

6E 6073**6E 6073****B.Tech. VI Semester (Main) Examination, May-June 2015****Electrical Engineering****6EE3A Switchgear & Protection****(Common for EE,EX)****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) What do you mean by amplitude comparator and phase comparator? Prove the duality between them with the help of phasor diagrams. (10)
- b) What are the advantages and limitations of static relay. (6)

OR

1. a) Explain how inverse - time overcurrent relay is different in operation from definite - time over current relay with neat ckt. diagrams. Explain the working of inverse time over current static relay. (10)
- b) Explain directional static over current relay. (6)

Unit - II

2. a) What do you mean by 3ϕ scheme of percentage differential relay with their characteristics. Explain in detail. (10)
- b) Explain static impedance relay, reactance relay and mho relay. (6)

OR

2. a) Explain the protection of a 3ϕ star-connected generator by means of a % percentage differential relay. (8)
- b) Explain in detail distance relay based on current comparison principle with neat diagram. (8)

Unit - III

3. a) Explain with the help of neat sketch the setup of carrier current relaying employed in transmission line protection. Explain utility of
- i) Line trap unit and
- ii) Coupling capacitor unit. Discuss why carrier current protection is suitable for important interconnected lines (10)
- b) Compare elliptical relays and quadrilateral relays (6)

OR

3. a) What is the effect of power swings on the performance of distance protection (8)
- b) Explain:
- i) Operation of directional comparison protection
- ii) Phase comparison carrier protection (8)

Unit - IV

4. a) Explain the terms recovery voltage, restriking voltage and RRRY. Derive an expression for restriking voltage in terms of system capacitance. (8)
- b) Classify all type of arc-interruption methods. Compare high-resistance interruptions method and low resistance interruption method & which is better. (8)

OR

4. Write selection criteria for good circuit breaker and compare the bulk oil circuit breaker, minimum oil circuit breaker, Air circuit breaker and miniature circuit breaker on following pts. points
- i) Arc quenching medium

- ii) Voltage breaking capacity
- iii) Design features
- iv) Applications and
- v) Remarks and

Explain rating of circuit breakers.

(16)

Unit - V

5. a) Explain with necessary diagram the phenomenon of current chopping in an air blast ckt Breaker. How this problem can be rectified by using resistance switching? Why mostly air blast circuit breakers are susceptible to current Chopping. (8)
- b) Describe the working principle of a vacuum circuit breaker. What are the shortcomings of a vacuum circuit breakers. (8)

OR

5. a) Explain the construction and working of SF₆ circuit breaker. Also enumerate the dielectric properties and arc quenching characteristic of SF₆ circuit breakers with their limitations. (8)
- b) Explain transmission line digital distance protection by using block diagram. What do you mean digital protection. (8)