



**B.E DEGREE EXAMINATIONS: APRIL / MAY 2023**

(Regulation 2018)

Fourth Semester

**MECHANICAL ENGINEERING**

U18EEI4207 : Electrical Drives and Control

**COURSE OUTCOMES**

- CO1:** Describe the construction, principle of operation and characteristics of DC motors.  
**CO2:** Distinguish the construction and operation various types of induction motors.  
**CO3:** Familiarize the speed control techniques for DC motor and induction motor.  
**CO4:** Describe the construction and operation of special electrical machines.  
**CO5:** Choose the suitable motor for specific application.

**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 principle of operation of DC generator.           | CO1 | [K1] |
| 2. List the types of DC motor.                                 | CO1 | [K2] |
| 3. Differentiate between shell type and core type transformer. | CO2 | [K1] |
| 4. Define transformer transformation ratio.                    | CO2 | [K1] |
| 5. List the advantages of electric drives.                     | CO3 | [K1] |
| 6. What is meant by DC Chopper?                                | CO3 | [K2] |
| 7. What is VVVF control?                                       | CO4 | [K2] |
| 8. Write the speed equation of an induction motor.             | CO4 | [K2] |
| 9. Define stepping angle.                                      | CO5 | [K3] |
| 10. Compare conventional DC motor and PMBLDC motor.            | CO5 | [K1] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

- |  |    |     |      |
|--|----|-----|------|
| 11. a) Explain the construction details of DC shunt motor with neat diagrams.                                    | 12 | CO1 | [K2] |
| b) Derive the expression for torque equation of DC motor.  | 4  | CO1 | [K2] |
| 12. a) Describe the operation of capacitor start, capacitor run type motor with neat diagram and phasor diagram. | 12 | CO2 | [K2] |

	b)	Draw the diagram of Transformer and describe it.	4	CO2	[K2]
13.	a)	Explain the single phase full wave converter drive speed control for DC drive with waveforms.	12	CO3	[K2]
	b)	Draw the circuit diagram of four quadrant chopper.	4	CO3	[K2]
14.	a)	Explain the V/f control method of AC drive with neat sketches.	12	CO4	[K2]
	b)	Draw the circuit diagram of rotor resistance control.	4	CO4	[K2]
15.	a)	Explain the construction and working principle of BLDC motor.	12	CO5	[K2]
	b)	List out the merits and demerits of PMDC?	4	CO5	[K1]
16.	a)	Describe the operation of four quadrant chopper with suitable waveforms.	12	CO3	[K2]
	b)	List out the merits and demerits of PMDC?	4	CO5	[K2]

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Please indicate knowledge level ( $K_1$  to  $K_6$ ) and Course Outcome level (CO1 to CO5) against each question for each subdivision.