

Duration: 3 Hours

Total Marks: 80

Note: 1. Q. 1 is compulsory.

2. Solve any 3 questions out of remaining questions.

3. Assume suitable data if necessary.

Q1) Solve any four [20]

- What is MTTF and Failure rate?
- What do you mean by bath tub curve in reliability studies?
- The reliability of a component is 0.8. How many such component is connected in parallel to achieve an overall reliability of at least 0.85?
- Explain Weather Load Model
- Explain loss of load probability & loss of load expectation in short

Q2) [20]

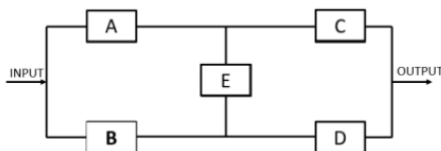
- What is Impact of high renewable energy penetration on stability and reliability of power system?
- Explain Peak load forecasting

Q3) [20]

- Derive the general expression for reliability in terms of Hazard rate.
- Define following System and load point indices
 - Expected load curtailed
 - Expected number of load curtailments
 - Expected energy not supplied
 - Expected duration of load curtailment.

Q4) [20]

- Explain customer-oriented indices and load and energy-oriented indices.
- Evaluate a general expression for system success and the reliability of the system if each component has reliability of 0.99.



Q5) [20]

- Consider a system containing five units of 40MW each with FOR=0.03. Prepare the capacity outage table for the system. Find Loss of Load Expectation and risk factor if the annual peak load is 180 MW and base load is 40% of peak load.
- Explain the concept of rate of departure. Derive the expression for state frequency in terms of state probability and rate of departure.

Q6) [20]

- Differentiate in Short, Medium and Long Term Planning
- A generating system has one generator of 25 MW and 2 generators of 50 MW with FOR 0.02. Prepare Capacity Outage Table for the same.