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Reg. No. :

Question Paper Code : 71091

M.E./M.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Second Semester
Electrical Drives and Embedded Control
PX5251 – SPECIAL ELECTRICAL MACHINES
(Common to M.E. Power Electronics and Drives)
(Regulations 2017)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. State the merits and demerits of PMBLDC motor.

2. What are the various types of rotor position sensor ?

3. Write down the emf equation of PMSM.

4. Define skew factor.

5. List out any four applications of switched reluctance motor.

6. Write down the simplified torque equation of SRM.

7. Define step angle.

8. State the use of current suppression circuits.

9. Write the various applications of hysteresis motor.

10. What is an A.C. series motor ? Give its applications.

PART – B   (5×13=65 Marks)

11. a) Discuss the operation of electronic commutator in PMBLDC motor with neat diagram.

(OR)

b) Explain in detail about the power controllers in Permanent magnet brushless D.C. motors.

12. a) Derive the emf and torque equation of permanent magnet synchronous motor.

   (OR)

   b) Explain the construction and performance of a permanent magnet synchronous motor with neat sketch.

13. a) Explain in detail the constructional features and working principle of switched reluctance motors.

   (OR)

   b) Discuss in detail about the characteristics and control techniques of switched reluctance motor.

14. a) Write a detailed technical note on the following :

   i) Modes of excitation of stepping motor.

   ii) Static characteristics of stepping motor.

   (OR)

   b) With a neat circuit diagram, explain the driving circuits of stepping motors.

15. a) Explain in detail about the principle of operation of hysteresis motor.

   (OR)

   b) Discuss the working principle and applications of linear induction motor.

<div align="center">PART – C</div> <div align="right">(1×15=15 Marks)</div>

16. a) Explain the term stepping angle and explain how full step, half step and micro step modes of operation is achieved in a stepper motor also discuss the dynamic characteristics of stepper motor.

   (OR)

   b) A switched reluctance motor with 6 stator poles and 4 rotor poles has a stator pole arc of 30° and rotor pole arc of 32°. The aligned inductance is 10.7 mH and unaligned inductance is 1.5 mH. Saturation can be neglected. Calculate the instantaneous torque when the rotor is 30° before aligned position and the phase current is 7 A.