A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 99304

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

Elective

Electrical and Electronics Engineering

19UEE904 – SPECIAL ELECTRICAL MACHINES

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In PMBLDC motor Field Magnet on the CO1- R

   (a) Stator (b) Rotor (c) both (a) and b) (d) None of the above

2. The speed of permanent magnet BLDC motor cannot be controlled by CO1- U

   (a) Rheostatic control method (b) Flux control method

   (c) Electronic circuits (d) None of the above

3. Pmsm working principle is CO2-R

   (a) Amphere circuital law (b) ohms law (c) magnetic locking (d) lenz law

4. EMF equation of the PMSM similar to CO2-U

   (a) Transformer (b)dc machine (c) stepper motor (d) None of the above

5. What is the angle between stator direct axis and quadrature axis? CO3-R

   (a) 90° (b)0° (c) 45° (d) 60°

6. Types of control techniques used in SRM CO3- R

   (a) Voltage control (b)Frequency control (c)v/f control (d) Hysteresis control

7. Operation of stepper motor at high speed is referred to as CO4- U

   (a) Fast forward (b)Slewing (c)Inching (d) Jogging

8. Torque constant of a stepper motor is also called as CO4- R

   (a) Détente torque (b)Torque sensitivity (c)Pull in torque (d) Pull out torque

9. Radial airgap motor has ---------- CO5- R

(a) axial laminations (b)radial laminations (c)both laminations (d) none of the above

10. A linear Induction Motor may be_____. CO5- R

(a) Single sided / Double sided (b)Primary / secondary

(c)none of the above (d) both a &b

PART – B (5 x 2= 10 Marks)

11. List out the different classifications of BLPM DC motor CO1- U

12. What are the assumptions made in the derivation of EMF equation for PMSM? CO2- R

13. Illustrate the different modes of operation of switched reluctance motor. CO3 -U

14. Define step angle. CO4 -U

15. List the applications of synchronous reluctance motors. CO5 -U

PART – C (5 x 16= 80 Marks)

16. (a) Explain the Construction & principle of operation of PMBLDC motor. CO1- U (16)

Or

(b) Sketch the structure of power controller for PMBLDC motor & Explain the functions of each block CO1- U (16)

17. (a) Draw and explain the phasor diagram of PMSM CO2- U (16)

Or

(b) Discuss about various power controller used in PMSM motor CO2- Ana (16)

18. (a) Draw the cross sectional view of switched reluctance motor and explain the principle of Operation CO3- Ana (16)

Or

(b) Describe the following: CO3- U (16)
(i) Role of microprocessors in control of switched reluctance motor
(ii) Sensorless operation

19. (a) Describe in detail the construction and working of variable reluctance stepper motor. CO4- R (16)

Or

(b) Draw and explain drive circuits and their performance characteristics for stepper motor CO4- U (16)

20. (a) Describe the constructional features and operation of variable reluctance synchronous reluctance motor CO5- U (16)

Or

(b) Describe briefly about the repulsion motor. CO5- R (16)