8E4111

B.Tech. (Sem. VIII) (Main/Back) Examination, 2013

Electrical Engineering

8EE3 SWITCHGEAR AND PROTECTION

(Common for 8EE3, 8EX3)

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions of 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

Q.1 Describe how comparator is realized in a protective relay. Describe the construction and principle of phase splitting type amplitude comparator. Describe the duality between amplitude and phase comparator. **[3+10+3=16]**

OR

Q.1 Describe the merits and demerits of statics relays over analog relays. Describe the working of directional statics overcurrent relay and draw neat figure. Describe the overcurrent relay operating time equations for various inverse characteristics. **[3+10+3=16]**

Unit-II

Q.2 Describe the principle and working of statics differential relay. Draw neat block diagram for various static elements of this relay. **[12+4=16]**

OR

Q.2 Describe how distance relay can be constituted depending upon the inputs from a two input comparator, and draw the related wave forms also in this regard. Make the block diagram for a static distance relay. **[12+4=16]**

Unit-III

Q.3 Describe the power line carrier system basic scheme. Also describe the principle of operation of directional comparison carrier protection drawing neat figures. **[6+10=16]**

OR

Q.3 What are quadrilateral and elliptical relays? What is meant by "out of step tripping" and "mho relay with blinders" with regard to distance protection? Explain. [6+10=16]

Unit-IV

Q.4 Explain restriking and recovery voltage derive the expressions for these. Describe the difference between bulk oil and minimum oil circuit breaker construction and principle of operation. [8+8=16]

OR

Q.4 Describe electric Arc characteristics of and explain high resistance interruption and current zero interruption. Explain energy balance and recovery rate theory of arc interruption. [8+8=16]

Unit-V

Q.5 Describe the digital relay components by neatly drawing the block diagram of a digital relay. How the digital transmission line distance protection is realized? [8+8=16]

OR

Q.5 How the various ratings of circuit breakers are defined and what are the criteria in their selection? Describe the constructional features and principle of operation of SF_6 circuit breaker. [8+8=16]