

CBCS SCHEME



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17EE72

Seventh Semester B.E. Degree Examination, June/July 2023 Power System Protection

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain how the protective relays are classified list them. (06 Marks)
- b. Explain various methods of back-up protection. (06 Marks)
- c. Discuss the essential qualities of protective relay. (08 Marks)

OR

- 2 a. Define the following terms:
i) Relay ii) Pick up level iii) Reset iv) Current setting. (08 Marks)
- b. Write a short note on Auto reclosure. (04 Marks)
- c. Draw the schematic diagram of numerical relay and briefly describe the functions of its various components. (08 Marks)

Module-2

- 3 a. With a neat sketch, explain directional over current relay. (06 Marks)
- b. What is impedance relay? Explain the operating principle, torque equation and operating characteristics of impedance relay. (08 Marks)
- c. Explain the overcurrent protective scheme for ring-feeder. (06 Marks)

OR

- 4 a. Explain the working principle of reverse power or directional relay with neat diagram. (08 Marks)
- b. Distinguish between earth fault relay and over current relay. (06 Marks)
- c. Explain the different types of over current protective schemes. (06 Marks)

Module-3

- 5 a. Describe the balanced (opposed) voltage differential protection scheme. (08 Marks)
- b. What are the different types of pilots used? Discuss their field of application. (06 Marks)
- c. Explain the working of Buchholtz relay with neat diagram. (06 Marks)

OR

- 6 a. Explain the working of frame leakage protection used for Bus-zone protection. (10 Marks)
- b. Describe the circulating current principle with neat schematic diagram. (10 Marks)

Module-4

- 7 a. What are the advantages and disadvantages of SF₆ circuit breaker? (06 Marks)
- b. Explain the recovery rate theory and energy balance theory of arc interruption in a circuit breaker. (08 Marks)
- c. Explain the working vacuum circuit breaker. (06 Marks)

OR

- 8 a. Explain the terms: Restriking voltage, recovery voltage and RRRV. Derive an expression for restriking voltage and RRRV in terms of system voltage, inductance and capacitance. (10 Marks)
- b. Explain the working of air break circuit breaker with neat diagram. (10 Marks)

Module-5

- 9 a. Describe the construction, operation of HRC cartridge fuse with indicator. Write application of HRC fuse. (10 Marks)
- b. Define the following terms:
- i) Fuse
 - ii) Fuse element
 - iii) Rated element
 - iv) Minimum fusing current
 - v) Fusing factor. (10 Marks)

OR

- 10 a. What is a Gas insulated substation? Discuss the advantages and disadvantages as compared to conventional air insulated substation. (08 Marks)
- b. Write a note on Klydonograph and Magnetic link. (06 Marks)
- c. What are the causes of overvoltages in a power system? (06 Marks)
