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

Question Paper Code : X 60512

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Seventh Semester
Electrical and Electronics Engineering
EE 2403/EE 73/10133EEE25 – SPECIAL ELECTRICAL MACHINES
(Regulations 2008/2010)
(Common to PTEE 2403/10133EEE25 – Special Electrical Machines for B.E. (Part-Time) Sixth/Seventh semester – EEE – Regulations 2009/2010)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. List the types of synchronous reluctance motors.
2. Give the difference between synchronous reluctance motor and switched reluctance motor.
3. Name the various modes of excitation in stepping motor.
4. Define the terms holding and detente torques as referred to stepper motor.
5. Write the voltage and torque equations of a switched reluctance motor.
6. List the methods of rotor position sensing in switched reluctance motor.
7. Classify the types of BLDC motor.
8. How the demagnetization occurs in PMBLDC motor ?
9. Write torque and EMF equation of PM synchronous motor.
10. Write the significance of power controllers of permanent magnet synchronous motors.

PART – B **(5×16=80 Marks)**

11. a) Derive the voltage and torque equations of synchronous reluctance motors, draw the phasor diagram and explain the characteristics. **(16)**

(OR)

b) Explain the working of variable reluctance type and hybrid type synchronous reluctance motor. **(16)**

12. a) Explain the construction operation of variable reluctance type stepper motor. Also explain about micro stepping. **(16)**

(OR)

b) i) Derive the reluctance torque of a stepper motor. **(8)**

ii) Calculate the stepping angle for a 3 phase 24 pole permanent magnet type stepper motor. **(8)**

13. a) Explain with neat diagrams the constructional details and operation of rotary switched reluctance motors.

(OR)

b) i) Explain with neat circuit any two configurations of power converters used for the control of switched reluctance motor. **(12)**

ii) State the advantages of sensorless operation. **(4)**

14. a) Discuss the hysteresis type current regulation of PMBLDC motor with neat diagram. **(16)**

(OR)

b) Analyze the operation of electronic commutator in PMBLDC motor with neat diagram.

15. a) Write short notes on :

i) Volt-ampere requirements in PMSM Motor. **(8)**

ii) Torque/speed characteristics in PMSM Motor. **(8)**

(OR)

b) Derive EMF and torque equations of permanent magnet synchronous motor.

———————