

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

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>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Define electric drive.	RE	1	2
2.	List the factors affecting the selection of motors.	UN	1	2
3.	Differentiate between continuous and discontinuous conduction mode.	UN	2	2
4.	Illustrate the speed torque equation of dc separately excited motor fed drive.	AP	2	2
5.	Why stator voltage control is suitable for speed control of induction motors in fan and pump drives.	UN	3	2
6.	List out the applications of AC drives.	UN	3	2
7.	When a synchronous motor can be load commutated.	RE	4	2
8.	Name any two controllers employed in the closed loop control of synchronous motor drives.	UN	4	2
9.	Recall the methods of speed sensing.	RE	5	2
10.	Write the modes of adjustable frequency control in synchronous motor drives.	UN	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Derive the equations governing motor load dynamics.	UN	1	13
	Or			
	b Explain acceleration, deceleration, starting & stopping of a motor.	UN	1	13
12.	a Explain the operation of four quadrant operation of chopper fed DC separately excited motor drive with necessary diagram.	AN	2	13
	Or			
	b Describe the electrical – mechanical characteristics of commonly used electric motors.	AN	2	13
13.	a i Explain why a cyclo-converter fed induction motor drive is preferred over inverter controlled synchronous motor drive for low speed applications.	UN	3	7
	ii Discuss in detail about the principle of vector control of Induction motor drive.	UN	3	6
	Or			
	b i Describe the VSI fed induction motor drive.	UN	3	7
	ii Mention the drawbacks of stator voltage control method.	UN	3	6

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| 14. | a | Describe the closed loop operation of permanent magnet synchronous motor drive. | UN | 4 | 13 |
| | | Or | | | |
| | b | Describe using a diagram the working of a voltage source inverter fed synchronous motor Drive. | UN | 4 | 13 |
| 15. | a | Explain the closed loop operation of armature voltage control method and field weakening mode control for DC drive. | EV | 5 | 13 |
| | | Or | | | |
| | b | Design the speed controller of converter fed separately excited dc motor with inner current control and outer speed control loops. | EV | 5 | 13 |

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	A three phase 50Hz Induction motor has the following parameters for its equivalent circuit $R_1 = R_2 = 0.04 \text{ ohm}$ and $X_1 = X_2 = 0.1 \text{ ohm}$ is to be operated at one half of its rated voltage and 45 Hz frequency. Calculate (i) the maximum torque at this reduced voltage and frequency operation in terms of its normal value and (ii) the starting torque at this reduced frequency and the voltage in terms of its normal value.	EV	3	15
		Or			
	b	Evaluate various types of the speed control scheme of induction motor drive.	EV	3	15