



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(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)

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| 1. State the advantages of solid- state drives. | CO4 | [K ₂] |
| 2. Classify electrical braking. | CO1 | [K ₂] |
| 3. List 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 $\alpha_1 = 60^\circ$. Calculate the firing angle for converter 2. | CO2 | [K ₂] |
| 5. Identify two quadrant DC- DC converters for DC motors. | CO3 | [K ₃] |
| 6. The voltage of a battery is 24V . A DC motor requires 48V input. For the simulation of the DC motor drive, calculate the duty ratio of the DC-DC converter to be used between battery and DC motor. | CO5 | [K ₃] |
| 7. State the merits of constant V/f ratio control for induction motor drive. | CO3 | [K ₂] |
| 8. List the features of vector control of induction motor. | CO3 | [K ₃] |
| 9. Choose the applications of PMSM drives. | CO4 | [K ₂] |
| 10. List the simulation tools for AC motor drives. | CO5 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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| 11. a) Draw the block diagram and explain the elements of electric drive system. | (8) | CO1 | [K ₂] |
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- b) List the classes of motor duty with examples. (8) CO1 [K₂]
12. Describe the operation of three phase fully controlled converter fed separately excited DC motor with circuit and waveforms for the firing angle of **60°**. (16) CO2 [K₃]
13. Draw the circuit and explain the quadrants of operation of four quadrant chopper fed DC motor. (16) CO3 [K₂]
14. Describe the circuit and operation of a slip power recovery scheme of induction motor. (16) CO3 [K₂]
15. a) Compare VSI fed induction motor and CSI fed induction motor. (8) CO2 [K₂]
b) Draw the block diagram and explain constant V/f control of synchronous motor drive. (8) CO3 [K₂]
16. Describe the block diagram and operation of BLDC motor drive used in electric scooter. (16) CO4 [K₃]

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