Reg. No.															

Question Paper Code	14396

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Fourth Semester

Electrical and Electronics Engineering

24EEPC402 - ELECTRICAL MACHINES - II

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	The lamination sheets used for the stator core of a synchronous machine is a) Stainless steel b) Silicon steel c) Cast iron d) Cast steel	*1*	*K1*	*CO1*
2.	Distributed winding is preferred over concentrated winding as it a) reduces noise b) reduces the machines size c) reduces the amount of copper required d) improves the generated emf waveform and adds rigidity and mechanical strength to the winding	*1*	*K3*	*CO1*
3.	The armature reaction effect in a synchronous machine depends on a) load current b) power factor of the load c) speed of the machine d) both (a) and (b)	*1*	*K2*	*CO1*
4.	An ideal synchronous motor has no starting torque because the a) rotor is made up of salient poles b) relative velocity between the stator and rotor mmfs is not zero c) relative velocity between the stator and rotor mmfs is zero d) rotor winding is highly reactive	*1*	*K2*	*CO2*
5.	The value of load angle for a synchronous motor depends mainly upon its a) excitation b) load c) speed d) supply voltage	*1*	*K1*	*CO2*
6.	A synchronous motor connected to an infinite bus is over excited. Considering only the reactive power, from the point of view of the system, the machine acts as a) capacitor b) inductor c) resistor d) none of the above	*1*	*K2*	*CO2*
7.	The material used for the slip rings in an induction machine is a) Carbon b) Phosphor bronze c) Nickel d) Manganese	*1*	*K1*	*CO3*
8.	Skewing of the rotor in a three phase squirrel cage induction motor reduces a) noise, parasitic torque, starting torque and pull-out torque b) noise and parasitic torque, but increases starting torque and pullout torque c) noise and pullout torque, but increases parasitic torque and starting torque d) noise, parasitic torque and starting torque, but increases pullout torque	*1*	*K3*	*CO3*
9.	The fractional slip of an induction motor is the ratio of a) rotor copper loss/rotor input b) stator copper loss/stator input c) rotor copper loss/rotor output d) rotor copper loss/stator copper loss	*1*	*K3*	*CO3*

10.	The reversing of a 3-phase induction motor is achieved by a) Star/delta starter b) DOL starter c) Auto transformer d) Interchanging any two of the supply line	*1*	*K3*	*CO4*
11.	Which of the starting methods cannot be used for starting a 3-phase squirrel cage induction motor from the following: a) Star-delta starter b) Auto-transformer starter c) Rotor-resistance starter d) DOL starter	*1*	*K1*	*CO4*
12.	The speed of slip-ring three phase induction motor can be controlled from the rotor side by a) changing the supply voltage b) changing the supply frequency c) rheostatic control d) changing the number poles	*1*	*K2*	*CO4*
13.	A rotating magnetic field is produced by current in two windings displaced by 90 electrical degrees. This the principle of a) phase sequence b) phase splitting c) phase timing d) none of these	*1*	*K1*	*CO5*
14.	The slip of the backward field in the double field revolving theory is a) s b) -s c) 1-s d) 2-s	*1*	*K2*	*CO5*
15.	A servomotor is primarily used for a) uncontrolled, variable speed operation b) generating large amounts of power c) continuous high speed rotation d) closed-loop feedback control of position and speed	*1*	*K3*	*CO6*
16.	The BLDC motors preferred in drones and quad-copters because a) they operate at low speeds b) they provide high torque and precise control c) they are cheaper than brushed motors d) they require no power supply	*1*	*K3*	*CO6*

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Identify influence of power factor in the armature reaction of synchronous generator.	*3*	*K3*	*CO1*
18.	Utilizing a synchronous motor how the power factor can be improved in the infinite bus.	*3*	*K3*	*CO2*
19.	Analyze the role of rotor resistance in the starting torque and maximum torque of a three-phase induction motor.	*3*	*K4*	*CO3*
20.	Identify an efficient electrical braking method applied in three phase induction motor with justification.	*3*	*K3*	*CO4*
21.	Inspect the concept of phase splitting applied in starting the single phase induction motor.	*3*	*K4*	*CO5*
22.	Examine the number of rotor and stator teeth required in a four stack VR stepper motor to make a step angle of 1.8^{o}.	*3*	*K4*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	A three phase star connected alternator supplies a load of 10 MW at 0.85 power factor lagging & 11KV (terminal voltage). Its resistance is 0.1 Ω / phase & synchronous reactance is 0.66 Ω / phase. Solve the value of E.M.F generated and regulation.	*11*	*K3*	*CO1*

OR

	b)	Construct the step procedure of determining the voltage regulation of an alternator using the ZPF method.	*11*	*K3*	*CO1*
24.	a)	Identify and explain the techniques applied to start the synchronous motors in detail.	*11*	*K3*	*CO2*
		OR			
	b)	Make use of synchronous motor how power factor is improved explain this with the suitable phasor diagram.	*11*	*K3*	*CO2*
25.	a)	From the basic principle, develop the torque equation in three phase induction motor and draw the torque-slip characteristic.	*11*	*K3*	*CO3*
		OR			
	b)	Construct the equivalent circuit with the information obtained from the no-load and blocked rotor tests of three phase induction motor.	*11*	*K3*	*CO3*
26.	a)	Analyze the starting toque of three phase induction motor using auto-transformer starter and star-delta starter.	*11*	*K4*	*CO4*
		OR			
	b)	Compare the braking methods used in three phase induction motors and suggest the economic one.	*11*	*K4*	*CO4*
27.	a)	Draw the circuit diagram of a capacitor-start capacitor-run single-phase induction motor and analyze the need of capacitor.	*11*	*K4*	*CO5*
		OR			
	b)	Using a neat diagram, examine the operation of shaded pole single phase motor.	*11*	*K4*	*CO5*
28.	a)	Explain the operation of the hysteresis motor containing a shaded pole excitation. Also identify its application based on its characteristics.	*11*	*K3*	*CO6*
		OR			
	b)	Making use of the speed torque characteristics of DC and AC servomotors to explain their operation.	*11*	*K3*	*CO6*