

Code No: C0702

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I Semester Examinations March/April-2011

RELIABILITY ENGINEERING
(ELECTRICAL POWER SYSTEMS)

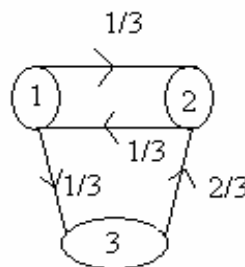
Time: 3hours

Max.Marks:60

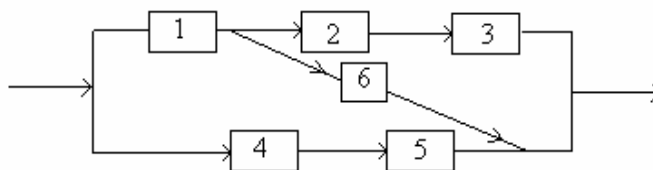
Answer any five questions
All questions carry equal marks

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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. Markov 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.

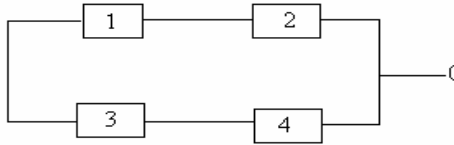


[12]

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



$$\tau_1 = 5 \times 10^{-4} \text{ f / hr}$$

$$\tau_2 = 1 \times 10^{-5} \text{ f / hr}$$

$$\tau_3 = 6 \times 10^{-5} \text{ f / hr}$$

$$\tau_4 = 5 \times 10^{-6} \text{ f / hr}$$

[12]

8. Write short notes on
- Weibull distribution
 - MTTF, MTTR
 - Conditional Probability approach

[12]

FIRSTRANKER