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Question Paper Code : P 1293

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Fifth Semester

(Regulation 2004)

Electrical and Electronics Engineering

EE 1302 — PROTECTION AND SWITCHGEAR

(Common to B.E (Part-Time) Fourth Semester EEE – Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the common protective schemes which are used for modern power system protection.
2. What is the need for calculating short circuit currents?
3. Give the block diagram for a basic static distance relay scheme.
4. Draw the characteristic of a directional impedance relay and mho relay on an R-X diagram.
5. Classify the various bus-bar faults.
6. Why the secondary of C.T should not be open?
7. State the different methods of arc-extinction.
8. Classify the oil circuit breakers.
9. List the factors affecting the Transient Recovery Voltage.
10. What is the significance of reliability tests on circuit breakers?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail the need and different types of earthing schemes. (10)
- (ii) What are the essential qualities to be met by a protection scheme? Explain. (6)

Or

- (b) (i) A 50 M VA, 11 kV three-phase alternator was subjected to different types of faults. The Fault currents are as under:
3-phase fault = 2000 A; Line-to-Line fault 2600 A; Line - to ground fault = 4200 A. The generator neutral is solidly grounded. Find the values of the three sequence reactances of the alternator. Ignore resistances. (10)
- (ii) Explain the different protection zones in a power system. (6)
12. (a) Explain with suitable examples the working principle and different types of differential relays. (16)

Or

- (b) (i) Draw and explain static instantaneous over current relay. (8)
- (ii) Explain the working of gas operated Buchholz relay used for transformer protection. State its merits and demerits. (8)
13. (a) (i) Explain the different types of faults that occur in a transformer. (8)
- (ii) Explain Buchholz relay operation. (8 + 8)

Or

- (b) Explain in detail, the various possible faults in a generator and hence suggest suitable protection scheme for each case. (16)
14. (a) (i) Explain in detail the D.C. current breaking. (8)
- (ii) Calculate the RRRV of 132 kV circuit breaker with neutral earthed. Short circuit data is as follows. Broken current is symmetrical; restriking voltage has frequency 20 kHz, power factor is 0.15. Assume the fault is also earthed. (8)

Or

- (b) (i) Explain in detail the interruption of capacitive currents. (8)
- (ii) Explain resistance Switching in circuit breakers. (8)

15. (a) Explain with neat diagrams the construction, working principle and types of air circuit breakers. (16)

Or

- (b) (i) Explain with neat diagrams the construction, working principle of SF₆ circuit breakers. (10)
- (ii) Compare the merits of SF₆ circuit breaker over air circuit breaker. (6)

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