

2054

B.E. (Electrical and Electronics Engineering)

Eighth Semester

EE-808 (i): Electrical Machine Design

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

- a) What are the factors that decide the choice of specific magnetic and electric loading in induction machine?
- b) Define stacking factor and give its typical value.
- c) Write down the output equation of 1-phase and 3-phase transformer.
- d) What are the factors to be considered for selecting number of slots in induction machine stator?
- e) Discuss how the ventilation and cooling of large high speed alternator is carried out? (5x2)

### UNIT - I

- II. a) Explain the significance of the ratio  $r = \phi_m / AT$  in the design of transformer.  
b) Define the terms specific electric loading and magnetic loading as applied to transformer. Discuss its importance. (2x5)
- III. Calculate overall dimensions of a 200 KVA, 6600/440 V, 50 Hz, 3-phase core type transformer. The following data may be assumed:  
BM = 1.3 wb/m<sup>2</sup>, current density = 2.5A/mm<sup>2</sup>, K<sub>w</sub> = 0.3, overall height is equal to overall width, K<sub>i</sub> = 0.9, emf per turn = 10V. Use. Circuciform transformer. (10)
- IV. a) Explain various cooling methods used in electrical machines.  
b) Discuss various duties and ratings of rotating machines and give their temperature time curves. (2x5)

P.T.O.

(2)

**UNIT - II**

- V. What are the typical values of SCR for salient pole and turbo alternators? How the value of SCR affects the design of alternator? Derive the output equation of alternator explaining all the terms. (10)
- VI. Determine the main dimensions of a 15 KW, 3-phase, 400 V, 50Hz, 2810 rpm, squirrel cage induction motor having a efficiency of 88% and full load power factor of 0.9. specific magnetic loading is  $0.5 \text{ wb/m}^2$ , specific electric loading is 25000 A/m. (10)
- VII. Write note on the following:-
- a) Elimination of Harmonic torques
  - b) Hybrid method of electrical machine design (2x5)

x-x-x