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

Question Paper Code : 10319

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2012.

Fourth Semester

Electrical and Electronics Engineering

EE 2251/131401/EE 42/EE 1251 A/10133 EE 402/080280003 —
ELECTRICAL MACHINES — I

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Clearly define the MMF and EMF.

2. What are the core losses and how can this loss be minimized?

3. What happens if DC supply is applied to the transformer?

4. Why all day efficiency is lower than commercial efficiency?

5. What do you mean by coenergy?

6. What are the requirements of the excitation systems?

7. What is meant by reactance voltage?

8. Why fractional pitched winding is preferred over full pitched winding?

9. Define commutation.

10. Why DC series motor is not suitable for belt driven loads?

PART B — (5 × 16 = 80 marks)

11. (a) Explain clearly the statically and dynamically induced EMF. (16)

Or

(b) (i) Discuss AC operation of magnetic circuits (10)

(ii) A single phase, 50Hz, 100KVA transformer for 12000/240V ratio has a maximum flux density of 1.2 Wb/m^2 and an effective core section of 300 cm^2, the magnetising current (RMS) is 0.2A. Estimate the inductance of each wire on open circuit. (6)

12. (a) Describe the method of calculating the regulation and efficiency of a single phase transformer by OC and SC tests. (16)

Or

(b) (i) Derive an expression for the emf of an ideal transformer. (6)

(ii) Calculate the efficiency at half, full load of a 100 KVA transformer for PF of unity and 0.8. The copper loss is 1000 W at full load and iron loss is 1000 W. (10)

13. (a) Deduce an expression for the mechanical force of field origin in a typical attracted armature relay. (16)

Or

(b) Find an expression for the magnetic force developed in a multiply excited magnetic systems. (16)

14. (a) Explain the construction and principle of operation of synchronous machines (16)

Or

(b) A 2000V, three phase star connected synchronous motor has an effective resistance and synchronous reactance of 0.2Ω and 2.2Ω per phase respectively. The input is 800Kw at normal voltage and the induced line emf is 2500V. Calculate the line current and power factor. (16)

15. (a) Explain the different methods of excitation and characteristics of a DC generators with suitable diagrams. (16)

Or

(b) What are the methods of speed control of a DC shunt motor? and briefly explain them with help of neat diagram. (16)

———————