Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE / Electrical & Electronics) (2011 Onwards E-I) (Sem.–6)

COMPUTER AIDED ELECTRICAL MACHINE DESIGN

Subject Code : BTEE-605A

Paper ID : [A2339]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

a. How the induction motor can be designed for best power factor?

b. What are the materials used for slip-rings and brushes in induction motor?

c. Name few insulating materials used in transformer.

d. Why short chorded windings are employed in induction motor?

e. Why stepped core are generally used for transformer?

f. Why wound rotor construction is adopted?

g. What type of starter cannot be used for squirrel cage motors?

h. What is the fundamental requirement of a good insulating material?

i. Define unbalanced magnetic pull.

j. What are the ranges of specific magnetic and specific electric loading in induction motor?

SECTION-B

2. Classify the insulating materials based on thermal considerations. Give examples for each classification.

3. Derive the output equation of a three-phase core type transformer.

4. Explain the peripheral velocity and its influence on design of machines.

5. Prove that e.m.f./turn of a single-phase transformer = $K\sqrt{Q}$, where Q = per phase kVA output of transformer.

6. What steps are taken in the design procedure to minimize crawling and cogging in case of a three-phase induction motors?

SECTION-C

7. Discuss the various factors considered when estimating the length of air-gap of a three-phase induction motor. Give the expressions used in calculations of length of air-gap.

8. Derive the expression for the number of cooling tubes required to limit the temperature rise in a three-phase transformer. Design its tank dimensions and show them pictorially.

9. Show that :

   a. for minimum cost design of transformer, cost of iron = cost of conductor and;

   b. for minimum copper loss, current density in primary winding = current density in secondary winding.