Register Number:……..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEI6204**:** Solid State Drives

COURSE OUTCOMES

CO1: Compare various types of loads, quadrants of operation and characteristics of motors.

CO2: Design power converter circuits for DC and AC motor drives.

CO3: Describe the speed control schemes for DC and AC motor drives.

CO4: Choose the motor drives for appropriate applications.

CO5: Simulate AC and DC drive circuits using software tool.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	List the merits of solid-state drives.	CO4	[K_2]
2.	Write the torque balance equation of electrical drive system.	CO1	[K_2]
3.	State the performance parameters of AC- DC converter fed DC motor drives.	CO2	[K_3]
4.	Single phase dual converter is operated for separately excited DC motor on circulating current mode. Firing angle of converter 1 is $\alpha 1 = 45^{o}$. Calculate the firing angle for converter 2.	CO2	[K_2]
5.	Choose two quadrant DC- DC converters for DC motors.	CO3	[K_3]
6.	The voltage of a solar PV module is **48V**. A DC motor requires **60V** input. For the simulation of the DC motor drive, calculate the duty ratio of the DC-DC converter to be used between solar PV module and DC motor.	CO5	[K_3]
7.	Justify the need for constant V/f ratio control for induction motor drive.	CO3	[K_2]
8.	State the merits of vector control of induction motor.	CO3	[K_3]
9.	List the applications of PMSM drives.	CO4	[K_2]
10.	Identify the simulation tools for electrical drives.	CO5	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Illustrate the elements of electric drive system.	8	CO1	[K_2]
	b)	Classify the classes of motor duty with load curve, temperature curve and example.	8	CO1	[K_2]
12.	a)	Draw the circuit and waveforms of three phase fully controlled converter fed separately excited DC motor for the firing angle of **60º**.	8	CO2	[K_3]
	b)	A **220V, 20A, 1000** rpm separately excited DC motor has **Ra= 0.2Ω** and fed from single phase half- controlled converter with input supply of **240V rms, 50 Hz**. Calculate the firing angle of the converter to operate the motor at **500 rpm** and rated load torque.	8	CO2	[K_3]
13.	a)	With circuit diagram, explain the operation of DC motor fed from step down chopper on time ratio control.	8	CO3	[K_2]
	b)	Draw the circuit and explain the quadrants of operation of class E chopper fed DC motor.	8	CO3	[K_2]
14.	a)	Describe the stator voltage control method for three phase induction motor.	8	CO3	[K_2]
	b)	With circuit diagram, explain a slip power recovery scheme of induction motor.	8	CO2	[K_2]
15.	a)	Compare VSI fed induction motor and CSI fed induction motor.	8	CO4	[K_2]
	b)	Describe constant V/f control of synchronous motor drive.	8	CO3	[K_2]
16.	a)	Draw the block diagram of BLDC motor drive and explain the operation.	8	CO2	[K_2]
	b)	Explain the process and drives used for steel rolling mill.	8	CO4	[K_2]

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