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Seventh Semester B.E. Degree Examination, June/July 2023
Reactive Power Control in Electrical Power Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Mention the objectives in load compensation. Explain in brief. (10 Marks)
b. Explain the characteristics of an ideal compensator. (10 Marks)

OR

- 2 a. With the help of phasor diagrams, explain the concept of power factor correction. (10 Marks)
b. With an equivalent circuit and phasor representation, explain voltage regulation improvement. (10 Marks)

Module-2

- 3 a. Explain the uncompensated transmission line with the help of fundamental transmission line equation, with the help of lumped element representation of a long transmission line. (10 Marks)
b. Explain the fundamental requirements of AC power transmission. (10 Marks)

OR

- 4 a. Mention the advantages and disadvantages of the compensating equipments for transmission line. (10 Marks)
b. Explain the voltage and current profile of uncompensated line on open circuit and under load. Briefly explain the effect of line length, load power and power factor on voltage and reactive power. (10 Marks)

Module-3

- 5 a. Explain the control of open circuit voltage with shunt reactors. (10 Marks)
b. Mention the objectives of series compensation. Write its practical limitations. (10 Marks)

OR

- 6 a. With a neat circuit and phasor diagram, explain the concept of symmetrical line with mid-point series capacitor and shunt reactor. (10 Marks)
b. Explain the power transfer characteristics and maximum transmissible power with necessary equations. (10 Marks)

Module-4

- 7 a. What are static compensators? Mention the practical applications of it in electrical power systems. (10 Marks)
b. With necessary diagram and waveforms, summarize the operation of saturated reactor compensation. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 8 a. What is protective gear? Explain its importance in the context of series capacitor compensation of a transmission line. (10 Marks)
- b. What is synchronous condenser? Explain its operation. (10 Marks)

Module-5

- 9 a. What is meant by harmonics in electrical system? Mention the effects of harmonics on electrical equipment. (10 Marks)
- b. What is reactive power planning? Give economic justification for reactive power planning. (10 Marks)

OR

- 10 a. What is the effect of telephone interference in electrical system? How does it give rise to harmonics? (10 Marks)
- b. What are the transmission benefits of reactive power management? (10 Marks)
