CBCS SCHEME

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17EE72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
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. What is protective relay? Discuss the basic classification of protective relays. **(08 Marks)**

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

c. Explain the nature and causes of faults. **(06 Marks)**

OR

2 a. Draw a neat sketch of an induction cup type relay and explain its operating principle. **(08 Marks)**

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

c. With neat diagram, explain zones of protection in typical power system. **(06 Marks)**

Module-2

3 a. What are the various over current protective scheme? Explain their merits, demerits and applications. **(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 over current 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 an 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 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 relays. **(07 Marks)**

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

Module-4

7 a. With 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 diagram 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 neat sketch, explain the construction and working of SF6 circuit breaker. (08 Marks)
c. Write a shot note on HVDC circuit breaker. (06 Marks)

Module-5

9 a. Explain the construction and operation of the HRL fuse. What are its advantages and disadvantages? (10 Marks)
b. Explain with neat diagram,
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 impare testing. (10 Marks)
b. What are the various components of GIS? Briefly describe their functions. (10 Marks)

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