

**8E4111**

Roll No. \_\_\_\_\_

Total No of Pages: **3****8E4111****B. Tech. VIII Sem. (Main/Back) Exam., April, 2015****Electrical Engineering****8EE3 Switchgear & Protection****Common for 8EE3 & 8EX3****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*

*Use of following supporting material is permitted during examination.  
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT - I**

- Q.1 (a) What is a static relay and what is the basis for its development? In what way has it been successful in replacing the conventional electromagnetic relays? [8]
- (b) In what respect are static comparators more convenient than electromagnetic comparators? How are the composite signals derived in a system to be fed to the comparator? [8]

**OR**

- Q.1 (a) How are the logic gates applied in protective relaying? Explain clearly the relay logic with the help of logic gates. [8]
- (d) Differentiate the characteristics of different static over – current relay by suitable graphs and their block diagrams. [8]

## UNIT – II

- Q.2 (a) How can different distance relay characteristics be achieved with the help of amplitude as well as phase comparators? [8]
- (b) Describe the circuitry of static differential protection of generator. [8]

OR

- Q.2 (a) Describe the advantages of poly – phase relays. Discuss with the help of neat diagram the theory and principle of the operation of a poly – phase relay. [8]
- (b) Discuss the directional reactance scheme for distance protection. [8]

## UNIT – III

- Q.3 (a) Explain the advantages of elliptical and quadrilateral characteristics for distance protection. How is a quadrilateral characteristics obtained with the help of static comparators? [8]
- (b) How does the carrier help in overcoming the limitation of the three-stepped distance protection? [8]

OR

- Q.3 (a) What are the various options for implementing the carrier communication channel? [8]
- (b) Discuss the effect of power swings on the performance of distance protection. [8]

## UNIT – IV

- Q.4 (a) A three phase circuit breaker is rated at 1250A, 2000 MVA, 33kV, 4s. Find the rated symmetrical breaking current, making current and short time rating. [6]
- (b) Develop expression for restriking voltage and RRRV for circuit breaker. [10]

OR

Q.4 Write technical notes on the following:-

- (a) Energy balance theory [8]
- (b) Current chopping phenomena. [8]

## UNIT – V

- Q.5 (a) Explain the construction of an SF<sub>6</sub> circuit breaker. How does it essentially differ from an air-blast circuit breaker? [8]
- (b) Describe the hidden failures in power system. How digital relays can prevent/overcome it? [8]

OR

- Q.5 (a) What are the practical limitations of breaking high voltage direct current circuits? Explain some of the means of overcoming these difficulties. [8]
- (b) Briefly describe the block diagram of digital relay. [8]