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]

a. What is MTTF and Failure rate?
b. What do you mean by bath tub curve in reliability studies?
c. 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?
d. Explain Weather Load Model
e. Explain loss of load probability & loss of load expectation in short

Q2) [20]

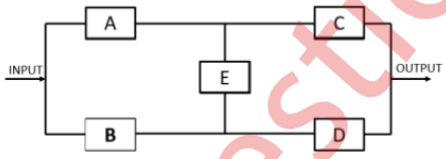
a. What is Impact of high renewable energy penetration on stability and reliability of power system?
b. Explain Peak load forecasting

Q3) [20]

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

Q4) [20]

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



Q5) [20]

a. 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 if 40% of peak load.
b. Explain the concept of rate of departure. Derive the expression for state frequency in terms of state probability and rate of departure.

Q6) [20]

a. Differentiate in Short, Medium and Long Term Planning
b. 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.
