

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 81286

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Fourth Semester

Electrical and Electronics Engineering

EE 3405 – ELECTRICAL MACHINES - II

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Write the principle of synchronous generator.
2. Calculate the distribution factor for a 36 slots, 4 pole, single-layer three phase winding
3. Mention some specific applications of synchronous motor.
4. A synchronous motor starts but fails to develop its full torque. Examine the reason.
5. Write the condition for maximum starting torque in Induction motor.
6. Draw the torque-slip characteristics of three phase induction motor.
7. List the advantages of slip power recovery scheme.
8. The stator of a three phase induction motor has 3 slots per pole per phase. If supply frequency is 50Hz, calculate the (a) number of stator poles and total number of slots on the stator (b) speed of the rotating stator field.
9. Write the principle of magnetic levitation.
10. Single phase induction motor is not a self-starting motor. Give reason.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Draw the phasor diagram and explain the Zero Power Factor method in detail.

Or

- (b) (i) Elaborate the necessary conditions for proper synchronization of alternators. (8)
- (ii) Derive the EMF equation of alternator. (5)

12. (a) (i) Explain the effect of increased load on a synchronous motor under conditions of normal and over excitation. (8)
(ii) Briefly explain the phenomenon of hunting in synchronous motor. (5)

Or

- (b) (i) Write down the procedure for starting a synchronous motor. (5)
(ii) Explain the concept of V-curve and inverted V - curve in a synchronous generator. (8)
13. (a) Discuss the construction and working of three phase induction motor in detail.

Or

- (b) With neat sketch explain the no-load and blocked rotor tests conducted in three phase induction motor.
14. (a) Discuss in detail the v/f method of speed control of induction motor. Also mention its disadvantages.

Or

- (b) With neat diagram, explain the static Scherbius and static Kramer slip power recovery schemes in detail.
15. (a) Discuss the operation of capacitor-start capacitor-run and shaded pole type of single phase induction motor.

Or

- (b) (i) How does torque develop in a repulsion motor? (7)
(ii) Explain the different excitation modes used to operate a stepper motor. (6)

PART C — (1 × 15 = 15 marks)

16. (a) A 3-phase, 400V, 50Hz induction motor gave the following test results:
No-load test: 400V, 8A, 600W
Blocked rotor test: 200V, 35A, 3000W
Stator resistance per phase: 0.5 ohms
Construct the circle diagram and estimate the line current, power factor, efficiency and output power at full load.

Or

- (b) A 3-phase, slip-ring, induction motor with star-connected rotor has an induced EMF of 120V between slip-rings at standstill with normal voltage applied to the stator. The rotor winding has a resistance per phase of 0.3 ohm and standstill leakage reactance per phase of 1.5 ohm. Calculate (i) rotor current/phase when running short circuited with 4 percent slip and (ii) the slip and rotor current per phase when the rotor is developing maximum torque.
-

