

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2025**

INDUCTION MACHINES

[Maximum marks: 100]

[Time: 3 Hours]

PART – A

Maximum marks: 10

I. (Answer *all* the questions in one or two sentences. Each question carries **2** marks)

1. List the losses in a transformer.
2. Define turns ratio of transformer.
3. Define Slip in Induction Motor.
4. List any two methods of braking used for induction motor.
5. Give any two applications of an induction motor. (5 x 2 = 10)

PART – B

Maximum marks: 30

II. (Answer any *five* of the following questions. Each question carries **6** marks)

1. Explain the cooling methods used in power transformer.
2. Derive the condition for maximum efficiency of a transformer.
3. Explain the conditions to be fulfilled for parallel operation of three phase transformers.
4. Differentiate between Power and Distribution transformer.
5. Explain the working principle of three phase induction motor.
6. A slip ring Induction Motor runs at 290 rpm at full load, when connected to 50 Hz supply. Determine the number of Poles and Slip.
7. Explain any two starting methods of Induction motor. (5 x 6 = 30)

PART – C

Maximum marks: 60

(Answer *one full* question from each unit. Each full question carries **15** marks)

UNIT – I

III. (a) Derive the EMF equation of transformer. (7)

- (b) The maximum flux density in the core of a 250/3000 volts 50 Hz single phase transformer is 1.2 Wb/meter square. If the e.m.f per turn is 8 volt, determine
(i) Primary and secondary turns (ii) Area of the core. (8)

OR

- IV. (a) Explain the classification of transformers based on construction. (7)
(b) (i) A 2200/200 V transformer draws a no load primary current of 0.6 A and absorbs 400 Watts. Find the magnetizing and Iron loss currents.
(ii) A 2200/250V transformer takes 0.5 A at a pf of 0.3 on open circuit. Find magnetizing and working components of no load primary current. (8)

UNIT - II

- V. (a) Explain open circuit and short circuit tests on transformer. (7)
(b) Explain the working of autotransformer. (8)

OR

- VI. (a) Derive an expression for saving of copper in an autotransformer. (7)
(b) Explain the working of current transformer and its applications. (8)

UNIT - III

- VII. (a) Differentiate between wound rotor and Squirrel cage Induction Motors. (7)
(b) A 4 pole three phase Induction Motor operates from supply whose frequency is 50Hz. Calculate
(i) The speed at which the magnetic field of the stator is rotating.
(ii) The speed of the rotor when the slip is 0.04.
(iii) The frequency of the rotor currents when the slip is 0.03.
(iv) The frequency of the rotor currents at standstill. (8)

OR

- VIII. (a) Draw and Explain Torque Slip Characteristics of Induction Motor. (7)
(b) The power input to a phase Induction Motor is 60 KW. The total stator losses is 1 KW. Find the mechanical power developed and the rotor copper loss per phase if the motor is running with a slip of 3%. (8)

UNIT - IV

- IX. (a) Illustrate the plugging of a squirrel cage induction motor. (7)
(b) Illustrate the Kramer System of Speed Control. (8)

OR

- X. (a) Describe the Blocked Rotor test of three phase Induction Motor. (7)
(b) Explain speed control methods for Squirrel Cage Induction Motor. (8)
