?

## PART – B

II.   **Answer any __FIVE__ of the following**                          **7 X 5 = 35**

8. A) List out all the assumptions of multiple linear regression.
   B) What is QQ plot? Why do we use it?                               (5+2)

9. What is heteroscedasticity? Explain Spearman's rank correlation test and one remedial measure to overcome heteroscedasticity.

10. What is Trend? Explain any one method to estimate Trend in time series.

11. What is income equality? Explain in detail about the measures used to measure Income Inequality.

12. Discuss the role of Bayes' theorem in medical diagnosis and the use of ROC curves to evaluate the accuracy of diagnostic tests.

13. Using inverse transformation method to generate random observation from Exponential distributions and provide simple illustrations for the same.

14. A) Give the algorithm to generate random number from Normal distribution.

    B) What are true random numbers? How do you generate it?                    (3+4)


## PART – C

**III.    Answer any <u>TWO</u> of the following                    10 X 2 = 20**

15. A) Explain forward selection and backward elimination in regression analysis.

    B) Explain the steps involved in construction of seasonal indices by ratio to moving averages.                    (5+5)


16. A) Explain the test for significance of individual regression coefficients and testing significance of overall regression model.

    B) Write a note on coefficient of determination.                    (7+3)


17. A) What are clinical trials? Explain the phases in clinical trials.

    B) Write the full form of: MOSPI and NSSO.                    (8+2)


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