

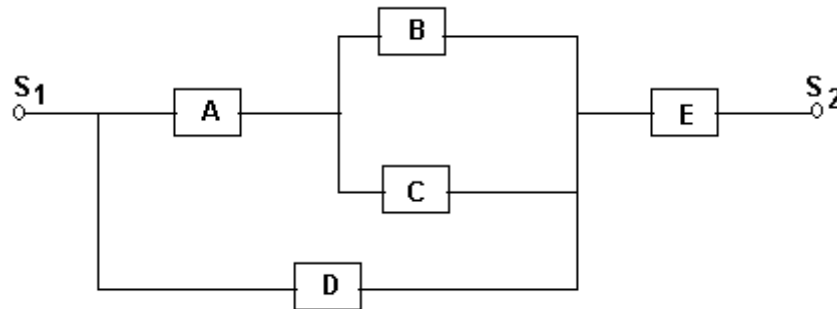
IV B.Tech I Semester Supplementary Examinations, April/May 2005
RELIABILITY & SAFETY ENGINEERING
(Electronics & Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Define the term 'Reliability'. Discuss what parameters are to be defined in order to evaluate the reliability of a system.
 (b) Give a brief account of 'Cost Benefit Analysis' on reliability.
2. (a) An electric power system has 10 generating units each with a capacity of 30MW and probability of failure of 0.05. Calculate the probability of the system failing to supply a steady load of 200 MW.
 (b) A switch board receives on the average 60 calls per hour. If the operator is away for 30 seconds, what is the probability of receiving at least one call in the period.
3. Derive the relation between the reliability function (R_t) and the mean time to failure (MTTF) of any component.
 b) Estimate the reliability of the system represented by the network shown below, given $R_A = 0.9$, $R_B = 0.8$, $R_D = 0.8$, $R_E = 0.9$.



4. (a) Enumerate the various functions of the maintenance system in an industry.
 (b) Describe the basic activities in prevention maintenance and discuss its advantages.
5. (a) State the conditions to be specified for conducting a demonstration test.
 (b) The light bulbs are placed under line test. The test is terminated at $t_o = 850$ hours. Eight components fail before 850 hours are elapsed. Estimate the failure rate and MTTF for the following situations.
 - i. Components are replaced as they fail
 - ii. Components are not replaced when they fail.

6. (a) Define the term 'Terotechnology'. What is the object of terotechnology in operation and maintenance of plants?
(b) Discuss how designers can make use of different aspects of terotechnology for the improvement of the life cycle of a product.
7. (a) Discuss the various factors that affect the human failure rate in a particular operation.
(b) Explain the process of human reliability analysis.
8. Write short notes on the following:
 - (a) Mutually exclusive events and statistically independent events.
 - (b) Statistical distributions for the random variable t , the time to failure.
 - (c) Presentation and correction maintenance.
