4E 2111

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B.Tech. IV Semester (Main/Back) Examination 2012
Electrical Engineering.
4EE3 Electrical Machines - II

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt Overall **Five questions** selecting **one question** from **each unit**. All questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.)*

Unit - I

1. a) Derive the expression for induced e.m.f. in one "N TURN" Full Pitch coil. Show that e.m.f. generated in a short pitch coil is reduced by a factor $\cos \varepsilon/2$. where e is the "Chording Angle". **(5+5)**

   b) For a 3 phase winding with coil span of 150^0, determine the distribution, pitch and winding factor. Take three phase winding. Assume that it is uniformly distributed and has a phase spread of 120^0 also calculate the distribution and winding factors when winding has 9 (nine) slots per pole. **(6)**

OR

1. a) Explain M.M.F. generation in distributed winding with the help of suitable diagrams and wave forms. **(5)**

   b) Define distribution factor (K_d) and show that its expression for the fundamental frequency component is given by

$$K_d = \frac{Sin\ q\ Y/2}{q\ Sin\ Y/2}$$

   where q denotes the slots per pole per phase and Y is the slot angular pitch. **(6)**

   c) For a 3phase winding with 3 slots per pole per phase and coil span of 8 slots compute the following :

   i) Breadth and pitch factor.

   ii) Percentage increase in per phase e.m.f (r.m.s) due to third harmonic where flux density in the Air Gap of the machine is found to have 30% third harmonic. **(5)**