(3 Hours) **Total Marks: 80**

NB: (1) Question No. 1 is compulsory
(2) Answer any THREE questions out of the remaining FIVE questions.
(3) Assume suitable data if necessary and justify them
(4) Figure to the right indicates marks

1	(a)	State the factors affecting the choice of Electric dives.	5
	(b)	Explain the term intermittent periodic duty.	5
	(c)	What do you understand by constant toque drive and constant power drive?	5
	(d)	Variable frequency control of induction motor is more efficient than stator voltage control, why?	5
2	(a)	Explain the Speed-Torque conventions and Multi-quadrant Operation of Electric drives with an example.	10
	(b)	Derive and explain Thermal Model of Motor for Heating and Cooling.	10
3	(a)	Explain the operation of closed loop speed control scheme with inner current control loop. What are the function of inner current loop?	10
	(b)	Illustrate with neat diagram the working of Three phase fully controlled rectifier control of DC separately excited motor	10
4	(a)	A 2.8 kW. 400 V, 50 Hz, 4 pole, 1370 rpm delta connected squirrel cage induction motor has following parameters referred to the stator: R_s = 2Ω, R_r' =5Ω, X_s=X_r' =5Ω, X_m =80 Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate motor terminal voltage, current and torque at 1200 rpm.	10
	(b)	Explain variable frequency control of induction motor and explain the following points i. For speeds below base speed (V/f) ratio is maintained constant, why? ii. For speed above base speed, terminal voltage is maintained constant, why?	10
5	(a)	Explain star-delta and autotransformer starters of induction motor. Why high current inrush occurs during open circuit transition in star-delta and autotransformer starters of induction motors?	10
	(b)	Explain d-q model of Induction Motor.	10
6	(a)	Explain with diagrams, the principle of vector control in AC dives.	10
	(b)	Explain control methodology of Direct Torque Control of induction motor.	10