Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-V Examination-Nov/Dec.-2011

Subject code: 150901 **Date: 22/11/2011**
Subject Name: Electrical Machine-II **Time: 2.30 pm -5.00 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)** Discuss various phase groups of 3-phase transformer connections with usual symbols & notations. **07**

(b) Attempt the followings. **07**
(i) In Scott connection, the tapping on the primary of the teaser transformers is taken 86.6%. Justify
(ii) What are the advantages of tertiary winding in a 3-phase transformer?

Q.2 **(a)** Describe the construction and working of a double-cage induction motor. Compare a single-cage and double-cage induction motors of the same ratings. **07**

(b) Explain a test which can measure the Iron loss and Copper loss simultaneously in a 1-phase Transformer. **07**

OR

(b) Two 1-phase furnaces working at 100 V are connected to 3300 V, 3-phase mains through Scott-connected transformers. Calculate the current in each line of the mains when the power taken by each furnace is 400 kW at a power factor of 0.8 lagging. Neglect losses in the transformers. Draw the relevant vector diagram. **07**

Q.3 **(a)** A 14.9 kW, 3-phase,400 V, 50 Hz, Induction motor gave the following test readings: **07**
No-load test: 400 V, 9 A, 1250 W
Blocked rotor test: 150 V, 38 A, 4 kW
Find from the circle diagram, the full-load current, p.f., slip and efficiency. Assume the stator and rotor copper losses to be equal.

(b) Explain the phenomena of crawling and cogging with their remedies. **07**

OR

Q.3 **(a)** Why starter is necessary for starting a 3-phase Induction motor. Discuss any two types of AC motor starters. **07**

(b) Discuss different methods of speed control of 3–phase Induction motor. **07**

Q.4 **(a)** Discuss the working of Induction generator when connected to (i) Infinite bus and (ii) Isolated load. **07**

(b) Define acceleration time. Derive its expression using normal notations of moment of inertia (J), optimum slip for minimum acceleration time ($S_{max,opt}$) etc. **07**

OR

Q.4	**(a)**	What is double-revolving theory? Draw equivalent circuit of 1-phase Induction motor for (i) Running and (ii) Starting conditions.	**07**
	(b)	Compare linear induction motor and conventional induction motors.	**07**
Q.5	**(a)**	Why a 1-phase Induction motor is not self starting? Explain working of split phase type 1-phase Induction motor.	**07**
	(b)	Explain the working of 1-phase (i) capacitor start & run Induction motor and (ii) shaded pole induction motor.	**07**

OR

Q.5	**(a)**	What is the role of commutator in an AC commutator motor? Explain the working of a Schrage motor.	**07**
	(b)	Discuss working of (i) Repulsion motor and (ii) Universal motor.	**07**

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