## B.E. (Electrical Engineering (Electronics & Power)) Sixth Semester (C.B.S.) Electrical Drives & Their Control

P. Pages : 2 Time : Three Hours			*0600* NRT/KS/19 Max. Marks		/ <b>3475</b> : 80		
	Note	s: 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	All questions carry marks as in Solve Question 1 OR Questions Solve Question 3 OR Questions Solve Question 5 OR Questions Solve Question 7 OR Questions Solve Question 9 OR Questions Solve Question 11 OR Question Due credit will be given to near Assume suitable data whenever Use of non programmable calcu	dicated s No. 2 s No. 4 s No. 6 s No. 1 ns No. mess a neces ulator	1. 2. 4. 5. 3. 10. 12. nd adequate dimensions. sary. is permitted.		
1.	a)	Explain	the block diagram of an electric	drive.			6
	b)	A 230V, DC Motor drives a load whose torque remains constant. The motor takes a armature current of 25Amp from the supply and its speed is 500rpm. If the speed is to be rise to 700rpm. What additional resistance must be placed in the shunt field winding, if the filed resistance and the armature resistance are $120\Omega$ and $0.6\Omega$ respectively.					7
				OR	ł.		
2.	a)	Discuss starting and running characteristics of DC motors.					6
	b)	A 40H.P., 400V, 3 phase, 50Hz, 6 pole squirrel age induction motor takes a full load current of 58 Amps from the supply and has a slip of 5% The stator is delta connected with the impedance of $2.5\Omega$ /phase. Calculate the starting torque and starting current taken from the supply if the motor is to be started by- i) Direct starting ii) Star-delta & Taster iii) A star connected auto-transformer with 70% Tapping					
3.	a)	Derive the expression for motor torque when load is increasing or flywheel decelerating.					6
	b)	A 25 H.P., 3 phase, 10 poles, 50Hz Induction motor is provided with flywheel has to supply a load curve of 800N-m for 10 sec, followed by no load period during which the flywheel regains, its full load slip of motor is 4% and the torque-speed may be assume linear over the working region. Find the moment of inertia of flywheel if the motor torque is not to exceed the full load torque.					7
				OR	ł		
4.	a)	Define- i) Con iii) RM	ntinuous rating 1S Horse power rating	ii)	Short time rating		6

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	b)	A motor of 25HP with a heating time constant of 100min has a temp. rise of 40°C on continuous rating. Find the 1/2 hr rating of the motor for this temp. rise assuming that it cooles down completely between each load period. The motor has max. efficiency at 85% of its full load.						
5.	a)	State the advantages, applications and types of PLC.						
	b) Draw the block diagram of PLC and explain it in detail.							
6.	a)	Explain with suitable example the programming of PLC using ladder diagram.						
	b)	Explain in detail how the speed control of a D.C drive is possible using PLC.						
7.	a)	Differentiate between AC & DC contactors.						
	Explain star-delta starting of 3 phase Induction motor with power & control circuit. <b>OR</b>	7						
8.	a)	Explain reversing of 3 phase induction motor using contactor with control circuit diagram.						
	b)	State the different methods of acceleration control of DC shunt motor. Explain any one in detail with power & control circuit.						
9.	a)	Explain speed-Time curve in detail with relevant diagrams.	6					
	b)	<ul> <li>Two 750V DC motors each having a resistance of 0.1Q are started on the series-parallel system. The mean current through out the starting period is 300Amp. The starting period is 15 sec and the train speed at the end of this period is 30Km/hr. Calculate.</li> <li>i) Rheostatic losses during series parallel operation of motor.</li> <li>ii) Energy input of two motors</li> <li>iii) Energy output of the motors</li> <li>iv) Starting efficiency.</li> </ul>						
10.	a)	Explain series parallel control of traction motor with diagram.						
	b)	List the advantages of electric traction over other modes of traction.						
11.	a)	Explain analog and digital control of electric drives.	6					
	b)	Draw and explain the block diagram of analog control of electrical drives.						
12.	a)	<b>OR</b> Explain the block diagram of digital control of electric drives						
	<ul> <li>b) State the requirements &amp; mention the drives commonly used in the following industrial/domestic applications.</li> <li>i) Rolling Mills</li> <li>ii) Pumps,</li> <li>iii) Cranes and Hoists work</li> <li>v) Textile Mills</li> <li>vi) Fans</li> </ul>							

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