R09

Code No: C0702

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations March/April-2011
RELIABILITY ENGINEERING
(ELECTRICAL POWER SYSTEMS)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

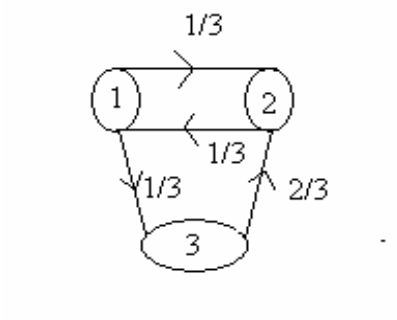
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1. a) Define the term Reliability and explain the key terms used in the definition.
   b) Explain with examples the different types of random variables. [12]

2. a) Derive expression for mean and standard deviation of Binomial distribution.
   b) Under what condition Binomial distribution can be approximated to Poisson distribution. [12]

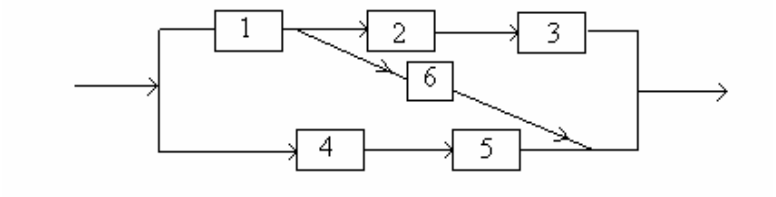
3. Derive expressions for reliability, failure rate, failure density and MTTF of a two unit system connected in (a) Series b) Parallel . The failure rate of each unit may be assumed as τ . Draw the relevant graphs. [12]

4. Markor model for a reliability test list is given below. Evaluate.
   a) Time dependent probability after three time internals.
   b) If state 3 is absorbing state No. of times it spent in each state. [12]



5. A mission oriented system consists of 3 non-identical, non – repairable components, two of which must operate for system success. If the failure rates are 0.01, 0.05 and $0.1f/10^6 hr$, Construct the stochastic transitional Probability matrix and hence evaluate the MTTF of the system. [12]

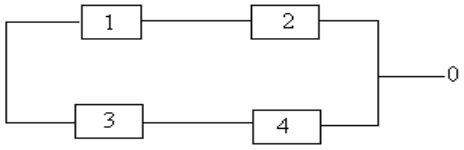
6. Using tie set technique obtain the reliability of the following system if reliability of the following system if reliability of each component is 0.82. Also derive the equation used.



[12]

Cont…2

7. Calculate the reliability of the system shown in the following fig. for a 1200 hrs mission.



$\tau_1 = 5x10^{-4}\ f/hr$

$\tau_2 = 1x10^{-5}\ f/hr$

$\tau_3 = 6x10^{-5}\ f/hr$

$\tau_4 = 5x10^{-6}\ f/hr$ [12]

8. Write short notes on
   a) Weibull distribution
   b) MTTF, MTTR
   c) Conditional Probability approach [12]

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