

6E 3111**6E 3111****B.Tech. VI Semester(Back) Examination, May 2015****Electrical Engg.****6EE3 Protection of power system****(Common for 6EE3(O) & 6EX3(O))****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) Describe the fault clearing process in electrical network/power system by drawing a typical relay circuit. Describe various sources of any typical power system which feed to short circuit when it occurs (04+04)
- b) Describe the protection zone concept to achieve selectivity in power system protection. Explain concept of primary and backup protection. (04+04)

OR

1. a) Draw the equivalent circuit of current transformer and phasor diagram for the same. Show how the ratio error & phase angle errors are expressed for current transformer; draw vector diagram also (04+04)
- b) Describe the desired response from measurement CT & protective CT with the help of excitation characteristic for each of these (04+04)

Unit - II

2. a) Describe the working and principle of induction disc type over current relay
- b) Describe how the protection is given in parallel feeder and ring main by directional & non directional over current relays (10+6)

OR

2. a) A relay operates with a rated current of 5 Amp which has a relay setting of 150% (one hundred & fifty percent). It is connected to a power system through a current transformer of 400/5 ratio. If the fault current is 6000 Amp, determine the plug setting multiplier of the relay.
- b) How the directional overcurrent relay 30° and 90° connections are provided by various combinations of voltages and currents. (10+6)

Unit - III

3. a) Describe with the help of figure how the percentage differential protection for a star-connected generator is provided.
- b) Describe how the stator interturn part protection is provided in generator. (10+6)

OR

3. a) Describe how rotor earth fault protection is provided in generator
- b) Draw figures for the loss of excitation protection and unbalanced current protection for a generator rotor (10+6)

Unit - IV

4. a) Describe harmonic current restraint percentage differential relay protection in transformer protection.
- b) Describe the operating characteristics of a percentage differential relay. (10+6)

OR

4. a) Describe correct methods of selection of CT ratios for differential protection of busbars to detect

i) External fault

ii) Internal fault

(8+8)

Unit-V

5. Draw the figures for implementation of reactance relay & mho relay using the four-pole induction cup structure, and explain the trip law for these relays using the universal torque equation.

(8+8)

OR

5. Draw figures for phase fault and ground fault protection for induction motor protection and explain negative sequence voltage relay protection for induction motor against unbalance in supply voltage.

(8+8)