

Code : R7410208

R07

IV B.Tech I Semester (R07) Supplementary Examinations, May 2012

RELIABILITY ENGINEERING & APPLICATION TO POWER SYSTEMS

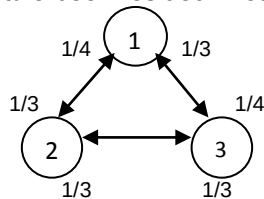
(Electrical & Electronics Engineering)

Time: 3 hours

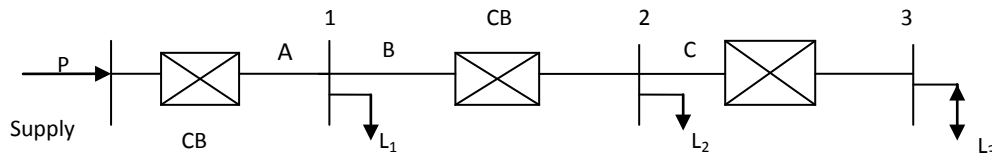
Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

1. Explain the rules for combining probabilities of the events with suitable examples.
2. (a) Explain about series and parallel systems for network reliability/unreliability evaluation.
(b) Classify the various types of redundant configuration and explain.
3. (a) Explain what is meant by bath tub curve.
(b) Prove that $R(t) = e^{-\lambda t}$ where λ is failure rate defining various functions involved in it.
4. In the following state space diagrams the transitional rates are shown. Obtain the limiting state probabilities of the states. If now state '2' is treated as absorbing state, determine how much of time the component would have been resided in other states before reaching the absorbing state.



5. Explain how equivalent transitional rates, cumulative probabilities and cumulative frequency of a system can be evaluated if the identical units are combined.
6. Consider that there are three generating units of capacities 25MW, 25 MW and 50 MW respectively. Each unit has a failure rate of 0.02f/day and a repair rate of 0.48 r/day.
(a) Using sequential additions method, determine the capacity outage cumulative probability table.
(b) Compare the above with Bernoulli's principle.
(c) Compute capacity outage cumulative probability table if the 50MW unit is to be removed.
7. Explain the weather effects on transmission systems using necessary expressions.
8. Consider a three load point radial distribution system shown in figure.



Component data of the system is as follows:

Line Id.	λ f/yr.	R in hrs.	No.of customers (N_{Li})	Average load demand in KW	Load point Id.
A	0.2	6	200	1000	L1
B	0.1	5	150	700	L2
C	0.15	8	100	400	L3

Evaluate:

- (a) Load point reliability indices.
- (b) Various customer oriented load and energy oriented indices of the system.
