JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations, April 2011
RELIABILITY ENGINEERING
(CONTROL SYSTEMS)
**Time: 3hours**   **Max. Marks: 60**
Answer any five questions
All questions carry equal marks
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1.a) Define Reliability and explain the various terms used in it.
  b) Differentiate between continuous and discrete random variable with examples.[12]

2.a) Explain probability density function and probability distribution function.
  b) In a certain manufacturing process, one percent of the products are known to be
     defective. If 50 items are purchased by a customer, what is the probability of his
     getting two or less number of defective? Use the Binomial distribution and Poisson
     distribution and compare the answers.   [12]

3.a) Derive an expression for reliability in terms of hazard function.
  b) A component has a reliability of 0.9 for a mission time of 50 hrs. What is the
     reliability for a mission time of 100 hrs.   [12]

4.a) Derive symbolic expression for reliability of series systems and parallel system.
  b) The reliability network of a system is shown in the figure. The figure marked
     indicate the reliabilities of the components. Calculate the reliability of the system by
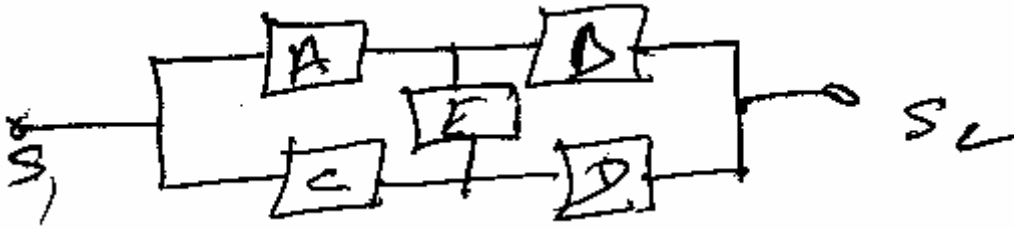   network reduction.
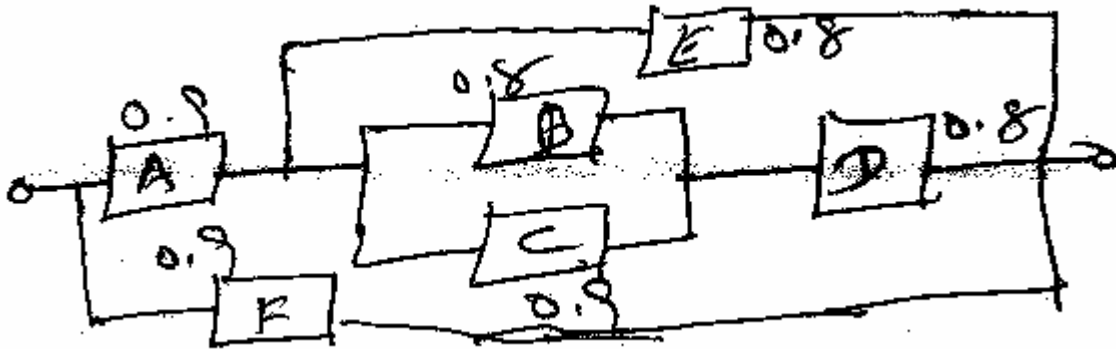
                                                                            [12]
5.a) What is a minimal cut-set?
  b) Calculate the reliability of the network shown in the figure. Using minimal cut-sets.
                                                                            [12]

6.a) Explain two state Markov process for a single component with repair and also get the steady state probabilities.

b) Obtain the expressions for steady state probabilities of a two component system with dependent failures. The dependent is of the form that no component can fail while the other is down.

7. Calculate the probability, arrival rate and departure rate for the state after merging (2) and (3) for the given state space diagram

8. Write short notes on:
   a) Bath-tub curve
   b) Conditional probability method.

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