Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER 2013

Subject Code: 172402 **Date: 24-05-2013**

Subject Name: Industrial Drives and Control-II

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Notations used have usual meaning.**

Q.1	**(a)**	Discuss the operation of 3 phase induction motor with single phasing.	**07**
	(b)	Why starter is necessary for induction motor? Explain star-delta starter for 3-Φ induction motor.	**07**
Q.2	**(a)**	Discuss stator voltage control method for induction motor.	**07**
	(b)	A 6 pole, 50 Hz, 3 phase induction motor running on full load develops a useful torque of 160 Nm when the rotor emf makes 120 complete cycles per minute. Calculate the shaft power output. If the mechanical torque lost in friction and that for core is 10 Nm, compute mechanical power developed and rotor copper loss.	**07**
		OR	
	(b)	A 3 phase, 400 V, 6 poles, 19 kW induction motor has the following per phase parameters of its approximate circuit model. $R_1 = 1.4\Omega$, $R'_2=0.6\ \Omega$, $X_1=2\ \Omega$, $X'_2=1\ \Omega$ and $X_m=50\ \Omega$ The rotational loss is 275 W. for a slip of 0.03 determine: (i) Line current (ii) power factor (iii) power input	**07**
Q.3	**(a)**	Explain torque/speed characteristic of 3-Φ induction motor.	**07**
	(b)	Discuss the effect of non-sinusoidal sources on induction motor.	**07**
		OR	
Q.3	**(a)**	Describe rotor resistance control method for 3-Φ slip ring induction motor.	**07**
	(b)	Explain Kramer sub-synchronous speed control method for induction motor.	**07**
Q.4	**(a)**	Discuss open loop control of synchronous motor with voltage source inverter.	**07**
	(b)	Explain dynamic d-q modeling of induction motor.	**07**
		OR	
Q.4	**(a)**	Explain direct vector control method for induction motor.	**07**
	(b)	Write brief note on parameter sensitivity for vector control of induction motor.	**07**
Q.5	**(a)**	Describe permanent magnet AC motor drive.	**07**
	(b)	Explain basic principle of direct torque control. How it is comparable with vector control method.	**07**
		OR	
Q.5	**(a)**	Discuss frequency control method for speed control of induction motor.	**07**
	(b)	Explain plugging of induction motor.	**07**

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