1604N175   Candidate's Seat No :_____

M.Sc Semester-2 Examination
407
Statistics

Time : 2-30 Hours]   April-2024   [Max. Marks : 70

RELIABILITY AND LIFE TESTING

Q-1 (A): Establish the relationship between hazard rate and pdf for a continuous variable. **[07]**

Q-1 (B): Prove the independence of variables on the basis of iid exponential variates with parameter λ. **[07]**

=OR=

Q-1 (A): What is exponential lifetime model? What is memoryless property? State and prove its converse for the exponential lifetime model. **[07]**

Q-1 (B): Show that exponential life time model follows poisson distribution with parameters $n\lambda t$. **[07]**

Q-2 (A): Explain the phenomenon of censoring in the field of reliability and life testing. **[07]**

Q-2 (B): Explain Type II Censoring Scheme without replacement in detail. **[07]**

=OR=

Q-2 (A): Explain Rayleigh Life Time Model using Type II Censoring Scheme without replacement. **[07]**

Q-2 (B): Explain weibull life time model considering type I censoring. **[07]**

Q-3 (A): Explain two parameter exponential life time model considering type II censoring without replacement. **[07]**

Q-3 (B): Explain geometric life time model considering type I censoring. **[07]**

=OR=

Q-3 (A): Explain sample size determination with minimum cost under type-II censoring with replacement. **[07]**

Q-3 (B): Explain hazard rate estimation for weibull life time model using Sinha and Fu method. **[07]**

Q-4 (A): Explain in detail series system in reliability. [07]

Q-4 (B): Explain in detail parallel system in reliability. [07]

=OR=

Q-4 (A): Write a detailed note on redundancy and describe in detail reliability of 'k' out of 'n' system. [07]

Q-4 (B): Explain stand-by system with both the switching methods. [07]

Q-5: ANSWER IN SHORT: [ANY 7] [14]

1. Explain the term Lifetime with suitable example.
2. Define Hazard Function and Hazard Rate.
3. Define Initial Failure Rate. Give examples.
4. Define Wear Out Failure Rate. Give examples.
5. Define Instantaneous Failure Rate. Give examples.
6. In which distribution, hazard rate is constant? In which distribution, hazard rate increases with time?
7. In which distribution with discrete nature, hazard rate is parameter itself?
8. Define Redundancy. Give suitable example.
9. Define Perfect Switching. Give suitable example.
10. Define Imperfect Switching. Give suitable example.
11. What is fully redundant, partially redundant and non redundant system?
12. Explain the term Reliability with suitable example.

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