

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (Old) EXAMINATION – WINTER 2019****Subject Code: 170903****Date: 28/11/2019****Subject Name: Power System Protection****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What do you understand by a zone of protection? Discuss various zones of protection for a modern power system. **07**
- (b) What do you understand by time multiplier setting and plug setting multiplier in over current relay? Explain with the help of relay characteristic. **07**
- Q.2** (a) What is amplitude and phase comparator? What is duality between them? **07**
- (b) Explain difference between protective C.T. and measuring C.T. **07**
- OR**
- (b) Derive an expression for torque produced by an induction relay. Using the expression find the necessary conditions for two alternative fluxes acting on a rotor to produce torque and maximum torque. **07**
- Q.3** (a) Explain with a neat diagram the over current protection of a 3 phase feeder against phase faults and earth faults. How many phase fault and earth fault relays are used? **07**
- (b) Explain the impedance relay characteristic on the R-X diagram. Discuss the range setting of three impedance relays placed at a particular location. **07**
- OR**
- Q.3** (a) Explain under reach and over reach of a distance relay. **07**
- (b) Discuss the advantages of numerical protection. **07**
- Q.4** (a) Explain the restricted earth fault protection scheme applicable to transformer. **07**
- (b) A 3 phase transformer having line voltage ratio of 400 V/ 33000 V is connected in star-delta. The CTs on the 400 V side have a current ratio of 1000/5. What must be the ratio of CTs on the 33000 V side? **07**
- OR**
- Q.4** (a) Explain the differential protective scheme for protection of bus-zone. **07**
- (b) Discuss the protection employed against loss of excitation of an alternator. **07**
- Q.5** (a) With the help of block diagram explain the organization of numerical relay. **07**
- (b) Explain installation and commissioning tests of relays in brief. **07**
- OR**
- Q.5** (a) Explain the phase comparison method of carrier current protection. **07**
- (b) What are various abnormal operating condition from the load side and supply side to which an induction motor is subjected to? **07**
