

# CBCS SCHEME

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21EE71

## Seventh Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 High Voltage and 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. Mention the desired properties of gaseous dielectric for high voltage application. (04 Marks)
- b. Derive an expression for the current in air gap  $I = I_0 \exp(\alpha d)$  considering Townsends first ionization coefficient. (08 Marks)
- c. Explain the following mechanism in liquid dielectric:
  - (i) Suspended particle mechanism
  - (ii) Thermal mechanism(08 Marks)

OR

- 2 a. What is Paschen's law? Discuss to measure minimum voltage for breakdown under a given  $P \times d$  conditions. (10 Marks)
- b. Explain the following mechanism in solid dielectric:
  - (i) Electronic Breakdown
  - (ii) Avalanche or Streamer Breakdown(10 Marks)

### Module-2

- 3 a. With a neat sketch, explain the working of Cockcroft Walton Voltage Multiplier with waveforms. (10 Marks)
- b. With a neat sketch, explain:
  - (i) Series Resistance Microammeter
  - (ii) Resistance Potential divider for measurement of high dc voltage.(10 Marks)

OR

- 4 a. Explain in detail the components of Multistage impulse generator. (10 Marks)
- b. Explain discharge detection using straight detectors. (10 Marks)

### Module-3

- 5 a. With a neat diagram, explain zones of protection in a power system. (08 Marks)
- b. List the types of faults and its effects. (04 Marks)
- c. With a neat diagram, explain the construction and working of:
  - (i) Plunger or solenoid type relay
  - (ii) Reed Relay(08 Marks)

OR

- 6 a. Explain in detail about Primary and Backup protection. (08 Marks)
- b. With a neat sketch, explain the working of Induction Cup relay. (08 Marks)
- c. Write short notes on protection of parallel feeder. (04 Marks)

**Module-4**

- 7 a. With a neat sketch, explain the Operating Principle of impedance relay and its characteristics. (08 Marks)  
b. Explain Balanced Voltage Scheme with a neat diagram. (08 Marks)  
c. Explain in brief protection of transformer against overheating. (04 Marks)

**OR**

- 8 a. List the various type of differential relay and explain any one of them. (10 Marks)  
b. Write a short note on stator overheating protection. (10 Marks)

**Module-5**

- 9 a. Explain with a neat sketch Air-break Circuit Breaker. (10 Marks)  
b. Explain the causes of over voltages. (10 Marks)

**OR**

- 10 a. Explain in detail about direct testing and indirect testing of circuit breaker. (10 Marks)  
b. With a neat diagram, explain the construction and working of klydonograph. (10 Marks)

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