CBCS SCHEME

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18EE72

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Power System Protection

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Discuss briefly the role of protective relay in a modern power system. **(06 Marks)**

b. Explain the nature and causes of faults. Discuss the consequences of faults on a power system. **(08 Marks)**

c. Draw a neat sketch of an induction disc relay and explain its operating principle. **(06 Marks)**

OR

2 a. Explain the working principle, types and application of thermal relays. **(06 Marks)**

b. What is numerical relay? What are its advantages over conventional type relays? **(06 Marks)**

c. Explain various types of overcurrent relays with its characteristic curve. **(08 Marks)**

Module-2

3 a. What are the various overcurrent protective scheme? Explain their merits, demerits and field of application. **(07 Marks)**

b. Describe the operating principle, constructional features and area of application of reverse power or directional relay. **(07 Marks)**

c. Distinguish between an earth fault relay and an overcurrent relay. Explain various methods to energize an earth fault relay. **(06 Marks)**

OR

4 a. Explain the impedance relay with its operating principle. **(06 Marks)**

b. Explain stepped time-distance characteristics of three distance relaying units used for I, II and III zone of protection. **(08 Marks)**

c. Discuss the effect of arc resistance on the performance of different types of distance relays. **(06 Marks)**

Module-3

5 a. What are the important operating principles used in wire pilot schemes? Explain Transley scheme of wire pilot protection. **(07 Marks)**

b. Describe the behaviour of simple differential protection scheme during normal, external and internal fault. **(08 Marks)**

c. Explain balanced voltage differential relaying scheme. **(05 Marks)**

OR

6 a. Describe with neat sketch, the percentage differential protection of a modern alternator. **(08 Marks)**

b. Explain with neat diagram the working of Buchholz relay. **(07 Marks)**

c. Discuss buszone protection with neat diagram. **(05 Marks)**

Module-4

7 a. With a neat sketch, explain the recovery rate theory and energy balance theory of arc interruption in a circuit breaker. **(08 Marks)**

b. Explain the interruption of capacitive current with neat sketch and waveform. **(06 Marks)**

c. Discuss the working of air blast circuit breaker. **(06 Marks)**

OR

8 a. Explain with neat diagram the direct testing of circuit breaker. **(06 Marks)**

b. With a neat sketch, explain the construction and working of non-puffer type SF6 circuit breaker. **(08 Marks)**

c. Write short notes on HVDC circuit breaker. **(06 Marks)**

Module-5

9 a. Explain the construction and operation of the HRC cartridge fuse. What are its advantages and disadvantages? **(10 Marks)**

b. Explain with neat figure:

(i) Rod gap arrestor

(ii) Expulsion type arrestor **(10 Marks)**

OR

10 a. Explain the term insulation coordination. Describe the construction of volt time curve and terminology associated with impulse testing. **(10 Marks)**

b. What are the various components of GIS? Briefly describe their functions. **(10 Marks)**

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