Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VIII • EXAMINATION – SUMMER • 2014

Subject Code: X 80902 **Date: 29-05-2014**

Subject Name: Electrical Machine design I and II

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)**	Explain the various factors that should be consider for designing power and distribution transformer.	**07**
	(b)	Explain the factors affecting for the selection of flux density and current density in transformer.	**07**
Q.2	**(a)**	Discuss the factors affecting the selection of number of poles in a d.c. machine.	**07**
	(b)	Derive the output equation for 3 phase transformers.	**07**
		OR	
	(b)	Explain the terms “critical speed” and “run away speed” with reference to synchronous machine	**07**
Q.3	**(a)**	Explain the factors affecting the length of air gap selection in d.c. machine.	**07**
	(b)	Explain the factors affecting for the choice of armature diameter and armature core length in d.c. machine.	**07**
		OR	
Q.3	**(a)**	Explain different types of windings in transformer.	**07**
	(b)	Discuss the importance of mitered joints in the core assembly of transformers	**07**
Q.4	**(a)**	Explain SCR and its effect on synchronous machine performance.	**07**
	(b)	Explain hunting in Synchronous machine.	**07**
		OR	
Q.4	**(a)**	Determine the main dimensions of a 100 MVA, 11KV, 50Hz, 40 salient pole generator assuming air gap flux density as 0.65wb/m^2 and ampere conductors as 40000 per meter. The peripheral speed should not exceed 60m/sec.	**07**
	(b)	State the effects of harmonics. What efforts are taken in designing the synchronous machine to eliminate harmonics effects?	**07**
Q.5	**(a)**	What is dispersion coefficient? Explain its effect on maximum output power factor.	**07**
	(b)	Explain harmonic induction and harmonic synchronous torques produced in induction motor.	**07**
		OR	
Q.5	**(a)**	Explain methods of Improving starting torque of Induction Motor.	**07**
	(b)	Find the current in the bars and end rings of a cage rotor of a 6 pole 3 phase, induction motor having 72 stator slots with 15 conductors in each slot if the stator current per phase is 20A and rotor slots are 55.	**07**

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