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**L 1287**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Sixth Semester

Electrical and Electronics Engineering

EE 338 — PROTECTION AND SWITCHGEAR

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the need for protective gear in power system?
2. What is meant by static relay?
3. Why current transformers are required in a protective relaying scheme?
4. State the principle of operation of distance relay.
5. Mention the different methods of high resistance arc interruption.
6. Define rate of rise of restriking voltage.
7. What is meant by making capacity of a circuit breaker?
8. What are the main design problems in HVDC circuit breakers?
9. What are the causes of over voltages?
10. Draw the v-i characteristics of ZnO lightning arrester.

PART B — (5 × 16 = 80 marks)

11. (a) Describe the construction and principle of operation of an induction type directional over current relay with neat diagram. (16)

Or

- (b) Discuss the basic principle and functional blocks of a microprocessor based digital relays. (16)
12. (a) (i) Explain with a neat diagram the application of Merz-Price circulating current principle for the protection of alternator. (8)
- (ii) Describe the construction and working of Buchholz relay. (8)

Or

- (b) A star connected 3-phase, 10-MVA, 6.6-kV alternator has a per phase reactance of 10%. It is protected by Merz-Price circulating-current principle which is set to operate for fault currents not less than 175A. Calculate the value of earthing resistance to be provided in order to ensure only 10% of the alternator winding remains unprotected. (16)
13. (a) State the principle of arc extinction. What are the methods of arc extinction? Describe them in detail. (16)

Or

- (b) Explain the phenomenon of current chopping and capacitive current breaking with diagrams and wave forms. (16)
14. (a) With neat diagram, discuss the constructional details and operational features of a typical minimum oil circuit breaker. Also state its advantages and disadvantages over others. (16)

Or

- (b) Explain in detail the constructional features, principle of working, advantages and applications of SF<sub>6</sub> circuit breaker with a neat diagram. (16)

15. (a) (i) What are the different methods employed for protection of overhead transmission lines against lightning? Explain them briefly. (8)
- (ii) What is the basic principle of operation of surge diverter? Explain horn-gap diverter. (8)

Or

- (b) (i) Describe the various types of lightning stroke. (8)
- (ii) Discuss the construction and working principle of Thyrite arrester. (8)
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