1058

B. Engg. (Electrical & Electronics Engg.)
8th Semester
EE-808: Electrical Machine Design

Time allowed: 3 Hours   Max. Marks: 50

NOTE: Attempt **five** questions in all, including Q. No. 1 which is compulsory and
          selecting atleast **two** questions from each Unit.
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I.   Attempt the following: -
      (a)   What are the factors to be considered for selection of motor power ratings?
      (b)   Explain how the output and losses of machines vary with linear
             dimensions.
      (c)   What are the different types of leakage reactance in induction motor?
      (d)   How will you make a choice of specific magnetic loading for machines?
      (e)   Write down the advantages of direct cooling of Turbo-alternation.   (5×2)

UNIT-I

II.   Determine the dimensions for care and yoke for a 5 KVA, 50Hz 1−ϕ core type
      transformer. A rectangular core is used with long side twice as long as short side.
      The window height is 3 times the width, voltage per turn is 1.8V, space factor 0.2,
      current density 2.5A/mn^2, window space factor of 0.28 and stacking factor of 0.9.
                                                                              (10)

III. Derive an expression for the leakage reactance of a transformer with primary and
      secondary cylindrical coils of equal length. State clearly the assumptions made.
                                                                              (10)

IV.   Show that for rotating electric machines, percentage core loss decreases with
      increase in size. Develop the output equation of an a.c. machine.   (10)

UNIT-II

V.   (i)   Discuss peripheral speed and its influence on design of machines.
      (ii)   Define short-circuit ratio of a synchronous machine. What is its effects on
             the performance?   (5+5)

VI.   A 415V, 3-phase, 50Hz, 6 pole delta connected induction has a specific magnetic
      loading of 24000 A/m. The stator core diameter and length are 0.275m and
      0.15m respectively. Find output of machine if full load efficiency and power
      factor are 0.88 and 0.89 respectively. Determine the number of stator slots,
      conductors per slot and the length of air-gap.   (10)

VII. Write note on the following: -
      (a)   Analysis and Synthesis method of machine design
      (b)   Types of alternators   (5+5)
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