

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

Time: 3 hours

Date: 04/05/2018

Maximum Marks: 50

This paper carries 55 marks. You can answer as many questions as possible, but the maximum score will be limited to 50.

1. (a) Define ROCOF.

(b) The failure time in continuous operating hours of a machine is as follows:

4, 252, 277, 284, 374, 440, 475, 536, 568, 744, 884, 904, 1017, 1288, 1337, 1351, 1393, 1412.

Prepare a plot of average ROCOF against time and offer comments about the process.

(4 + 9 = 13)

2. A new component is to be designed. A stress analysis revealed that the component is subjected to a tensile stress. But there are variations in the load and the tensile stress normally distributed with a mean of 30,000 psi and a standard deviation of 4,000 psi. A strength analysis of the component showed that the mean value of the significant strength is 40,000 psi. The variations introduced by various strength factors are not clear at present. The engineer wants to know the maximum value of the standard deviation for the strength that will insure that the component Reliability does not drop below 0.95.

(10)

3. (a) Explain non-homogeneous poisson process (NHPP)

(b) A mechanical system's MTTR is 1.6 hours. What is the probability that a repair will be completed in 3 hours, if the time to repair is exponentially distributed.

(6 + 6 = 12)

4. Write short note on the following

- (a) Accelerated life testing
- (b) Availability
- (c) Stress – Strength Models
- (d) Different types of warranty schemes
- (e) Repairable system cost models

(5 x 4 = 20)