Code: EE4T2

II B.Tech - II Semester–Regular/Supplementary Examinations–April 2018

ELECTRICAL MACHINES-II
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks

$$11 \times 2 = 22M$$

1. a) What are the properties of an ideal transformer?
   b) Define voltage regulation of transformer.
   c) Give the condition to be satisfied for parallel operation of transformer.
   d) List losses in transformer.
   e) What is the condition for obtaining the maximum torque in case of 3 phase induction motor?
   f) A 6 pole, 60HZ 3-ph induction motor runs with 6% slip then determine its slip speed.
   g) Pictorially represent how the starting torque of the induction motor varies with rotor resistance.
   h) List the advantages and disadvantages of auto transformer starter.
   i) What is eddy current losses?
   j) List the methods to make single phase induction motors self-starting.
   k) Give the application of various single phase induction motors.

PART – B

Answer any **THREE** questions.   All questions carry equal marks.

3 x 16 = 48 M

2. a) Draw the phasor diagram of 1-phase transformer on load
   for   8 M
   i) Inductive load ii) Capacitive load
            Indicate all quantities and explain

   b) A 2300/230V, 500 kVA, 50 Hz distribution transformer
      has a core losses of 1600 W at rated voltage and copper
      losses of 7.5 kW at full load. During the day it is loaded as
      follows: 8 M
      No Load for 2 hours
      20% Load for 4 hours at 0.7 lag pf
      50% Load for 4 hours at 0.8 lag pf
      80% Load for 5 hours at 0.9 lag pf
      100% Load for 7 hours at upf
      125% Load for 2 hours at 0.85 lag pf
      Determine the all-day efficiency of the Transformer

3. a) Explain about the auto transformer and compare it with two
      winding transformer. Discuss the application auto
      transformer?   8 M

   b) Explain about star-star, star-delta and delta-star
       connections used in 3-phase connection of transformers.
       Discuss their advantages and disadvantages?   8 M

4. a) Obtain the equivalent circuit of a 3φ induction motor. Draw the phasor diagram based on the equivalent circuit obtained.   8 M

   b) Explain the operation of induction generator and list its applications.   8 M

5. a) Briefly explain different methods of starting of squirrel cage induction motor. Explain autotransformer starting with the help of a neat sketch.   8 M

   b) A 60 kVA 400V, 3- phase 50 Hz squirrel cage induction motor has full load slip of 7%. Its standstill impedance is 0.913 ohms per phase. It is started using a tapped autotransformer. If the maximum allowable supply current at the time of starting is 103 A, Calculate the tap position and the ratio of starting torque to full load torque.   8 M

6. a) Describe shaded pole method of starting of a single-phase induction motor.   8 M

   b) State the characteristics, applications and speed control techniques of universal motor.   8 M