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**Fourth Semester B.E. Degree Examination, June / July 2014**  
**Transformers and Induction Machines**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART – A**

- 1
  - a. Enlist the assumptions for an ideal transformer. (04 Marks)
  - b. What happens if by mistake DC supply is given to transformer? (04 Marks)
  - c. Draw phasor diagram of single phase transformer for inductive and capacitive load. (08 Marks)
  - d. Define transformation ratio and its significance. (04 Marks)
- 2
  - a. Draw equivalent circuit of single phase transformer referring the primary side quantities to secondary side and explain it. (06 Marks)
  - b. Why does core loss remain constant, at all loads? Explain the reasons. (04 Marks)
  - c. Prove that for maximum efficiency, Iron loss is equal to copper loss. (04 Marks)
  - d. The following readings are obtained from O.C and S.C tests on 8KVA 400/120 , 50Hz transformer  
 OC test (L.V side) : 120V ; 4A ; 75W  
 SC test (H.V side) : 9.5V ; 20A; 110W , Calculate  
 i) The equivalent circuit constants.  
 ii) Voltage regulation and efficiency for 0.8 lagging power factor load and  
 iii) The efficiency at half full load and 0.8/pf load. (06 Marks)
- 3
  - a. Justify the need for parallel operation of transformer. (04 Marks)
  - b. Enlist the condition to be satisfied for parallel operation of transformers. (04 Marks)
  - c. Derive the expression for copper saving in Auto transformer. (06 Marks)
  - d. Write a note on constant current transformer. (06 Marks)
- 4
  - a. A 3 phase 1000KVA, 6600/1100 V transformer is delta connected on the primary and star connected on the secondary. The primary resistance per phase is 1.8 ohm and secondary resistance phase is 0.025 ohm. Determine the efficiency on full load at  
 i) Unity pf      ii) 0.8 pf lagging if the iron loss is 15kW. (10 Marks)
  - b. State with the help of connection and vector diagram how a 2 – phase supply can be obtained from a 3 – phase supply. (06 Marks)
  - c. What is the advantage of V – V connection? (04 Marks)

**PART – B**

- 5
  - a. Describe the construction and working principle of a 3 phase induction motor. (08 Marks)
  - b. Derive an expression for the torque of an induction motor and obtain the condition for maximum torque. (08 Marks)
  - c. Draw torque slip curve for 3 phase induction motor. (04 Marks)

- 6 a. A 400V, 11kW, 3 phase, 50Hz 4 pole delta connected induction motor gave the following test data :  
No load test : 400V, 8A, 1000W  
Locked rotor test : 100V, 25A, 1750W  
Construct the circle diagram and determine  
i) Full load current and power factor. (16 Marks)  
ii) Maximum possible power output.  
iii) The best possible operating factor. (04 Marks)
- b. Explain the phenomenon of i) cogging ii) Crawling. (04 Marks)
- 7 a. Describe the working principle of double cage rotor. (05 Marks)  
b. Describe the working of self excited and externally excited induction generator. (10 Marks)  
c. Justify the suitability of induction generator in windmills. (05 Marks)
- 8 a. Why starters are required for 3 phase induction motor? (02 Marks)  
b. Describe star – delta starter. (08 Marks)  
c. Explain the basic difference between 3 phase and 1 phase induction motor. (04 Marks)  
d. Write a note on shaded pole motor. (06 Marks)

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