Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40497

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Electrical and Electronics Engineering

EE 8602 — PROTECTION AND SWITCHGEAR

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare unit system and non-unit system of protection.

2. Identify the different types of faults occurring in the power system?

3. Write the torque equation of the universal relay.

4. Explain the principle of negative sequence relay.

5. List the application of the current transformer.

6. Discuss the causes of over speed and how alternators are protected from it.

7. Show the Duality between Amplitude and Phase Comparators.

8. List out the general characteristics of numerical protection.

9. List the methods of arc interruption.

10. What are the advantages of SF6 circuit breaker over Air blast circuit breaker?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the overlapping of protective zones with a neat schematic diagram.

Or

(b) Explain three-phase symmetrical faults and also about different types of unsymmetrical faults that can occur on a three-phase system.

12. (a) Describe the operating principle, constructional features and area of applications of the directional relay. How do you implement the directional feature in the overcurrent relay?

Or

(b) Show the MHO relay characteristic on the R-X diagram. Discuss the range setting of various distance relays placed on a particular location.

13. (a) Discuss the principle of differential protection of generator with necessary diagrams.

Or

(b) Describe the types of protective schemes employed for the protection of Busbar.

14. (a) Derive the characteristics equation for the phase comparator and amplitude comparator.

Or

(b) Discuss with Neat Block diagram of Numerical Distance Protection of Transmission Line.

15. (a) Describe the construction and principle of operation of air blast circuit breaker.

Or

(b) Draw the schematic diagram of SF6 circuit breaker and explain the working in detail.

PART C — (1 × 15 = 15 marks)

16. (a) The positive, negative and zero sequence reactance of a 20 MVA, 13.2 KV synchronous generator are 0.3 p.u, 0.2 p.u and 0.1 p.u, respectively. The generator is solidly grounded and is not loaded. A line to ground fault occurs on phase A, neglecting all the resistance, determine the fault current.

Or

(b) A star connected 3 phase, 12 MVA,11 KV alternator has a phase reactance of 10%. It is protected by Merz- price circulating current scheme, which operates for fault current not less than 200A. Calculate the value of earthing resistance to be provided to ensure that only 15% of the alternator winding remains unprotected.

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