

(DEE 412)

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Final Year)

ELECTRICALS & ELECTRONICS ENGINEERING

Paper - II : Power Systems operation and Control

Time : 3 Hours

Maximum Marks : 75

Answer question No.1 compulsory

(15)

Answer ONE question from each unit

(4 × 15 = 60)

- 1) a) Define Heat Rate Curve.
- b) Define incremental efficiency.
- c) Define constraints.
- d) Write condition for optimality.
- e) Draw Fuel Cost Curve.
- f) Write the expression for the total transmission losses in terms of real power generation when $n = 2$.
- g) Define penalty factor.
- h) Define dynamic response.
- i) Define control area.
- j) Define Reactive Power.
- k) Write purpose of shunt capacitor.
- l) Write purpose of STATCOM.
- m) Write importance of energy control centre.

- n) Write about power system control center dispatcher activity.
- o) Write about dispatch training simulator.

UNIT - I

- 2) a) Describe the need of economic dispatch.
- b) A constant load of 400 MW is supplied by two 210 - MW generators 1 and 2 for which the fuel cost characteristics are given as below :

$$C_1 = 0.05 P_{G1}^2 + 20P_{G1} + 30.0 \text{Rs/hr}$$

$$C_2 = 0.06 P_{G2}^2 + 15P_{G2} + 40.0 \text{Rs/hr}$$

The real power generations of units P_{G1} and P_{G2} are in MW. Determine the most economical load sharing between the generators.

OR

- 3) a) What are B-coefficients? Derive them?
- b) Obtain the condition for optimum operation of a power system with n plants when losses are considered.

UNIT - II

- 4) a) Develop LFC block diagram of an isolated power system.
- b) Write importance of keeping voltage and frequency constant in a power system.

OR

- 5) a) Develop block diagram of Speed Governing System and explain its components.
- b) A 125 MVA turbo-alternator operator on full load operates at 50Hz. A load of 50 MW is suddenly reduced on the machine. The steam valves to the turbine commence to close after 0.5s due to the time lag in the governor system. Assuming the inertia to be constant H-6kW-S per KVA of generator capacity. Calculate the change in frequency that occurs in this time.

UNIT - III

- 6) a) Explain role of excitation system?
- b) Draw the block diagram of AVR and explain its components.

OR

- 7) a) Explain series compensation?
b) Write short notes.
i) STATCOM
ii) Thyristor switched capacitors

UNIT - IV

- 8) a) Explain Evolution of power system control technology.
b) Write system engineering aspects of power system operation?

OR

- 9) a) Explain about typical energy control center functions.
b) Write difference between energy control centre and power system control centre.

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