

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Fifth Semester**Electrical and Electronics Engineering***EE3012 - Electrical Drives***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	List the major components of an electric drive system.	L1	1	2
2.	Draw the block diagram representation of a closed-loop electric drive system.	L1	1	2
3.	What are the downsides of the discontinuous conduction mode of operation of power electronic converters?	L2	2	2
4.	List types of time ratio control techniques and list their significance.	L2	2	2
5.	In v/f control of induction motor drive, why the v/f ratio have to be kept constant for speed control below base speed?	L1	3	2
6.	Why field weakening is needed in induction motor drives? List the characteristics of field weakening mode.	L1	3	2
7.	How the power factor of a synchronous motor can be controlled?	L2	4	2
8.	What is the difference between true synchronous and self-synchronous modes of control of synchronous motor drives?	L2	4	2
9.	List the transfer function of a separately excited DC motor?	L1	5	2
10.	Infer the speed feedback necessary in a closed-loop control system?	L1	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a With speed-torque sign convention, explain the multi-quadrantal operation of electric drive system. Also sketch and explain the necessary block set required for the closed loop of the same. Or b Classify the motor duty cycles and explain the selection of motor by considering load and thermal variation factors.	L2	1	16
12.	a Explain the four-quadrant operation of a single phase fully-controlled converter -fed separately excited DC drive. Sketch and explain its characteristics. Or b Sketch and explain the block diagram representation of the current limit control of an electric drive system. Classify the types of current limit control techniques and list their limitations.	L3	2	16

13.	a	Explain the v/f control strategy of an induction motor drive with power schematics and control logic. Also, sketch the speed Vs torque characteristics of such a control strategy.	L2	3	16
		Or			
	b	Classify the types of basic loop structures required for closed-loop control of electric drive. Sketch its block diagram representation for an electric drive system.	L2	3	16
14.	a	With the required schematic, explain the concept of margin angle control of a self-controlled synchronous motor drive along with its control strategy.	L2	4	16
		Or			
	b	Explain the control principle of the PMSM drive with schematics. Also sketch the various transformations used for the control principle.	L2	4	16
15.	a	With the transfer function approach, discuss the methodology involved in the design of speed controller of a separately excited DC motor drive.	L3	5	16
		Or			
	b	Discuss armature voltage control and field weakening mode of a DC motor. Compare their speed control ranges and applications.	L3	5	16