Indian Statistical Institute, Bangalore
M.S. (QMS) First Year
Second Semester - Reliability, Maintainability and Safety-II

Final Exam

Time: 3 hours   Date: 02/05/2024   Maximum Marks: 50

1. The failure times in continuous operating hours for a system are as follows: 2, 14, 92, 252, 277, 284, 374, 440, 444, 475, 536, 568,744, 884, 904, 1017, 1288, 1337 and 1338. Plot the ROCOF and comment about the reliability of the system.

[10]

2. Obtain the maintainability function for normal distribution.

[10]

3. A component has a strength which is normally distributed with a mean of 4000N and a standard deviation of 200N. The load it has to withstand is also normally distributed with a mean of 2500N and a standard deviation of 200N. What is the Reliability per load application?

[5]

4. Assume a constant stress (3 stress levels) accelerated life testing model under Type II censoring scenario.
   a) Write down the likelihood function (take the necessary assumptions of number of units failed and censored).
   b) Find the corresponding score vector and profile likelihood function (if possible).

[5 + 5 = 10]

5. A mechanical system's mean time to repair is two hours. What is the probability that a repair will be completed in 3 hours, if the time to repair is exponentially distributed.

[5]

6. Write short notes on the following
   a) Power model is accelerated life testing
   b) Duane's plot
   c) Homogeneous Poisson Process and its properties
   d) Different types of warranty schemes

[4 x 4 = 16]