

Code: 9A10702

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2017

RELIABILITY ENGINEERING

(Common to E.Con.E & EIE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Discuss about the probabilities of combining events.
(b) There are four boxes A, B, C, D in which there are fuses. The percentages of defective fuses in each box are given in below table. Find the probability that the picked fuse is good.

Box number	No. of fuses	% of defective fuses
A	2000	5
B	500	10
C	1000	8
D	1000	9

- 2 Distinguish between unit and component redundancies and hence, derive the general expression for symbolic reliability with necessary examples.
- 3 (a) Explain what is meant by bath tub curve.
(b) Given the probability failure density function of a random variable
$$f(t) = \frac{0.01}{(0.01+1)^2} \text{ for } t \geq 0$$
$$= 0 \text{ else where}$$
Find the reliability of the component for a mission time of 20 hrs.
- 4 Discuss about various methods of evaluation of limiting state probabilities.
- 5 (a) Derive the expression for time dependent probabilities of the component repairable model deriving necessary expressions.
(b) Distinguish between proactive and reactive maintenance and explain.
- 6 (a) Describe about the differences between maintainability and maintenance.
(b) Discuss about the concept of total productive maintenance (TPM).
- 7 (a) What is the significance of maintainability? Also explain design considerations for maintainability.
(b) Discuss the concepts of life testing.
- 8 (a) Explain the causes of failure and reliability.
(b) Define product knowledge and also explain the importance of product knowledge.
