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Question Paper Code : 81290

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Sixth Semester

Electrical and Electronics Engineering

EE 3601 — PROTECTION AND SWITCHGEAR

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Specify the consequences of faults on a power system.
2. Compare the essential qualities of protection: selectivity and sensitivity.
3. What do you understand by pick-up and reset value of the actuating quantity?
4. Why are attracted armature type of relays noisy and mention the measures are taken to minimize it.
5. What is a linear coupler? Where is it used?
6. Mention few protection schemes for Stator protection in generators.
7. Compare Static and Numerical relays.
8. Mention few advantages of static relays.
9. Compare DC and AC circuit breaking.
10. In what way current chopping is done?

PART B — (5 × 13 = 65 marks)

11. (a) What you understand by the primary and back-up protection. Also discuss the various methods of providing back-up protection.

Or

- (b) What you understand by the earthing and grounding. Also explain the different methods of grounding.

12. (a) With a neat sketch on Induction cup relay, explain how the force is produced in the rotor and deduce the expression for the resultant torque produced in relay.

Or

- (b) Discuss the operating principle and characteristics of Impedance relay and prove that the relay operates if impedance (Z) < constant (K).
13. (a) Suggest the various ways for protection using Potential transformers and explain the Capacitor type of PT.

Or

- (b) With a neat circuit connection diagram, explain the Percentage differential protection for Y- Δ connected transformer.
14. (a) Discuss the Phase and Amplitude comparators with a neat schematic diagram.

Or

- (b) Examine the Overcurrent relays with a neat block schematic diagram and program Flow chart.
15. (a) Discuss the recovery rate theory and energy balance theory of an arc interruption in a circuit breaker.

Or

- (b) Illustrate the SF₆ circuit breakers and discuss the operating principle and its advantages.

PART C — (1 × 15 = 15 marks)

16. (a) Draw impedance, reactance and MHO characteristics to protect the 100 per cent of the line having (2.5+j6) ohm impedance. A fault may occur at any point on the line through an arc resistance of 2 ohms. Determine the maximum percentage of line section which can be protected by each type of relay.

Or

- (b) An 11 kV, 100 MVA generator is provided with differential scheme of protection. The percentage of the generator winding to be protected against phase to ground fault is 80%. The relay is set to operate when there is 15% out of balance current. Determine the value of resistance to be placed in the neutral to ground connection.