Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electrical Engg.) (Sem.–6)
POWER SYSTEM RELIABILITY
Subject Code : BTEE-604B-18
M.Code : 79319
Date of Examination : 14-07-22

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

    a) Draw the schematic structure of power system for ultra high voltage system.

    b) Draw the structure of generation expansion planning optimization of power system?

    c) Define the multi-state systems in power system reliability.

    d) Define the two basic components of reliability calculation of substation schemes.

    e) Define the capacity outage.

    f) What is bulk power system?

    g) Define the role of discrete convolution in reliability modelling of electric power systems.

    h) What is state space in reliability analysis?

    i) Define the synchronous and asynchronous timing.

    j) What do you mean by analysis of risk in power system, give one example?

SECTION-B

2. Develop and discuss the reliability model of transmission line.

3. Explain the different types of indices used to evaluate the reliability level of any system or plant in power system.

4. What is the approach to establishing a proper reliability criterion for generation expension planning? Explain its different stages.

5. Explain the purpose of optimal reserve management for power generation systems.

6. Consider a system of two components. Each component can assume two statuses: failure or success. A failure of either component will cause a system to fail. Each component has a failure rate of $\lambda 1 = \lambda 2 = 0.1$ per year and a repair rate of $\mu l = \mu 2 = 10$ per year. In a rare occasion, both components at success state will fail at the same time: assume the common mode failure rate of $\lambda c = 0.01$ per year. Draw the state-transition diagram of the system and identify failure states. Find frequency of failure of the system. What the are equivalent failure and repair rate of the system?

SECTION-C

7. Explain the different methods of Monte Carlo simulation for reliability modelling and evaluation in power system.

8. Develop an analytical model for calculating reliability Indices for substations based on transformers overloading.

9. Write short notes on the following :

   a) Unit commitment and operating constraints

   b) Discrete convolution of generation and load models

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.