Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Vth Semester–Examination – Nov-Dec- 2011

Subject code: 150802

Subject Name: Electrical Machines-II

Date:29/11/2011 **Time: 02:30 pm – 05:30 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 how a 3-phase transformer Yd11 of group no.4 can be successfully operated in parallel with another transformer DY1 of group no.3	**04**
	(b)	Explain effects of varying excitation on armature current and power factor in a synchronous motor. Draw "v" curves	**06**
	(c)	Explain why a synchronous motor will run at synchronous speed or not at all. How can the speed of such motor can be varied ?.	**04**
Q.2	**(a)**	For a shaded pole induction motor, show that the flux in the shaded part of the pole segment, always lags the flux in the un shaded pole segment, both in space and time, thus producing rotation of a squirrel cage rotor.	**07**
	(b)	Explain the two field revolving theory for single phase induction motor . Give its torque speed characteristics. Why this motor does not have any starting torque? Show that this motor can run in either direction it once started.	**07**
		OR	
	(b)	Highlight the factors on which the choice of type of armature winding of a d.c machine will depend .	**07**
Q.3	**(a)**	Show schematically how a 3-phase transformer can be phased- in with another 3-phase transformer	**07**
	(b)	A large sized uncompensated d.c generator is delivering the rated current with a brush shift in the direction of rotation. Neatly sketch . The distribution of flux density in the air gap due to (1) main field mmf only (2) armature mmf only (3) both main field and armature mmf.	**07**
		OR	
Q.3	**(a)**	Describe the constructional features of "Variable-reluctance" type and "permanent magnet " type stepper motors. Compare them. Explain the working principal of any one. Discuss the effects of the stepping rate of pulses on the stability of the stepper motor.	**07**
	(b)	What are the similarities and dissimilarities between lap winding and wave winding in d.c machine. Also write short note on induction generator.	**07**

Q.4 **(a)** Explain with necessary diagrams how to 3-phase transformer can be used to convert a 3-phase Supply to 2-phase one. If the load is balanced on one side , show that it will be balanced on the other side. **07**

(b) Discuss the application and limitation of speed control of a 3-phase. induction motor by (a) adding resistance (b) injecting voltage. **07**

OR

Q.4 **(a)** Explain the construction of all details of a 3-phase transformer , with diagrams. **07**

(b) State various methods of starting of a 3-phase induction motor. Explain with the help of diagram the working of an automatic direct on line starter **07**

Q.5 **(a)** What are the various losses occurring in rotating machine? Mention the method to reduce them. **07**

(b) Explain with necessary circuit diagrams, the experimental test conducted on an induction motor to draw the circle diagram .How will you determine the motor characteristics from the circle diagram **07**

OR

Q.5 **(a)** Write short note on Hopkinson's. test for determination of efficiency of a d.c machine **07**

(b) A 120V, 60 Hz, ¼ hp universal motor runs at 2000 rpm and takes 0.6 Amp when connected to a 120V dc source. Determine speed, torque and power factor of the motor, when it is connected to a 120V, 60 Hz supply, and is loaded to take 0.6 Amp(rms). The resistance and inductance measured at terminals of the machine are 20 ohm and 0.25H respectively. **07**

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