Register Number:

DATE:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27

M.Sc. STATISTICS - IV SEMESTER

SEMESTER EXAMINATION - JULY 2022

ST 0320 – BIOSTATISTICS

Time: 2½ Hours **Max Marks: 70**

This question paper has **ONE** printed page and **TWO** sections

SECTION – A

I Answer any SIX of the following: 3 x 6 = 18

1. Discuss standard life table.
2. Explain actuarial method to estimate the survival function.
3. Compute Kaplan-Meier estimator for the following data using redistribution to the right algorithm: 6, 8, 13+, 18, 23, 28+, 31, 33+, 34, 45+.
4. Write about IFR and DFR family of distributions.
5. Define Sensitivity, Specificity and efficacy.
6. Define Intensity function.
7. State hardy Weinberg principle of equilibrium.
8. How does mutations affect equilibrium?

SECTION B

II Answer any FOUR of the following: 13 x 4 = 52

9. Describe the parametric analysis of survival data. Derive the survival function and estimate the parameters for exponential distribution. (13)

10. A) Obtain maximum likelihood estimator of the parameters for an exponential distribution under type-II censoring.
    B) Briefly outline Wald's test and Rao's score test. (9+4)

11. A) Explain the significance of Odds ratio in 2x2 tables. Sate the relation between Sensitivity and specificity.
    B) Describe random censoring with an example.
    C) Define Bivariate normal dependent risk model. (4+4+5)

12. A) Write a brief note on types of clinical study.
    B) Explain general epidemic process. (8+5)

13. A) Describe Competing Risk model. Distinguish between independent and dependent risk.
    B) For the log linear model in the exponential regression, derive modified minimum χ^2 method for the estimation of the regression parameters. (6+7)

14. A) Write a brief note on
    i. Principle of natural selection.
    ii. Mendel's law
    B) Explain the approach to equilibrium for X-linked genes. (8+5)