

Roll No

EE/EX-225

B.E. IV Semester

Examination, June 2017

Choice Based Credit System (CBCS)

Electrical Machine

Time : Three Hours

Maximum Marks: 60

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

iii) Assume any missing data, if any.

1. a) Obtain the equivalent circuit of a 200/400Volt, 50Hz single phase transformer from the following test data:

O.C. test: 200V, 0.7 Amp, 70Watts - on L.V. Side

S.C. test: 15V, 10 Amp, 85Watts - on H.V. Side

Also calculate the secondary voltage when delivery 5000Watts at 0.8 p.f. lagging, the primary voltage being 200V.

- b) Explain the working principle of Auto transformer. Draw its equivalent circuit and phasor diagram. Show the saving of copper as compared to two winding transformer.

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2. a) Why iron losses remains constant of a transformer on varying values of load current justify the statement.

- b) Draw the phasor diagram of single phase transform on inductive load.

- c) From the following data of a 500kVA, 3300/400V, 50Hz single phase transformer, Calculate the full load regulation and efficiency at a p.f. of 0.8 lagging.

S.C. test: 1250Watts, 100Volts, secondary short circuited with full load current in it,

O.C. test: 1000Watts with normal primary voltage.

3. Explain the following two only in brief:

- a) Pulse and high frequency transformer

- b) Scott connection

- c) Conservator and breather.

4. a) A three phase, 400Volt induction motor gave the following test readings:

No. load test: 400Volt, 1250Watts, 9Amp.

Short circuit test: 150Volt, 4000Watts, 38Amp.

Draw the circle diagram. If the normal rating is 14.9kW, find from the circle diagram, the full load value of current, power factor, and slip.

- b) Draw and explain the torque-slip characteristics of the three phase induction motor.

5. a) A 15 H.P., 3 Phase, 6-Pole, 50Hz, 400V, Delta connected induction motor runs at 960 rpm on full load. If it takes 86.4 Amp on direct starting, find the ratio of starting torque to full load torque with a star delta starter. Full load efficiency and power factor are 88% and 0.85 respectively.
- b) Give the construction and working principle of induction generator. Also draw the circuit and phasor diagram to explain the same.
6. Explain the following in brief:
- a) Power factor control of three phase induction motor
- b) Impact of unbalance supply and harmonics on the performance of three phase induction motor.
7. a) The following data relates to tests on a 110Volt, 150Watts, 50Hz, 6-pole, single phase induction motor:
- No-load test: 110Volt, 63Watts, 2.7Amps.
- Blocked rotor test: 55V, 212Watts, 5.8Amps.
- The stator winding resistance is 2.5 ohms and during the blocked rotor test, the starting winding is open; Determine the equivalent circuit parameters. Also find the core, friction and winding losses.
- b) List out the various starting methods, and their types of single phase induction motor with diagrams only.

Write the short notes on any two of the following:

- a) Linear induction motor
- b) Double revolving field theory of single phase induction motor.
- c) Cogging and crawling
- d) Power flow diagram of three phase induction motor.
