

Unit - V

5. a) Why single phase induction motors are not self starting? How are they started?
- b) State the types of single phase induction motor based on their starting method.
- c) What is Linear Induction Motor (LIM)? What are the two effects in LIM?
- d) With the help of a neat diagram, explain how no load test on single phase induction motor is used to determine friction and windage loss.

OR

Draw the equivalent circuit of a single phase induction motor clearly stating the various parameters. Which tests are used to determine these parameters?

Roll No

EX-404

B.E. IV Semester

Examination, December 2016

Electrical Machine - I

Time : Three Hours

Maximum Marks : 70

- Note:** i) Answer five questions. In each question part A, B and C is compulsory and D part has internal choice.
- ii) All parts of each question are to be attempted at one place.
- iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
- iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) Explain the principle of transformer action. Derive an expression for the emf induced in transformer.
- b) What is the purpose of performing open circuit and short circuit test on transformer?
- c) Draw the Phasor diagram of a transformer under inductive load and also write the corresponding emf equation.
- d) A 400 kVA transformer has an iron loss of 2 kW and the maximum efficiency at 0.8 p.f occurs when the load is 240 kW. Calculate :
- i) Maximum efficiency at upf and
- ii) Efficiency on full load at 0.71 p.f lag

OR

Explain sumpner's test for testing two single phase transformers with the help of a neat circuit diagram.

Unit - II

2. a) State various conditions of parallel operation of :
- i) Single phase and
 - ii) Three phase transformers.
- b) Explain the purpose of using :
- i) Conservator and
 - ii) Breather in transformer
- c) What is the difference between no-load and on-load tap changers?
- d) Explain vector grouping of transformers. Mention its usefulness.

OR

Explain scott connection with the help of a neat diagram giving its applications.

Unit - III

3. a) Describe briefly two types of rotor construction of induction motor.
- b) Explain briefly the working principle of a 3 phase induction motor.
- c) Draw and briefly explain Torque-slip characteristics of a 3 phase induction motor.

- d) The power input to a 500V, 50Hz, 6 pole, 3 phase induction motor running at 975 rpm is 40 kW. The stator losses are 1 kW and friction and windage losses are 2 kW.

Calculate :

- i) The slip
- ii) Rotor copper loss
- iii) The output in HP
- iv) The efficiency

OR

Draw the steady state operating characteristics of a 3 phase induction motor and give reason for the following :

- i) Why rotor speed falls as the load torque is increased.
- ii) p.f is low at no load, but improves as the load on the motor is increased

Unit - IV

4. a) Explain the phenomenon of crawling in a 3 phase induction motor.
- b) Explain the phenomenon of cogging in a 3 phase induction motor.
- c) What are the different methods of speed control of 3 phase induction motors?
- d) State the advantages of double cage induction motor. Draw its torque-speed characteristics.

OR

Explain the speed control of slip ring induction motor.