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Question Paper Code : 91455

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 – PROTECTION AND SWITCHGEAR

(Regulation 2008/2010)

(Common to PTEE 2402/10133 EE 702 Protection and Switchgear for B.E. (Part-Time) Sixth Semester Electrical and Electronics Engineering – Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term "pick up" value in a protective relay.
2. What is the necessity for earthing?
3. What is an under-frequency relay?
4. Mention any two advantages of a static relay.
5. State the methods of protection of busbars.
6. Why the secondary of current transformer should not be open in a power system?
7. Mention any two advantages of vacuum circuit breaker.
8. List the different types of circuit breakers.
9. Define the term "breaking capacity" in a circuit breaker.
10. What is meant by current chopping?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the functional requirements of protective relaying. (6)
(ii) Differentiate between surge diverter and surge absorber. Also explain the characteristics of an ideal surge diverter. (10)

Or

- (b) (i) With a neat diagram explain the operation of any one type of lightning arrester. (8)
- (ii) What is a Peterson coil? Explain the protective function performed by this device with necessary diagram. (8)
12. (a) Describe the techniques used to realize various time-current characteristics using electromechanical relays. Also, compare the time-current characteristics of inverse, very inverse and extremely inverse over current relays. Discuss their applications. (16)

Or

- (b) (i) Explain in what way distance protection is superior to over current protection for the protection of transmission lines. (6)
- (ii) Write short notes on :
- (1) under frequency relays. (5)
- (2) static relays. (5)
13. (a) (i) Briefly discuss the protective devices used for the protection of a large transformer. (8)
- (ii) Explain stepped time-distance characteristic of three distance relaying units used for I, II and III zone of protection. (8)

Or

- (b) (i) Describe with a neat sketch, the percentage differential protection of a modern alternator. (10)
- (ii) Explain impedance relay characteristics on the R-X diagram. Also discuss the range setting of three impedance relays placed at a particular location. (6)
14. (a) With necessary diagrams describe the recovery rate theory and energy balance theory of arc interruption in a circuit breaker. (16)

Or

- (b) Explain the terms : restriking voltage, recovery voltage and RRRV. Derive expressions for restriking voltage and RRRV in terms of system voltage, inductance and capacitance. (16)
15. (a) What are the different methods of testing of circuit breakers? Describe the method which is more suitable for testing the large capacity circuit breakers. Also, discuss the merits and demerits of the method. (16)

Or

- (b) Describe the construction, operating principle and application of SF₆ circuit breaker, with a neat sketch. Also discuss its advantages over other types of circuit breakers. (16)