Reg. No. : | | | | | | | | | | |

Question Paper Code: 52551

M.E. DEGREE EXAMINATION, NOV 2016

First Semester

Power Electronics and Drives

15PPE101 - ANALYSIS OF ELECTRICAL MACHINES

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Which is example of multiply excited magnetic field system?

   (a) Relay (b) Solenoid (c) DC Shunt motor (d) None of these

2. The energy storing capacity of magnetic field is about _____ times greater than that of electric field?

   (a) 50,000 (b) 25,000 (c) 10,000 (d) 40,000

3. The frequency of rotor currents at standstill is equal to

   (a) Zero (b) 2*f* (c) *f* (d) *sf*

4. The maximum power developed in a synchronous motor depends on all of the following except

   (a) Supply voltage (b) Direction of rotation
   (c) Rotor excitation (d) Maximum value of coupling angle

5. Inter poles in DC machines are provided to reduce

   (a) Sparking (b) Armature Reaction
   (c) Iron loss (d) Efficiency

PART - B (5 x 3 = 15 Marks)

6. Write the difference between single and multi excited electromagnetic system.

7. Draw the phasor diagram for balanced steady state position.

8. What do you understand by power invariant transformation?

9. State Park's equation for synchronous machine.

10. List the dynamic performance for three phase faults in induction machines.

PART - C (5 x 16 = 80 Marks)

11. (a) Derive the general expression of stored magnetic energy, co-energy and force for doubly excited system. (16)

Or

(b) Derive the general expression for a double excited electromagnetic system. (16)

12. (a) Derive the expression for the balanced steady state phasor and voltage equation of transformation variables. (16)

Or

(b) What is meant by arbitrary reference frame? Show that commonly used reference frame can be derived as a particular case of the arbitrary reference frame. (16)

13. (a) Derive the expression of ' State equation' of DC machines. (16)

Or

(b) Write and explain the solution of dynamic characteristics of permanent magnet DC machines by Laplace transformation. (16)

14. (a) Explain the simulation of a symmetrical three phase induction motor in the arbitrary reference frame. (16)

Or

(b) Derive the expression for voltage equation of PMSM in arbitrary reference frame and rotor reference frame. (16)

15. (a) Discuss the significance of voltage and torque equation in synchronous machines. (16)

Or

(b) Discuss the reference frame theory in a step by step basis and show that a three phase symmetrical induction machine model can be transformed in to two phase machine mode. (16)
