Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50509

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023

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. Why stepper motor works in external logic circuit?
2. What is holding torque in stepping motors?
3. What is the significance of closed loop control in switched reluctance motor.
4. Write the torque equation of switched reluctance motor.
5. What is the effect of demagnetization in brushless PMDC motors?
6. List the types of materials used in PMBLDC motors.
7. How permanent magnet synchronous motor is started?
8. What are slotless motors?
9. List out any four properties of reluctance motors?
10. Define cogging.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Describe the operation of a variable reluctance type stepper motor. (6)

(ii) What is stepping angle? Calculate the stepping angle for a 3-phase, 24- pole permanent magnet type stepper motor. (7)

Or

(b) (i) Explain with neat diagram the multistack configuration in stepper motors. (6)

(ii) Explain the working of hybrid motor. (7)

12. (a) (i) Draw the torque speed characteristics of switched reluctance motor. (6)

(ii) Explain the shaft position sensing of SR motor. (7)

Or

(b) Discuss the necessity of power electronic circuit in SR motor. Explain the different types.

13. (a) Describe the construction of a permanent — magnet DC motor. List the advantages of it compared with conventional DC motor.

Or

(b) (i) Derive the Torque equation of brushless DC motor. (6)

(ii) Discuss about the power controllers used in PMBDC motor. (7)

14. (a) (i) Explain the principle of operation of permanent magnet synchronous motor. (6)

(ii) Derive the emf equation of permanent magnet synchronous motor. (7)

Or

(b) Explain about

(i) Torque speed characteristics (6)

(ii) Microprocessor based control system (7)

In permanent magnet synchronous motor.

15. (a) Draw and explain the constructional features and principle of operation of synchronous reluctance motor. (13)

Or

(b) (i) With neat diagram explain the characteristics of hysteresis motor. (6)

(ii) Explain the working principle of repulsion motor. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Describe the position sensor that are used in PMBLDC motor and also the driving circuits employed.

Or

(b) Derive the thrust equation of an LIM and describe the transverse edge effects of LIM.

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