

## Seventh Semester B.E. Degree Examination, Feb./Mar. 2022

### Power System Protection

Time: 3 hrs.

Max. Marks: 80

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

#### Module-1

- 1 a. With neat sketch, explain the primary and Backup protection relaying. (08 Marks)
- b. What are the advantages and disadvantages of static relay? (04 Marks)
- c. Explain the time current characteristics of IDMT and very inverse time over-current relay. (04 Marks)

OR

- 2 a. Explain the Essential qualities of protective relay. (06 Marks)
- b. Mention comparison between electromechanical and Numerical relay. (05 Marks)
- c. The current rating of the relay is 5A, (PSM) Plug Setting Multiplier = 1.5, Time Multiplier Setting(TMS) = 0.4, CT ratio is = 400/5, fault current = 600A. Determine the operating time of the relay. At TMS = 1, Operating time at various PSM are mentioned in table below :

PSM	2	4	5	8	10	20
Operating time in seconds	10	5	4	3	2.8	2.4

(05 Marks)

#### Module-2

- 3 a. With neat sketch, explain the operation of directional Earth fault relay. (08 Marks)
- b. With neat sketch, explain the operating principle, torque equation and operating characteristics of reactance relay. (08 Marks)

OR

- 4 a. With neat sketch, explain the construction and operation of Reverse power or directional relay. (08 Marks)
- b. Explain the effect of line length and source impedance on the performance of distance relay. (08 Marks)

#### Module-3

- 5 a. With neat sketch, explain the operation of percentage or Biased differential relay. (08 Marks)
- b. With neat sketch, explain the percentage differential protection for generator protection considering internal and external fault. (08 Marks)

OR

- 6 a. With neat Schematic diagram, explain the operation of phase comparison carrier current protection. (08 Marks)
- b. With neat sketch, explain the construction and operation of Buchholz Relay. (08 Marks)

#### Module-4

- 7 a. With neat sketch, explain the construction and working of minimum oil circuit Breaker. (08 Marks)
- b. With neat sketch and waveform, explain the interruption of capacitive current. (08 Marks)

OR

- 8 a. With neat sketch, explain the construction and working of Air break circuit breaker. (08 Marks)
- b. Explain the rating of circuit breaker. (08 Marks)

**Module-5**

- 9 a. With neat sketch, explain the construction and working of HRC fuse. (05 Marks)
- b. Explain the operation of Lighting phenomena. (05 Marks)
- c. Mention advantages and disadvantages of Gas insulated substation. (06 Marks)

OR

- 10 a. With neat sketch, explain the construction and working of klydonograph instrument used for the measurement of surge voltage. (05 Marks)
- b. With neat sketch, explain the operation of Expulsion type lighting arrester. (06 Marks)
- c. Explain the term Insulation co-ordination with graph. (05 Marks)

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