Reg. No.															

Question Paper Code	13471

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20EIPC401 - ELECTRICAL MACHINES

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which part of a DC machine provides the path for magnetic flux? (a) Commutator (b) Armature Winding (c) Yoke (d) Brushes	1	K1	CO1
2.	Which part of a DC machine provides the path for magnetic flux? (a) Weakens the shunt field (b) Strengthens the shunt field (c) Has no effect on the shunt field (d) Reverses the direction of rotation	1	K1	CO1
3.	The basic principle of a transformer is: (a) Ohm's Law (b) Electromagnetic induction (c) Thermoelectric effect (d) Electrostatic induction	1	K1	CO2
4.	Three-phase transformers are generally used because: (a) They are cheaper than single-phase (b) They require less space (c) They provide balanced power (d) All of the above	1	K1	CO2
5.	The method commonly used to start a synchronous motor? (a) DOL starter (b) Star-delta starter (c) Using damper winding (d) Frequency control	1	K1	CO3
6.	In a V-curve of a synchronous motor, the lowest point indicates: (a) Maximum Power (b) United Power factor (c) Maximum Torque (d) Maximum Current	1	K1	CO3
7.	The principle of operation of a three-phase induction motor is based on: (a) Self-induction (b) Mutual inductance (c) Faraday's law (d) Rotating Magnetic field	1	K1	CO4
8.	In rotor resistance control method, speed control is: (a) Suitable only for squirrel cage motors (b) Smooth and efficient (c) Inefficient due to power loss (d) Achieved by stator winding change	1	K1	CO4
9.	Switched reluctance motors are controlled using: (a) Mechanical switches (b) Thyristors or power electronics (c) Brush commutators (d) Capacitor	1	K1	CO5
10.	The motor has very smooth and silent operation, making it suitable for audio equipment? (a) Shaded pole motor (b) Repulsion motor (c) Hysteresis motor (d) Universal motor	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	What is the main purpose of commutator and brushes?	2	K1	CO1
12.	Name Different types of starters.	2	K1	CO1
13.	Write the significance of back EMF.	2	K1	CO1
14.	List the losses in a transformer.	2	K1	CO2
15.	Why is transformer rated in KVA? Justify.	2	K1	CO2

16.	List the causes of stray losses.		*2*	*K1*	*CO2*
17.	Name the main parts of synchronous motor.		*2*	*K1*	*CO3*
18.	Name the starting methods of synchronous motor		*2*	*K1*	*CO3*
19.	Classify the types of 3-phase induction motor.		*2*	*K2*	*CO4*
20.	Recall the applications of 3-phase induction motor.		*2*	*K1*	*CO4*
21.	Infer the principle of a repulsion motor.		*2*	*K2*	*CO5*
22.	Compare the terms rotating and pulsating magnetic fields.		*2*	*K2*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the construction and working principle of a generator with neat diagrams.	*11*	*K2*	*CO1*
		OR			
	b)	Illustrate the different excitation schemes used in D.C. machines with suitable circuit diagrams and applications.	*11*	*K2*	*CO1*
24.	a)	Demonstrate the working principle of single phase transformer and the significance of mutual induction.	*11*	*K2*	*CO2*
		OR			
	b)	Outline the types and advantages of three-phase transformers over single-phase transformers.	*11*	*K2*	*CO2*
25.	a)	Summarize the construction and working of a synchronous motor with necessary diagrams.	*11*	*K2*	*CO3*
		OR			
	b)	Contrast the V and inverted V curves of a synchronous motor and their significance in performance analysis.	*11*	*K2*	*CO3*
26.	a)	Explain the working principle of a three-phase induction motor and distinguish between squirrel cage and slip-ring type.	*11*	*K2*	*CO4*
		OR			
	b)	Outline the various starting methods of three-phase induction motors and compare their effectiveness.	*11*	*K2*	*CO4*
27.	a)	Explain the types of single-phase induction motors and their principle of operation.	*11*	*K2*	*CO5*
		OR			
	b)	Explain the working of a hysteresis motor and the role of hysteresis loss.	*11*	*K2*	*CO5*
28.	a) (i)	Outline the classification of three-phase induction motors	*6*	*K2*	*CO4*
	(ii)	Illustrate the torque-speed characteristic of a repulsion motor.	*5*	*K2*	*CO5*
		OR			
	b) (i)	Illustrate the torque-slip characteristics and indicate regions of operation.	*6*	*K2*	*CO4*
	(ii)	Outline the applications of single-phase induction motors.	*5*	*K2*	*CO5*