Student Exam No:-_____

GANPAT UNIVERSITY
M.TECH SEM-I (ELECTRICAL)
REGULAR EXAMINATION NOV-DEC 2015
3EE104: ADVANCED ELECTRICAL MACHINES

Time: 3 Hours   Total Marks:-60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.
(4) Assume suitable data if required.

SECTION-I

Q:1 (A) Discuss variable voltage, variable frequency induction generator. (6)
(B) Discuss steady state equivalent circuit model of three phase induction motor with necessary diagram and equations. (4)

OR

Q:1 (A) Explain various operating mode of DFIM and write application of DFIG. (7)
(B) A three phase wound rotor induction motor has a star connected rotor winding with a rotor resistance of 0.12Ω/phase. With the slip rings shorted, the motor develops a rated torque at a slip of 0.04 and line current of 100 A. What external resistance must be inserted in each rotor phase to limit the starting current to 100 A? (3)

Q:2 (A) Define condition monitoring and explain condition monitoring of electrical equipment with block diagram. (5)
(B) Explain various types of faults in induction motor and suggest techniques to diagnosis that fault. (5)

OR

Q:2 (A) Discuss artificial neural network for induction motor fault diagnosis. (5)
(B) Discuss fault detection and diagnosis techniques for transformer. (5)

Q:3 Attempt any two: (10)
(A) Compare BLDC and conventional dc motors. Explain axial flux and radial flux motors

(B) Explain Bifilar winding type converter used for S.R.M
(C) Explain torque angle characteristic of stepper motor.

SECTION-II

Q:4 (A) Discuss construction and working of hybrid stepper motor. (5)

(B) Comment on number of stator and rotor poles of SRM. Mention merits, limitations and applications of SRM. (5)

OR

Q:4 (A) How stepper motor is different than SRM? Discuss operation of variable reluctance stepper motor. (5)

(B) How unidirectional torque can be obtained in SRM. Explain energy conversion in SRM. (5)

Q:5 (A) Define (i) Detent torque, (ii) pull out torque, (iii) slewing mode, (iv) pull in torque in a stepper motor (5)

(B) Justify that BLDC machine is AC machine. Explain working of BLDC machine with 120° conduction. (5)

OR

Q:5 (A) Explain the working principle of BLDC and PMBLDC machine. (5)

(B) What is significance of transformation equations in a reference –frame theory? Derive the relation $P_{qdos} = P_{abcs} = 3/2(v_{qs}i_{qs} + v_{ds}i_{ds} + 2v_{os}i_{os})$. (5)

Q:6 Attempt any two: (10)

(A) Classify the PMBLDC machine and Discuss its application.

(B) Derive the winding inductances and voltage equations for induction machine and also mention the assumptions made for derivation.

(C) Discuss block diagram of typical electromechanical system. Explain energy balance in such system.

END OF PAPER
Best of Luck