Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 160804 Date: 25/10/2016

Subject Name: Electrical Machine Design

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)**	List and explain briefly the limitations being imposed in the design of electrical machines also discuss the modern trends in the design.	**07**
	(b)	Explain the design procedure in the design of field windings for a d.c. shunt machine.	**07**
Q.2	**(a)**	How are machines classified based on its ratings? Show the temperature variation for any one.	**07**
	(b)	Deduce an expression for the m.m.f required for the air gap of an armature with slots and ducts.	**07**
		OR	
	(b)	Define heating time constant and explain how it can be evaluated from heating curve	**07**
Q.3	**(a)**	How are machines classified based on its ratings? Show the temperature variation for any one type.	**07**
	(b)	State the advantages of Hydrogen cooling in alternator. Explain Radial and axial ventilation with the help of sketch	**07**
		OR	
Q.3	**(a)**	Derive the output equation of a single phase transformer.	**07**
	(b)	What are the types of windings commonly used in transformer and on what basis are they selected?	**07**
Q.4	**(a)**	Show that for minimum total material cost of a 3-phase transformer the ratio (Weight of iron/Weight of copper) should be equal to the ratio (specific cost of Copper (Rs. /kg) / specific cost of iron ((Rs. /kg))..	**07**
	(b)	Derive the expression for the KVA rating of a three phase transformer and show that the e.m.f per turn $E_t=K\sqrt{KVA}$.	**07**
		OR	
Q.4	**(a)**	Derive the condition for the optimum design of transformer for the minimum cost and minimum losses.	**07**
	(b)	Derive output equation of 3 –Φ Transformer. Write significance of constant ‘K’.	**07**
Q.5	**(a)**	Distinguish between real and apparent flux densities	**07**
	(b)	What are the important considerations in choosing number of poles in d.c. machine?	**07**
		OR	

Q.5 **(a)** What are the factors that affect the size of rotating machines? Mention various factors on which brush friction loss depends. **07**

(b) Define specific magnetic loading (Bav) and specific electric loading (ac) and obtain an expression for the "output co-efficient for a d.c. machine. **07**

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