Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 51019

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Sixth Semester

Electrical and Electronics Engineering

EE 3602 – POWER SYSTEM OPERATION AND CONTROL

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you mean by load shedding?

2. Define load curve.

3. Mention two conditions for proper synchronizing of alternators.

4. State the principle of tie-line bias control.

5. Give the different types of reactive power compensation.

6. Differentiate between on-load and off-load tap changing.

7. Write down the various constraints of modern power system.

8. Compare short term and long term hydro scheduling.

9. What are the tasks of energy control centre?

10. List out the basic functions of EMS.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the necessity of voltage and frequency regulation in power system.

Or

(b) What is load forecasting? Also discuss about the computational methods available for it.

12. (a) List out the components of speed governor system of an alternator. Derive its transfer function with the help of block diagram.

Or

(b) Discuss in detail about the dynamic response of two-area system and deduce its system variables.

13. (a) Draw the block diagram of AVR loop and explain it. Also explain about the static analysis of AVR loop.

Or

(b) Explain the principle of operation of STATCOM and draw its V–I characteristics. Also explain about its role in power system operation and control.

14. (a) Discuss about the base point and participation factor method for economic dispatch problem.

Or

(b) Write down the necessary algorithm and explain with neat flow chart for finding the solution for unit commitment problem using forward Dynamic programming method.

15. (a) With neat block diagram explain about the SCADA's functional aspect. Also mention its application for power system monitoring and control.

Or

(b) Explain with neat diagram how the system states are continuously monitored and controlled in power systems.

PART C — (1 × 15 = 15 marks)

16. (a) A power system has a maximum demand of 25,000 kW, load factor of 60%, plant capacity factor of 50% and a plant use factor of 72%. Find (i) Daily energy produced (ii) Reserve capacity of the plant (iii) Maximum energy that could be produced daily if the plant operating in accordance with operating schedule, is fully loaded when in operation.

Or

(b) The fuel cost of two units are given by

$F_1 = F_1 (PG_1) = 1.5 + 20PG_1 + 0.1PG_1^2$ Rs./h

$F_2 = F_2(PG_2) = 1.9 + 30PG_2 + 0.1PG_2^2$ Rs./h

If the total demand on the generator is 200 MW. Find the economic load scheduling of the two units.

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