R13

B.Tech II Year II Semester (R13) Supplementary Examinations December 2016
ELECTRICAL MACHINES – II
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
  (a)   Describe the role of tertiary winding in transformer.
  (b)   Predict the causes of stray losses.
  (c)   Derive an expression for saving of copper when an auto –transformer is used.
  (d)   What is the difference between a 3-phase transformer bank and a 3-phase transformer unit?
  (e)   State the advantages of skewing.
  (f)   What are the starting methods used in three phase induction motor?
  (g)   Define the term crawling.
  (h)   Mention three possible methods of speed control of cascaded connection of induction motor.
  (i)   Compose the purpose of conducting open circuit test.
  (j)   Show the condition for parallel operation of a transformer.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   The full load copper loss on the HV side of a 100 kVA, 1100/317 V, single phase transformer is 0.62 kW
        and on the LV side is 0.48 kW. Calculate: (i) R_1, R_2, and R_3 in ohms. ii) The total reactance is 4 percent,
        find X_1, X_2 and X_3 in ohms if the reactance is divided in the same proportion as resistance.

OR

3 (a) What is meant by Inrush current in transformer?
   (b) A 4 kVA, 200/400 V single phase transformer has equivalent resistance and reactance referred to low
        voltage side equal to 0.5 ohm and .5 ohm respectively. Find the terminal voltage on the HV side when it
        supplies 3/4th full load at power factor of 0.8, the supply voltage being 220 V. Find the output of the
        transformer and its efficiency if the core losses are 100 W.

UNIT – II

4   A 6 kVA, 250/500 V, transformer gave the following test results:
              Short-circuit test: 20 V ; 12 A, 100 W
              Open circuit test : 250 V; 1 A, 80 W
        (i) Determine the transformer equivalent circuit.
        (ii) Calculate applied voltage, voltage regulation and efficiency when the output is 10 A at 500 volt and
        0.8 power factor lagging.
        (iii) Maximum efficiency, at what percent of full load does this maximum efficiency occur? (At 0.8 power
        factor lagging).
        (iv) At what percent of full load does the efficiency is 95% at 0.8 power factor lagging.

OR

5   Under what condition will there be no circulating current when two transformers are operated in parallel
        at no –load?

UNIT – III

6   Explain with the aid of diagrams, the principal of operation of double cage induction motor. Sketch the
        torque –slip curves of such a motor.

OR

7   Explain the principle of operation of 3-phase induction motor and explain how the rotating magnetic field
        is produced by three-phase currents.

UNIT – IV

8   How would you determine circle diagram of a 3- phase induction motor experimentally?

OR

9   Derive an expression for the torque of an induction motor and torque-slip characteristics and obtain the
        condition for maximum torque.

UNIT – V

10   Explain the rotor rheostat control of 3-phase slip ring induction motor.

OR

11   Explain the cascade operation of induction motors to obtain variable speed.

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