

Reg. No. :

Question Paper Code : 11214

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Elective

Power Systems Engineering

PS 4006 — POWER SYSTEM RELIABILITY

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the two main aspects for deciding reliability in power system.
2. What are the main advantages of computing reliability cost?
3. Mention any two points that are not indicated by the loss of load expectation.
4. How can the Energy Index of Reliability be obtained?
5. List out the parameters of generating capacity
6. What do you mean by derated states in generation model?
7. How can the data be classified in deterministic and stochastic data collection?
8. What is dependent and independent outages?
9. What is the importance of load and energy oriented indices?
10. Why probability distribution of reliability indices computation is required?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail the functions of system security for power system reliability.

Or

- (b) Discuss in detail about the functional zones and hierarchical levels of assessment in power system reliability.

12. (a) Elaborate the following in detail
- (i) Generation Shift Sensitivity Factors (7)
 - (ii) Scheduled Outages (6)

Or

- (b) Discuss in detail the use of capacity outage probability tables. What do you mean by equivalent forced outage rate and highlight its importance.

13. (a) Discuss in detail about the state transition diagram of a three unit system and explain how reduced generation model be obtained based capacity, probability and frequency of their states.

Or

- (b) Elaborate in detail about the use of system risk indices and discuss in detail about the cumulative state load model.

14. (a) Discuss in detail on the conditional probability approach for the reliability evaluation in radial and meshed networks.

Or

- (b) Highlight in detail the various data requirements for the reliability evaluation of composite systems.

15. (a) Discuss in detail about the Customer oriented, Load and Energy oriented Interruption Indices and what are its impacts in the power system reliability.

Or

- (b) Narrate the impacts of transferring loads and transfer restrictions in distribution systems.

PART C — (1 × 15 = 15 marks)

16. (a) Why and how Linear Sensitivity Factors are calculated when the power system operating condition changes.

Or

- (b) Elaborate the effects of lateral distributor protection, disconnects and protection failure in distribution systems.