

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 200/400V, 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.

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, 400V, 1250Watts, 9Amp. induction motor gave the following test readings:

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

Short circuit test: 150V, 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.
8. 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.

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