Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-III Examination May 2012

Subject code: 133402

Subject Name: Electrical drives and controls

Date: 09/05/2012 **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.**

Q.1	**(a)**	Explain the classes of motor duty in details.	**07**
	(b)	Answer the following question. 1. Write a brief note on the sources employed in electrical drives. 2. What are the main factors which decide the choice of electrical drives For a given application?	**07**
Q.2	**(a)**	The armature winding of a 200 V, 4-pole, series motor is lap connected. There are 280 slots and each slot has 4 conductors. The current is 45A and the flux per pole is 18mWb.the field resistance is 0.3 Ω; the armature resistance 0.5 Ω and the iron and friction losses total 800 W. the pulley diameter is 0.21m.find the pull in Newton at the run of the pulley.	**07**
	(b)	State and explain different types of speed control of DC series motor.	**07**
		OR	
	(b)	A 250 V shunt motor with armature resistance of 0.5 Ω runs at 600 r.p.m on full Load and takes an armature current of 20A.if resistance of 1.0 Ω is placed in the armature circuit, find the speed at (i) full load torque (ii) half full load torque.	**07**
Q.3	**(a)**	What are the need of starter? Explain the direct on line starter with circuit Diagram.	**07**
	(b)	State and explain the different classes of squirrel cage motor.	**07**
		OR	
Q.3	**(a)**	With a neat sketch explain the rotor resistance starting of slip ring motor.	**07**
	(b)	Explain starting and speed control of series motor.	**07**
Q.4	**(a)**	Explain the single phase fully controlled rectifier control of DC separately excited motor with neat circuit diagram.	**07**
	(b)	A 220V dc series motor runs at 1000 rpm and takes an armature current of 100A when driving a load with a constant torque. Resistance of the armature and field winding are 0.05 Ω each. Find the magnitude and direction of motor speed and armature current if the motor terminal voltage is reversed and the number of turns in field winding is reduced to 80%.assume linear magnetic circuit.	**07**
		OR	
Q.4	**(a)**	A 200V, 875 rpm, 150A separately excited DC motor has an armature resistance of 0.06 Ω.it is fed from a single phase fully controlled rectifier with an AC source voltage of 220V, 50Hz.assuming continuous conduction, calculate (i) Firing angle for rated torque and 750 rpm (ii) Firing angle for rated torque and (-500) rpm	**07**

(iii) Motor speed for $\alpha=160^{o}$ and rated torque.

(b) Explain the dual converter in details with neat circuit diagram. **07**

Q.5 **(a)** state the different types of starting method are used in induction motor. Explain any two method with diagram. **07**

(b) Draw the diagram of static rotor resistance control and explain it in details. **07**

OR

Q.5 **(a)** why are used voltage source inverter in induction motor control? Explain voltage source inverter with neat circuit diagram and waveform. **07**

(b) State the method of speed control of induction motor. Explain any two method with neat diagram. **07**

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