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

Question Paper Code : 82107

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

First Semester

Power Electronics and Drives

PE 9214/HV 9311/PE 914/HV 911 – ELECTRO MAGNETIC FIELD COMPUTATION AND MODELLING

(Common to M.E. Power Systems Engineering, M.E. High Voltage Engineering and M.E. Electrical Drives and Embedded Control)

(Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Write Maxwell's equation for time varying magnetic field.

2. Give the equations to calculate the force and torque experienced by a current carrying conductor in a magnetic field.

3. State the limitations of a conventional design procedures.

4. State the merits of analytical method of solving field problems.

5. What is FEM?

6. What is stiffness matrix?

7. Give the energy density expressions for electric and magnetic fields.

8. Give the expressions to find the time varying electric and magnetic field intensities.

9. How do you apply field computational methods to design an magnetic actuator?

10. How do you minimize fringing of field in the design of an insulator?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the principle of energy conversion.

Or

(b) Brief about the Electro Thermal formulation.

12. (a) What is the need for field analysis based design? Brief about a method of problem formulation.

Or

(b) Give a detailed procedure for solving field problem using numerical methods.

13. (a) Explain the energy minimization using FEM.

Or

(b) What is 1D and 2D planar? How will it be useful the designer? Discuss.

14. (a) Derive the formula to find a capacitance between a parallel transmission lines.

Or

(b) Derive a formula to calculate the capacitance between a transmission line and ground.

15. (a) Explain the magnetic circuit design of a Transformer.

Or

(b) How do you design a armature core of an Induction Motor? Explain.

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