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Question Paper Code : 70568

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Seventh Semester

Electrical and Electronics Engineering

EE 8702 – POWER SYSTEM OPERATION AND CONTROL

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the regional load despatch centres in India.

2. Mention the conditions for connecting two generators in parallel.

3. List the objectives of LFC.

4. What is a tie line?

5. How does the STATCOM regulate voltage in a power system?

6. Which type of appliances require AVR?

7. Give some examples of constraints in the unit commitment problem.

8. What is the difference between the base point and participation factor?

9. Mention some of the power system parameters which can be considered as states in the power system state estimation problem?

10. Why the measurements are weighted in state estimation problems?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the functions of various terms of load forecasting.

Or

(b) Elaborately discuss the requirements of a good power system.

12. (a) Systematically develop the model of a single-area power system.

Or

(b) Explain with a neat schematic diagram the integration of economic dispatch control with load frequency control.

13. (a) What is an AVR? Draw and explain the block diagram representation of the AVR loop.

Or

(b) Draw and explain the significant features of VI characteristics of SVC and STATCOM.

14. (a) Draw and explain the input-output curve and incremental cost curve of a thermal power plant.

Or

(b) Explain the solution to the Unit commitment problem using a priority list method with a simple flowchart. Also, discuss its merits and demerits.

15. (a) With a neat schematic diagram explain the functions of SCADA and EMS in power systems.

Or

(b) Explain the power system state estimation with a neat schematic diagram.

PART C — (1 × 15 = 15 marks)

16. (a) Perform the dynamic analysis of the LFC of a two-area system with a neat block diagram representation.

Or

(b) Consider two units of a plant that have fuel costs of

$$f_1 = \frac{0.8}{2}P_1^2 + 10P_1 + 25 \text{ Rs/h and } f_2 = \frac{0.7}{2}P_2^2 + 6P_2 + 20 \text{ Rs/h}$$

If these two units together supply a total of 220 MW, compute the economic operating settings.
