

B.E. Degree Examination, December 2020

Seventh Semester

EE16701 – SPECIAL ELECTRICAL MACHINES

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Reluctance motor operates at power factor of ___
a) .8 b) .2 c) .3 d) .9
2. SyRM is a self-starting machine with
a.)Axially laminated rotor b.)Radially laminated rotor c.)Horizontally laminated
d.)Vertically laminated
3. SRM is a better alternative for
a.) D.C shunt Motor b.)D.C Series Motor c.) D.C Compound motor
4. In salient pole synchronous machine, maximum power occurs at a load angle of
a.) 0° b.)less than 90° c.)Greater than 90° d.) 90°
5. Write the formula for the speed of the AC Motor.
6. Mid frequency Resonance in Stepper Motor. Define.
7. Isolation is needed in SRM.Justify.
8. Why PMSM operating in self-controlled mode is known as commutator less dc motor?

PART B - (4 X16 = 64 marks)

09. (a) (i) Explain the construction and working principle of the type of stepper (16)
motor used in Escalators. Draw the relative positions of rotor and stator
teeth after switching.

(OR)

- (b) (i) Explain in detail about different types of power drive circuits for stepper (12)
motor.
- (ii) A stepper motor has a step angle of 1.8° . Find (4)
a.)Resolution b.)Number of steps required for 50 revolutions c.)Shaft
speed if the stepping frequency is 5000 pulse/sec.
10. (a) (i) Discuss about the control scheme of machine used in Washing Machine (8)
with a neat block diagram.
- (ii) Quantify the use of Rotor position sensors and explain its types (8)

(OR)

- (b) Demonstrate the construction and working principle of Synchronous Reluctance Motor. **(16)**

11. (a) (i) Illustrate the sensor less control of PMSM. **(8)**
(ii) A Permanent magnet DC motor has an armature resistance of 1.03Ω . It draws a current of 1.25A at no load with 50V supply and running at 2100 rpm. Find a.) Speed-voltage constant b.) Rotational losses c.) Output power when it runs at 1700 rpm at 48V supply. **(8)**

(OR)

- (b) (i) Demonstrate the working of BLPM square wave motor with half cycle magnet arc. **(10)**
(ii) Contrast BLDC motor with Conventional DC motor. **(6)**
12. (a) Obtain the torque equation of BLPM sine wave motor by utilizing phasor diagram. **(16)**

(OR)

- (b) With the help of a flowchart and block diagram explain the microprocessor based control of PMSM **(16)**