Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 50543

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

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. Name the different kinds of over current relays.

2. What are unit system and non-unit system?

3. What are the various faults to which a turbo alternator is likely to be subjected?

4. Mention any two disadvantage of carrier current scheme for transmission line only.

5. What are the various faults that would affect an alternator?

6. Why busbar protection is needed?

7. How does a numerical over current relay work?

8. What are the advantages of static relays over electromagnetic relays?

9. Write the classification of circuit breakers based on the medium used for arc extinction?

10. What are the advantages of MOCB over a bulk oil circuit breaker?

PART B — (5 × 13 = 65 marks)

11. (a) Classify the different faults in power system. Which of these are more frequent?

Or

    (b) Explain the various methods of earthing the neutral point of the power system with a neat sketch.

12. (a) With a neat Diagram, explain the construction and operation of the Directional over the current relay.

Or

(b) Discuss in detail various types of Differential relays.

13. (a) Explain transformer protection using the following methods
    (i) Differential protection (Merz-price protection). (6)
    (ii) Buchholz relay. (7)

Or

(b) Discuss the protection of a Transmission line.

14. (a) Discuss the block diagram of numerical over current protection with a neat sketch along with its flowchart.

Or

(b) Describe with a neat block diagram the working of the solid state relays.

15. (a) Explain the construction, and operating principle of the Vacuum circuit breaker with a neat diagram.

Or

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

PART C — (1 × 15 = 15 marks)

16. (a) A circuit breaker is connected with 100MVA transformer at 220kV. The magnetizing current of a transformer is 5% of the full load current. Determine the maximum voltage which may appear across the gap of the breaker when the magnetizing current is interrupted at 53% of its peak value. The stray capacitance is 2500 μF. The inductance is 30H.

Or

(b) A generator is protected by restricted earth fault protection. The generator ratings are 13.2kV, 10 MVA. The percentage of winding protected against phase to ground fault is 85%. The relay setting is such that it trips for 20% out of balance calculate the resistance to be added in the neutral to ground connection.

_____

2   50543