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

Question Paper Code : 90526

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

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. Define positive sequence component and zero sequence component.
2. State the various types of unsymmetrical faults.
3. What are over current and under current relays?
4. Mention any two applications of differential relay.
5. What are the uses of Buchholz's relay?
6. What are the faults associated with a transformer?
7. What are the limitations of a static relay?
8. List the types of static relays.
9. Give the advantages of SF_6 circuit breaker over air blast circuit breaker.
10. Which factors the ARC phenomenon depends upon?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the Nature and Causes of Faults in a power system.

Or

(b) Explain the method of resistance and reactance grounding of the power system with neat sketch.

12. (a) Discuss in detail about various types of electromagnetic relays.

Or

(b) With neat diagram, explain the construction and operation of Non Directional over current relay.

13. (a) Write a detailed note on Motor Protection with neat sketch.

Or

(b) Explain about the following

(i) Faults occur in generator. (6)
(ii) Merz-Price protection of a generator. (7)

14. (a) Discuss about the block diagram of numerical relay with neat sketch with its advantages and limitations.

Or

(b) Describe with neat block diagram the working of transformer differential protection.

15. (a) Explain the construction, operating principles of SF_6 circuit breaker with neat diagram.

Or

(b) Explain with neat sketch the construction, operating principle of minimum oil circuit breaker with its merits and demerits.

PART C — (1 × 15 = 15 marks)

16. (a) A 6.6 kV star connected alternator has a transient reactance of 2Ω per phase and negligible winding resistance. it is protected by a circulating current Merz-Price protection. The alternator neutral is earthed through a resistance of 7.5Ω. The relays are set go operate when there is out-of-balance current of 1A in secondary of 500/5 A current transformers. How much% of winding is protected against earth fault?

Or

(b) It is given that fault current is 4000A; R_1 is set on 125%; R_2 is set on 150%; for discrimination the time grading margin between the relays in 0.6 seconds. Determine the operating time of relay 1 and time multiplier setting of relay 2 and time multiplier setting for relay R_1 is 0.3

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Plug setting Mulitplier	2	3.6	5	8	10	15	20
Time in seconds for a time multiplier of one	10	6	4	3.15	2	2	2