

6E3111

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

Total No of Pages: **3**

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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 burden 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 principle 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]

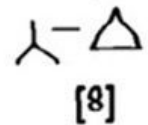
### OR

- 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 connected power transformer.



**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 averted? [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]