

M. Tech.**RELIABILITY OF ELECTRONICS AND COMMUNICATION SYSTEMS****SUBJECT CODE : EC - 512 (Elective - I)****Paper ID : [E0571]**

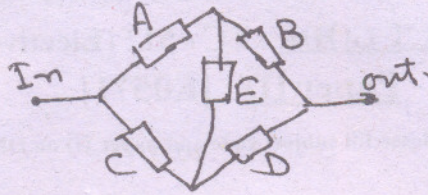
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Time : 03 Hours**Maximum Marks : 100****Instruction to Candidates:**

- 1) Attempt any **Five** questions.
- 2) All questions carry equal marks.

- Q1)** (a) Distinguish between the following :
- (i) Failure Rate and Hazard Rate.
 - (ii) MTTF and MTBF.
 - (iii) Reliability and Maintainability.
- (b) Establish a relationship between hazard rate and reliability. A system has a linearly increasing hazard rate $z(t) = a + bt$. Obtain its reliability function.
- Q2)** (a) Discuss the importance of normal and weibull distribution in the field of reliability engineering.
- (b) The random variation with respect to time in the output voltage of an electrical system are exponentially distributed with a mean value of 200V. What is the probability that the output voltage at any time will lie in the range of 180 to 200V.
- Q3)** (a) Give a concept of maintainability. How the inventory control of spares effect the maintainability of the system.
- (b) Explain Diagnostic instruments.
- (c) List out the factors to be provided in the design of a system to achieve optimum maintainability.

- Q4)** (a) What is meant by redundancy? Differentiate clearly between component redundancy and the system redundancy.
- (b) Compute the reliability of a system consisting of components A, B, C, D, E having reliabilities 0.9; 0.7; 0.5; 0.8 and 0.8 respectively and arranged as in the diagram.



- Q5)** (a) Compare active and passive redundancy.
- (b) Explain role of standby units with perfect and imperfect switching.
- (c) An air craft land on two engines though it has four. If each engine has a reliability of 0.95, find the probability of successful landing.
- Q6)** (a) Define Availability, Intrinsic availability, Inherent availability; equipment availability and operational availability.
- (b) A component has $MTBF = 300$ Hrs and $MTTR = 15$ hrs. with both the failure and repair distribution exponential. What is the availability at 10 Hrs, for first 10 hr and at steady state.
- Q7)** (a) Give any Non-destructive test for life testing of an equipment.
- (b) What is process of measurement and prediction of human reliability.
- (c) What is structure of value engineering. Give any one technique for value engineering.
- Q8)** Write short notes on any two :
- (a) Bays Decomposition method of reliability evaluation.
- (b) Reliability and Safety.
- (c) Monte-Carlo method.

