D4AST2003 **(2 Pages)** **Name.....**
Reg.No.....

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2022
(Regular-2020 Admission)

STATISTICS
FMST4E15: LIFE TIME DATA ANALYSIS

Time: 3 Hours **Maximum Weightage: 30**

Part A: Answer any *four* questions. Each carries *two* weightage.

1. Write a short note on Life distributions. Explain with an example.
2. What do you mean by truncation? How is it different from censoring?
3. Discuss the role of probability plots and hazard plots in diagnostic checking.
4. Explain the Kalpan Meier estimator and mention its important properties. Also write the greenwood formula for the variance of the estimate.
5. What are threshold parameters?
6. What are the graphical methods to identify accelerated failure time regression models?
7. Define the behaviour of hazard rate for Weibull distribution.

(4 × 2 = 8 weightage)

Part B: Answer any *four* questions. Each carries *three* weightage.

8. Explain type I censoring. Derive likelihood function based on random sample of size n.
9. What is mean residual life function? Obtain its relationship with survival function.
10. Show that the product limit estimate as a non parametric MLE of the survival function.
11. Develop a test for comparing two exponential models.
12. Explain log rank test.
13. What are the approaches to regression model for life times? Explain.
14. What is life table? Explain its importance in survival analysis.

(4 × 3 = 12 weightage)

(P.T.O.)

Part C: Answer any *two* questions. Each carries *five* weightage.

15. Explain different types of censoring of observations commonly used in survival analysis, giving suitable illustrative examples.

16. For the data on remission times (in days) given below obtain Kaplan-Meier estimator of survival function S(t) at t=1, 10, 29 and 60.

    1, 1, 2, 4, 4, 6, 6, 6, 7, 8, 9, 9, 10, 12, 13, 14, 18, 19, 24*, 26, 29, 31*, 42, 45*, 50*, 57, 60, 71*, 83*, 91.(Here * denote the censored observations).

17. Explain the likelihood based inference procedures for Weibull distribution. Also find the exact confidence interval in Type II censoring scheme.

18. Discuss in detail Cox's proportional hazard model.

(2 × 5 = 10 weightage)