

6. For which one of the following applications a Reluctance Motor is preferred?
 - (a) Electric shavers
 - (b) Refrigerators
 - (c) Signaling and timing devices
 - (d) Lifts and hoists
7. Which one of the following permanent magnet material has low coercive force?
 - (a) Cobalt – samarium
 - (b) Alnico
 - (c) Barium and strontium ferrites
 - (d) Neodymium – iron - boron
8. Permanent Magnet Brushless DC Motors are compact in size due
 - (a) Absence of field winding
 - (b) Presence of smaller field winding
 - (c) Present of magnets
 - (d) Any of the mentioned
9. In order to get maximum torque in Permanent Magnet Synchronous Motor, the angle between the stator flux and rotor flux is kept closer to.
 - (a) 90°
 - (b) 45°
 - (c) 30°
 - (d) 60°
10. Which of the following motor would suit applications where constant speed is absolutely essential to ensure a consistent product?
 - (a) brushless dc motor
 - (b) disk motor
 - (c) permanent-magnet synchronous motor
 - (d) stepper motor

PART - B (5 x 2 = 10 Marks)

11. Skewing is required for Synchronous reluctance motor. Justify?
12. Define holding torque and detent torque in Stepper motor.
13. Mention some position sensors used in switched reluctance motor.
14. How the demagnetization occurs in PMBLDC motor.
15. What are the assumptions made in derivation of torque equation for Permanent Magnet Synchronous Motor?

PART - C (5 x 16 = 80 Marks)

16. (a) A 10 HP, 4 pole, 240V, 60Hz, reluctance motor operating under rated load condition has a torque angle of 30° . Determine (a) Load torque on shaft (b) Torque angle if the voltage drops to 224V (c) For the above torque angle, will the rotor pullout of synchronism (16)

Or

- (b) Derive the voltage and torque equation of synchronous reluctance motor (16)
17. (a) Describe the construction and operation of Variable Reluctance Stepper Motor with different modes. (16)

Or

- (b) Explain the closed loop control concept of Stepper motor with neat diagram. (16)
18. (a) (i) Describe the various operating modes of Switched Reluctance motor (8)
(ii) Explain the speed-torque characteristics of Switched Reluctance Motor. (8)

Or

- (b) Describe the various operating modes of Switched Reluctance motor (16)
19. (a) (i) Explain in detail about magnetic circuit analysis of Permanent Magnet Brushless DC Motor on open circuit. (8)
(ii) Explain the speed- torque characteristics of Permanent Magnet Brushless DC motor in detail. (8)

Or

- (b) A PMBLDC motor has torque constant 0.12 Nm/A referred to DC supply. Find the motor's no load speed when connected to 48V DC supply. Find the stall current and stall torque if armature resistance is $0.15\Omega/\text{phase}$ and drop in controller transistor is 2V . (16)
20. (a) Explain microprocessor based control of Permanent Magnet Synchronous Motor in detail. (16)

Or

- (b) (i) Discuss about Volt-ampere requirements in Permanent Magnet Synchronous Motor. (8)
(ii) Derive an EMF equation of Permanent Magnet Synchronous Motor. (8)

