21P418 (Pages: 2) Name: ……..…………....

Reg. No: …………………..

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2023

(CBCSS-PG)

(Regular/Supplementary/Improvement)

CC19P MST4 E08 – RELIABILITY MODELING

(Statistics)

(2019 Admission onwards)

Time: Three Hours   Maximum: 30 Weightage

PART A

Answer any *four* questions. Each question carries 2 weightage.

1. Define reliability of a system in terms of reliability of components. Give two examples.

2. Explain reliability growth models.

3. Define minimal path and cut sets. Give examples to each.

4. State and prove lack of memory property of exponential distribution.

5. What are the conditions for coherency of a system? Give an example of a coherent system.

6. Define NBU (NWU) and NBUE(NWUE) properties.

7. Defne failure rate function and explain the failure rate behavior of Gamma distribution.

(4 × 2 = 8 Weightage)

PART B

Answer any *four* questions. Each question carries 3 weightage.

8. Prove that $IFR \rightarrow IFRA \rightarrow NBU \rightarrow NBUE$

9. Show that reliability function is increasing in component reliability.

10. Prove that the DFR class of distributions preserves the property under the formation of mixtures.

11. Define structural and reliability importance of components. In a series and parallel systems, which component is more important?

12. Define availability and limiting availability.

13. What is accelerated life testing? Write short note about any two accelerated life tests models?

14. Briefly explain bivariate exponential distribution. Discuss the properties.

(4 × 3 = 12 Weightage)

PART C

Answer any *two* questions. Each question carries 5 weightage

15. Explain the inclusion and exclusion method for finding bounds on system reliability.

16. Explain the testing of Homogeneous Poisson Process (HPP) vs Non-Homogeneous Poisson Process (NHPP).

17. Discuss univariate Poisson shock model. Under what condition the model is IFRA. Explain?

18. What is type I and type II censoring. Explain the non-parametric estimation of censored grouped and ungrouped data.

(2 × 5 = 10 Weightage)

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