

Code No: 114AB**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, May – 2019****ELECTRICAL MACHINES – II****(Electrical and Electronics Engineering)****Time: 3 Hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART - A**(25 Marks)**

- 1.a) Draw the core type transformer and explains its principle of operation. [2]
- b) State and explain different type of losses in the transformer. [3]
- c) Draw equivalent circuit of a 1- ϕ transformer. [2]
- d) Draw the circuit diagram for conducting O.C test on 1- ϕ transformer. [3]
- e) Explain the principle of operation of a single phase auto transformer. [2]
- f) Draw a circuit diagram for conversion of 2-winding transformer in to auto transformer in additive polarity. [3]
- g) Derive the condition for maximum torque at the time of starting in a 3- ϕ I.M. [2]
- h) Derive the condition for maximum torque under running conditions in a 3- ϕ I.M. [3]
- i) Explain the working principle of Induction generator. [2]
- j) Explain the speed control of 3- ϕ IM using cascade connection. [3]

PART - B**(50 Marks)**

- 2.a) Explain the principle of operation of an ideal transformer.
- b) Derive the EMF equation of a single phase transformer.
- c) A 25 KVA single phase transformer has 250 turns on the primary and 40 turns on the secondary winding. The primary is connected to 1500 V, 50Hz mains. Calculate (i) primary and secondary currents on full load (ii) secondary emf (iii) maximum flux in the core. [3+3+4]

OR

- 3.a) Draw the phasor diagrams for leading power factor load.
- b) When a transformer is connected to a 100V, 50 Hz supply the core loss is 100W of which 650W is hysteresis and 350W is eddy current loss. If the applied voltage is raised to 2000 V and the frequency to 100Hz, find the new core losses.

[5+5]

- 4.a) With neat circuit diagram explain the of a short circuit test conducted on a transformer.
- b) A 10 KVA, 500/250 V single phase transformer has its maximum efficiency of 94% when delivering 90% of its rated output at unity pf. Estimate its efficiency when delivering its full load output at pf of 0.8 lagging.
- c) Derive and explain necessary condition for zero regulation of a transformer.

[3+4+3]

OR

- 5.a) Explain the parallel operation of two single phase transformers with unequal voltage ratios.
- b) With neat circuit diagram explain the procedure of conducting sumpners test on single phase transformers.
- 6.a) Derive the condition for saving of a copper in a single phase auto transformer.
- b) A two winding transformer is rated at 2400/240 V, 50 KVA. It is reconnected as a step up auto transformer, with 2400 V input. Calculate the rating of the auto transformer and the inductively and conductively transferred powers while delivering the rated output at unity pf.
- c) Explain the scott connection operation with necessary circuit diagrams.

[3+4+3]

OR

- 7.a) Explain open-delta operation with necessary circuit diagrams.
- b) Two transformers are required for a scott connection operating from a 440V, 3-phase supply for supplying two single phase furnaces at 200 V on the two phase side. If the total output is 150 KVA, calculate the secondary to primary turn ratio and the winding currents of each transformer.
- 8.a) Explain the torque slip characteristics of 3- ϕ IM.
- b) Derive and explain rotating magnetic field in a three phase induction motor.

[5+5]

OR

- 9.a) Briefly explain the working of double Cage Induction motor.
- b) The power input to the rotor of 440V, 50 Hz, 6 pole, 3-phase, and induction motor is 80 KW. The rotor electromotive force is observed to make 100 complete alterations per minute. Calculate (i) the slip (ii) the rotor speed (iii) rotor copper losses per phase.
- 10.a) Explain the conducting procedure of No load test on three phase induction motor.
- b) Explain the working of y- Δ starter used in 3- ϕ induction motor.

[4+6]

[5+5]

OR

- 11.a) Explain the conducting procedure blocked rotor test on three phase induction motor.
- b) Explain the speed control of induction motor using Rotor resistance control.

[5+5]

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