Roll No. .....

24320

B. Tech. 6th Semester (EE) Examination – May, 2014

COMPUTER ADDED ELECTRIC MACHINES

Paper : EE-314-F

Time : Three Hours] *[M.M. : 100*

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complain in this regard, will be entertained after examination.

Note : Attempt any ***five*** questions out of given ***nine*** and at least ***one*** question from each Section and 1 is ***compulsory***.

1. (a) What is the use of heat sinks in electrical machines ? 5 x 4 = 20

(b) What is magnetic loading ?

(c) Compare leakage flux and leakage reactance.

(d) Explain the working principle of Induction motor.

(e) What do you mean by term optimization ?

SECTION – A

2. (a) Explain the general features of electrical machines and the limitations coming across during their designing. 10

(b) Derive an expressions for temperature rise, heating and heat dissipation for electrical machine while finalizing there design. 10

3. Explain in detail the Basic design principles for a electrical machine. 20

SECTION – B

4. A large reel of paper installed at the end of a paper machine has a diameter 1.8m, a length of 5.6 m, and a moment of inertia of 4500 kg.m^2. It is driven by a directly coupled variable speed dc motor turning at 120 r/min. The paper is kept under a constant tension of 6000 N. Calculate (i) The power of motor when the reel turns at a constant speed of 120 r/min. (ii) If the speed has to be raised from 120 r/min to 160 r/min in 5 seconds, calculate the torque that the motor must develop during the interval. (iii) Power of motor after it has reached the desired speed of 160 r/min. 20

5. (a) A fan rated at 3.75 KW blows 240 m^3/min of air through a 750 KN motor to carry away heat. If the inlet temperature is 22°C and outlet temp. is 31°C, estimate the losses in the motor. 10

(b) How no-load c/n is a major factor to consider while designing a transformer and induction motor ? Explain. 10

SECTION – C

6. Explain the detailed design of Induction motor. 20

7. Explain the detailed design of Synchronous Machine. 20

SECTION – D

8. (a) Enlist the advantages of CAD for machine design alongwith its limitations. 10

(b) What are the steps involved in the development of a computer program and performance prediction of a electric machine design process. 10

9. Write short notes on any *two* : 20

(a) Gap Contraction coefficient.

(b) Optimization techniques for machine design.

(c) Design of field magnet.