Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: X 70901 **Date: 03/01/2013**

Subject Name: Power System Protection

Time: 10.30 am - 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) Explain essential qualities of protection of power system. **07**

Q.2 (a) Explain what you understand by back up protection. What are the various methods for providing back up protection. **07**

(b) Draw a neat sketch of induction disc type relay and discuss its operating principle **07**

OR

(b) What are different types of over current relays? Discuss their area of applications. **07**

Q.3 (a) Explain the term (i) plug setting multiplier (ii) Time Multiplier setting with IDMT relays. What are their significance in relay operation. **07**

(b) Describe the principle of directional over current relay. How does it help in discrimination in protection of parallel feeders and ring mains. **07**

OR

Q.3 (a) Explain impedance relay characteristic on the R-X diagram. Discuss the range setting of three impedance relays placed at a particular location. Discuss why the I zone unit is not set for the protection of 100% of the line. **07**

(b) The current rating of a relay is 5A. PSM=1.5, TMS=0.4, C.T. ratio=400/5, fault current= 6000A. Determine the operating time of the relay. At TMS=1, operating time at various PSM are: **07**

PSM	2	4	5	8	10	20
Operating time in seconds	10	5	4	3	2.8	2.4

Q.4 (a) What is unit protection? What are its merits and demerits? How does carrier aided distance protection give better performance than carrier current protection. **07**

(b) Describe the protection scheme of an alternator against inter turn fault. **07**

OR

Q.4 (a) What are the types of faults that are likely to occur in a three phase induction motor? Distinguish between short circuit protection, overload protection and earth fault protection of motor. **07**

(b) Describe the principle of differential system of protection applied to a power transformer. What are the shortcomings of this scheme and how are they overcome? **07**

Q.5 (a) What is the principle of harmonic restraint relay? Explain its application. **07**

(b) Discuss the various transformer faults. What are the different protection schemes available for transformer. **07**

OR

Q.5 (a) Explain various parts of numerical relay with its block diagram. **07**

(b) Explain various types of Installation and commissioning tests for Relay **07**

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