

TED (15) – 5031

Reg. No. ....

(REVISION — 2015)

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

**INDUCTION MACHINES**

[Time : 3 hours

(Maximum marks : 100)

**PART — A**

(Maximum marks : 10)

Marks

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

1. Define transformation ratio and turns ratio.
2. Write the various losses in transformer.
3. Define slip.
4. Write the relation between Rotor current frequency and supply frequency.
5. List any two applications of slip ring induction motors.

(5×2 = 10)

**PART — B**

(Maximum marks : 30)

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

1. Explain the construction of single phase transformer.
2. Derive the EMF equation of transformer.
3. Draw the equivalent circuit of transformer.
4. Differentiate between Power and Distribution Transformer.
5. Explain the principle of operation of a 3 phase Induction motor.
6. Show the power stages from input to output of an Induction Motor.
7. Write the various methods of speed control of Induction Motor.

(5×6 = 30)

## PART — C

(Maximum marks : 60)

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

## UNIT — I

- III (a) Explain classification of transformer on the basis of construction. 7
- (b) A single phase 50Hz transformer has 80 turns on the primary winding and 280 turns on the secondary windings. The voltage across the primary winding is 240 V. Calculate (i) The Maximum flux density in the core (ii) Induced Emf in the Secondary winding. The net cross sectional Area of the core is  $200 \text{ cm}^2$ . 8

OR

- IV (a) Draw the vector diagram of Single phase transformer on load. 7
- (b) A 25 KVA 2200/220 V, 50 Hz Single phase transformer has the following resistance and leakage reactance.  $R_1 = 0.8 \Omega$ ,  $R_2 = 0.009 \Omega$ ,  $X_1 = 3.2 \Omega$ ,  $X_2 = 0.03 \Omega$ . Calculate Equivalent resistance referred to primary and secondary and equivalent Reactance referred to primary and secondary. 8

## UNIT — II

- V (a) Explain OC test of a transformer. 7
- (b) A 10 KVA 450/120 V, 50Hz transformer gave the following test results.  
OC Test 120V, 4.2A, 80W (on LV side)  
SC Test 9.65V, 22.2 A, 120W (LV side short circuited)  
Calculate efficiency and voltage regulation for 0.8 p.f lagging at full load. 8

OR

- VI (a) Derive the equation of saving of copper in Autotransformer. 7
- (b) Explain the working of current transformer. 8

## UNIT — III

- VII (a) Describe the construction of three phase Induction Motor. 7
- (b) If a 6 pole induction motor supplied from a three phase, 50 Hz supply has a rotor Frequency of 2.3 Hz. Calculate (i) Slip (ii) Speed of the Motor. 8

OR

- VIII (a) Draw and explain Torque-Slip Characteristics of Induction Motor. 7
- (b) The power input to the rotor of a 440 V, 50Hz, 3-phase 12 pole Induction motor is 75 W. The rotor emf has a frequency of 2 Hz. Calculate Slip, Rotor speed, Rotor Cu. Loss and Mechanical power developed. 8

## UNIT — IV

- IX (a) Explain the Blocked rotor test of a 3-phase Induction motor. 7
- (b) Explain various steps to construct a circle diagram of a 3-phase induction motor with neat sketch. 8

OR

- X (a) Explain with neat diagram the operation of Star-Delta starter. 7
- (b) Explain the Kramer system of speed control of 3-phase Induction motor. 8