CBCS SCHEME

USN | | | | | | | | | | |

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 $I = I_o \text{Exp}(\alpha d)$ 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)**

* * * * *