

Reg. No. :

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

Question Paper Code : 40548

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

Sixth Semester

Electrical and Electronics Engineering

EE 8005 — SPECIAL ELECTRICAL MACHINES

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define step angle.
2. Give the types of driver circuits.
3. Give basic features of switched reluctance motor.
4. Write the different modes of operation of SRM.
5. Compare conventional DC motor and PMBLDC motor.
6. State the application of PMBLDC.
7. Define load angle.
8. State the power controller of permanent magnet synchronous machines.
9. Define cogging.
10. Write short notes on SYNREL motor.

PART B — (5 × 13 = 65 marks)

11. (a) Describe in detail about the construction and working principle of variable reluctance stepper motor.

Or

- (b) Analyze the torque prediction and linear characteristics of a stepper motor in a real-world application.

12. (a) Describe the various power controller circuits applicable to switched reluctance motor and explain the operation of any one scheme with suitable circuit diagram.

Or

- (b) Draw the cross sectional view of switched reluctance motor and explain the principle of operation. State the advantages of SRM.
13. (a) Explain the closed loop control scheme of a permanent magnet brushless DC motor drive with a suitable schematic diagram.

Or

- (b) Discuss the use of Hall sensors for position sensing in PMBLDC motor with necessary block diagram.
14. (a) Describe in detail about the construction and working principle of PMSM.

Or

- (b) With necessary phasor diagram and circle diagram, describe the torque speed characteristics of PMSM.
15. (a) Describe in detail about the construction and principle operation of Hysteresis motor. State the applications.

Or

- (b) Explain the working principle of linear induction motor and also write its applications.

PART C — (1 × 15 = 15 marks)

16. (a) Identify appropriate power controllers for PMBLDC motor and explain with neat diagram.

Or

- (b) A stepper motor driven by a bipolar driven circuit has the following, winding inductance is 30 mH, rated current is 3A, DC supply voltage is 45V, the total resistance in each phase of 15 ohm, when the transistor are turned off, determine the time taken by the phase current to decay to zero and proportion of the stored inductive energy returned to the supply.