6E3111

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B. Tech. VI Sem. (Main & Back) Exam., May/June-2014

Electrical Engineering

6EX3 Protection of Power System

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 may suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1._____ 2._____

UNIT-I

Q.1 (a) What are the principal types of faults in a power system? In what way is a fault harmful to the power systems? [4+4]

(b) Find the output of CT having a transformation ratio of 100/s and secondary resistance of 0.1 Ohm. Its secondary terminals are connected to a relay whose bursar is 4.5.VA. the resistance of connecting leads is 0.15 Ohms. [8]

OR

Q.1 (a) Explain what is meant by primary and secondary backup protection. [8]

(b) Describe the application and operating principe of CVT. In what sense it is more effective than potential transformer. [6+2]

UNIT-II

Q.2 (a) Describe the construction and principle of operation of Disk type induction over-current relay. Derive torque equation. [4+4]

(b) Describe the construction and operation of a directional over-current relay. [8]

OR

Q.2 (a) Explain how time and current grading principles are applied in the protection of power system. [4+4]

(b) Distinguish over-current relays on the basis of definite time, inverse time and inverse definite minimum time (IDMT) characteristics. [8]

UNIT-III

Q.3 (a) Explain the protection of alternator against overheating of stator. [8]

(b) Describe how differential protection can be used against stator inter-turn faults in an alternator. [8]

OR

Q.3 (a) What are the consequences of failure of prime mover of an Alternator? How the protection against such fault is implemented? [2+6]

(b) Explain the causes and effects of unbalanced loading of an Alternator. Also explain the protection scheme associated with it. [2+6]

UNIT-IV

Q.4 (a) What is magnetizing inrush current in a power transformer? Explain the protection scheme required to prevent the faults caused by heavy magnetizing inrush currents in a power transformer. [2+6]

(b) Explain the percentage differential protection scheme applied for a $Y-\Delta$ connected power transformer. [8]

OR

Q.4 (a) How frame leakage protection is applied for bus-bar protection. Explain with suitable diagram? [8]

(b) Explain high impedance relay scheme for bus-bar protection. [8]

UNIT-V

Q.5 (a) Briefly explain the construction, operating principle and characteristic of an electromagnetic impedance relay. [8]

(b) Explain the importance and basic principle of distance protection of a transmission line. [8]

OR

Q.5 (a) What is meant by single phasing of an Induction motor? What are the hazards of single phasing and how it could be perverted? [2+2+4]

(b) What are the possible causes of earth faults in an induction motor? Explain the application of earth fault relay for the protection of induction motor. [2+6]
