60

BE S EM VIII (choice based) Summer 2022

Time: 3 Hours

Total Marks : 80

10/5/26

ELEC

NOTE: 1. Question No.1 is compulsory.
2. Attempt any three questions out of remaining five questions.
3. Assume necessary data wherever necessary.

1. Solve any Four. [20]

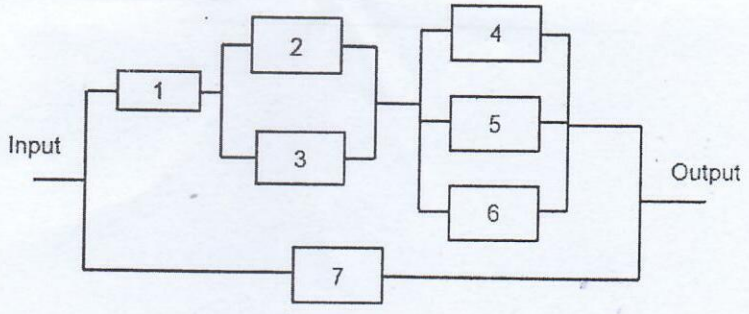
a. State the classification and characteristics of electrical loads.
b. Describe the bathtub curve with its three regions.
c. A series system has identical components each having a reliability of 0.998. what is the maximum number of components that can be allowed if minimum system reliability is to be 0.90.
d. Define Loss of Load Expectation (LOLE), Loss of Energy Expectation (LOEE) and energy index reliability (EIR).
e. Define Average service availability index (ASAI) and Average service unviability index (ASUI).

2. [20]

a. Discuss short-term planning and explain the tasks performed in the planning process.
b. Discuss the weather-sensitive load model and its importance in load forecasting.

3. [20]

a. Describe the two-state Markov model and derive the expressions for availability and unavailability.
b. For the given figure find the system reliability. If the reliability of each component is 0.8



4. [20]

a. The system data shown in following table

Unit no.	Capacity (MW)	Failure rate(f/day)	Repair rate(r/day)
1	25	0.01	0.49
2	25	0.01	0.49
3	50	0.01	0.49

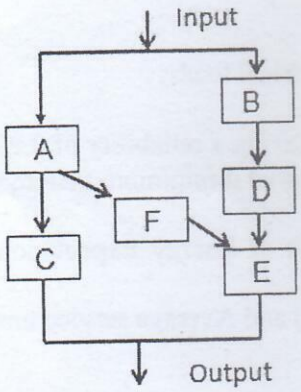
Calculate cumulative probability for the above system using recursive algorithm

b. A system consists of 5 units of 40 MW with forced outage rates 0.01. Find out loss of load probability table and risk factor. For the given system 160 MW is the peak load and base load is 40% of peak load.

5. [20]

a. Explain data requirement for Composite generation and transmission systems reliability evaluation.

b. Calculate reliability of the system using conditional probability approach with each component reliability 0.99.



6. [20]

a. What is Impact of high renewable energy penetration on stability and reliability of power system?

b. Explain Customer-orientated and energy-load indices in distribution planning and reliability