20P440 (Pages: 2) Name: ………………….…...

Reg. No……………………..

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2022

(CBCSS-PG)

(Regular/Supplementary/Improvement)

CC19P MST4 E08 - RELIABILITY MODELING

(Statistics - Elective Course)

(2019 Admission onwards)

Time: Three Hours   Maximum: 30 Weightage

Part A

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

1. Define coherent system.

2. What is structure function of k out of n system?

3. How can we identify IFRA distribution?

4. Define NBU and NBUE distribution.

5. What is compressed time test?

6. Define bathtub shaped failure rate model.

7. Obtain the failure rate function of Weibull distribution.

(4 × 2 = 8 Weightage)

Part B

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

8. If $\varphi(x_1, \ldots, x_n)$ be the structure function of a coherent system of n components. Find the corresponding reliability bounds using minimal path and cut sets.

9. Discuss the shape of reliability function $h(P)$, where $P=(p_1,\ldots,p_n)$.

10. If F_1 and F_2 are DFR distributions, show that their mixture is also DFR distribution.

11. Explain the lack of memory property of Bivariate exponential distribution. What is the sufficient condition for the property?

12. Discus the preservation of NBUE property.

13. Define structural and reliability importance of components. Discuss the importance in series and parallel system.

14. Define IFR and DFR distributions. What is bathtub shaped failure rate model?

(4 × 3 = 12 Weightage)

Part C

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

15. Prove that the reliability function has S-shape.

16. What are different accelerated life testing procedures? Explain each.

17. Show that IFR property of life distributions are preserved under formation of Convolution.

18. Establish the relationship between reliability and failure rate function. How can we identify failure rate distribution while the distribution is not absolutely continuous?

(2 × 5 = 10 Weightage)

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