CBCS SCHEME

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18EPS322

Third Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Power System Reliability

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the need for Power system reliability evaluation. **(10 Marks)**

b. Explain the concept of
   i) Adequacy
   ii) Security with respect to lower system reliability. **(10 Marks)**

OR

2 a. Discuss the relevant flow diagram and expressions a four state model for planning studies. **(07 Marks)**

b. Explain the term "ANNUAL LOLE". Discuss with relevant diagram how modified capacity model can be obtained during scheduled outages. **(07 Marks)**

c. Explain how load forecast uncertainity can be included in risk computations, using probability distribution method. **(06 Marks)**

Module-2

3 a. Explain simulation model of "Monte Carlo Simulation Technique". **(10 Marks)**

b. Describe the individual state load model in obtaining system risk indices in reliability engineering. **(10 Marks)**

OR

4 a. Explain the effect of tie capacity and tie-line reliability in interconnected systems. **(10 Marks)**

b. Discuss the concept and evaluation technique of probability array method in two interconnected systems. **(10 Marks)**

Module-3

5 a. Explain interruption costs for residential users. **(10 Marks)**

b. List the interruption cost factors of commercial establishment. Explain in detail cost of interruptions. **(10 Marks)**

OR

6 a. What are random variables? List them. **(10 Marks)**

b. Explain the interruption costs for Industrial users. **(10 Marks)**

Module-4

7 a. What are stations originated outages? Elaborate. **(10 Marks)**

b. Explain the concept of dependency in power system. **(10 Marks)**

OR

8 a. A typical distribution system has six load point bus bars. The number of customers and average load connected to these bus bars are shown in Table (1). Assume that four system failures occur in one given calendar year of Interest, having the interruption effects shown in Table (2). Evaluate the system performance indices I, e [customer and load oriented indices].
i) SAIFI ii) CAIFI iii) ASAI iv) SAIDI v) AENS

Load Point	Number of Customers	Average Load Connected kW
1	1000	5000
2	800	3600
3	600	2800
4	800	3400
5	500	2400
6	300	1800

Table (1)

INTERRUPTION CASE	Load Point Effected	N_C	L_C (kW)	d hrs
1	2	800	3600	3
-	3	600	1800	3
2	6	300	1800	2
3	3	600	2800	1
4	5	500	2400	1.5
-	6	300	1800	1.5

Table (2)

Where N_C = Number of Customers disconnected
L_C = Load Curtailed
d = duration of INTERRUPTION **(10 Marks)**

b. Write a short notes on:
i) INTERRUPTION Energy Assessment rate
ii) Reliability Assessment. **(10 Marks)**

Module-5

9 a. Discuss the evaluation techniques of scheduled maintenance for
i) Second order failure event
ii) Third order failure event. **(10 Marks)**

b. Develop and explain the state space diagram for a dual transformer feeder system shown in figure below Fig.Q.9(b).

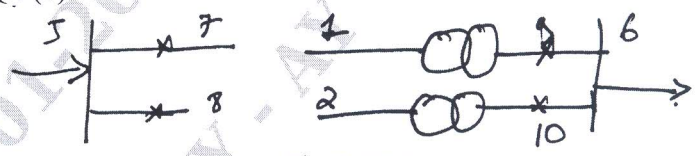

Fig.Q.9(b) **(10 Marks)**

OR

10 a. With the help of sequence diagram, describe the active and passive failures. **(10 Marks)**

b. Enumerate the operating and failure states of system components for
i) Normally Closed Breakers
ii) Normally open Breakers. **(10 Marks)**

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