Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VIII EXAMINATION – SUMMER 2016

Subject Code:X80902 Date:12/05/2016

Subject Name:Electrical Machine Design-I & II

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)**	Explain different types of winding used in transformer.	**07**
	(b)	Give the important guidelines in selecting no. of poles in d.c. machine design.	**07**
Q.2	**(a)**	Give reasons for following: 1) Why are tapping provided on HV winding? 2) Why core of transformer is stepped?	**07**
	(b)	Explain various methods of Cooling of Transformer.	**07**
		OR	
	(b)	A 3 phase 50 Hz, oil cooled core type transformer has the following dimensions: distance between core centres= 0.2m, diameter of circumscribing circle=0.14 m. The flux density in the core is 1.25 wb/m^2 , and the current density in the conductors is 2.5 A/ mm^2. Estimate the KVA rating. Assume a window space factor of 0.2 and a core area factor =0.56 , the core is 2 stepped.	**07**
Q.3	**(a)**	Explain harmonic induction and harmonic synchronous torques produced in induction motor.	**07**
	(b)	Discuss factors affecting the length of air gap on performance of a three phase induction motor.	**07**
		OR	
Q.3	**(a)**	Discuss the factors that guide a designer to select the number of stator slots of the induction motor.	**07**
	(b)	What is Dispersion coefficient? Explain the effect of Dispersion coefficient on maximum output power factor.	**07**
Q.4	**(a)**	Explain the factors affecting the choice of no of armature slots in d.c. machine.	**07**
	(b)	Determine the main dimensions of a 12MVA, 13.8 KV,50 Hz, 1500 RPM, 3 phase star connected, alternator. The following particulars are provided: Average gap density = 0.60 Tesla, Ampere conductors per meter = 42000, Peripheral speed = 80 m/sec,. Find also the maximum flux, the number of stator slots if one conductor per slot is used , and the number of turns per phase.	**07**
		OR	
Q.4	**(a)**	Explain the terms “critical speed” and “run away speed” with reference to synchronous machine.	**07**
	(b)	Explain steps for design of field winding of synchronous machine.	**07**
Q.5	**(a)**	Explain the term SCR and its effects on synchronous machine performance	**07**
	(b)	Explain hunting in Synchronous machine. Also explain design of damper winding.	**07**
		OR	
Q.5	**(a)**	Explain the choice of specific electrical and magnetic loading in 3 phase induction motor.	**07**
	(b)	Explain the factors affecting the design of power transformer and distribution transformer.	**07**

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