Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2016

Subject Code:170903 **Date:10/05/2016**

Subject Name:Power System Protection

Time:02:30 PM to 05:00 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 is the difference between measuring CT and protection CT?	7
	(B)	Explain capacitor Voltage Transformer. Compare it with magnetic PT.	7
Q.-2	(A)	Give relay CT connection for radial line, over current protection. Compare phase fault and earth fault IDMT relay units in the above protection.	7
	(B)	Why induction disc is cut with graded holes in IDMT Relays.	7
		OR	
	(B)	Clearly explain PSM & TSM for IDMT relay.	7
Q.-3	(A)	Give relay CT connection diagram for star-star connected power transformer. Give reasons for such connections.	7
	(B)	Draw circuit diagram for restricted earth fault protection. State its applications. What is the effect of neutral grounding resistance on percentage winding protected.	7
		OR	
Q.-4	(A)	Explain "under reach" and "over reach" of distance relay.	7
	(B)	Which type of distance relay is used for (i) Short line protection (ii) Very long line protection connecting two EHT grids. Give reason for the same.	7
		OR	
Q.-4	(A)	Explain the fourier technique for calculating impedance, resistance & reactance from voltage/current inputs.	7
	(B)	Under no-fault condition, a distance relay connected to a line has an accuracy of 1.0 for a rated voltage of 110 volts to its pressure circuit. The line impedance is 0.5 ohms/mile. The source impedance is j10.0 ohms. Its accuracy falls to 0.9 (under reach by 10%) for a relay. Voltage of 10 v. for a fault at the reach point Zn. Calculate (a) the maximum system impedance ratio (b) the shortest line the distance relay can protect	7
Q.-5	(A)	Explain prime mover failure protection for Synchronous Generator.	7
	(B)	What will happen to the generator if its field fails?	7
		Discuss field failure protection for large A.C. Generator.	7

OR

Q.-5 (A) Write note on microprocessor based over current relay. 7

(B) A generator winding R-phase is protected by biased differential protection using 400/5 CT s on both sides. Relay Characteristic is having bias = 0.1 and setting = 0.1. A high resistance fault of 16 Amp. is developed while delivering load of 400 Amp. Will the relay operate? 7

Q3 OR PART

Q3 (a) What is the importance of30^0, 60^0 and 60^0 connection of directional relay. 7

Q3 (b) What is the protection for short transmission line and why? 7