

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL – 2021**

INDUCTION MACHINES

[Maximum Marks: 75]

[Time: 2.15 Hours]

PART-A

(Answer *any three* questions in one or two sentences. Each question carries 2 marks)

I

1. Define transformation ratio of transformer.
2. Describe voltage regulation of transformer.
3. Identify the three phase transformer connections
4. Define the term slip in an induction motor.
5. Name any two electrical braking methods of three phase induction motors. (3×2=6)

PART-B

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

II

1. Draw phasor diagram for single phase transformer on inductive load.
2. Illustrate the concept of ideal transformer.
3. Classify the losses in a transformer. And explain it.
4. Explain load test on single phase transformer to find voltage regulation and efficiency.
5. Draw the power flow diagram of an induction motor.
6. Explain effects of change in supply voltage on torque slip characteristics of an induction motor.
7. Explain with figure starting method of slip ring induction motor. (4×6=24)

PART-C

(Answer *any of the three units* from the following. Each full question carries 15 marks)

UNIT-I

- III (a) A transformer has 400 turns on primary and 1000 secondary turns. The net Cross-sectional area of 60cm^2 if the primary connected to 400V, 50Hz supply. Find (i) Flux density (ii) Secondary induced emf (iii) Transformation ratio. (8)
- (b) Describe core and shell type transformers with neat sketch. (7)

OR

- IV (a) A 30KVA, 2400/120 V, 50Hz has high voltage winding resistance of 0.1ohm and reactance of 0.22ohm. The low voltage winding resistance of 0.035ohm and reactance of 0.012ohm. Find equivalent impedance referred to high voltage side. (8)
- (b) Derive the EMF equation of a single phase transformer. (7)

UNIT – II

- V (a) Develop equivalent circuit referred to primary for a single phase transformer. (8)
- (b) Explain construction and working of instrument transformers. (7)

OR

- VI (a) Explain OC and SC test on single phase transformers. (8)
- (b) Derive the equation of saving of copper in autotransformer. (7)

UNIT – III

- VII (a) Explain production of rotating magnetic field in three phase induction motor. (7)
- (b) A three phase induction machine is wound for 6 pole and is supplied from 50Hz supply, calculate
- (i) Synchronous speed
 - (ii) Rotor speed when the slip is 4%
 - (iii) Frequency of the rotor current
 - (iv) Frequency of rotor current when run at 700 RPM. (8)

OR

- VIII (a) Draw and explain Torque-Speed curve of induction motor. (7)
- (b) Power input to a 440V, 50Hz, 4 pole, three phase induction motor is 100 KW, stator copper loss is 3 KW and friction and Windage loss is 5 KW. If the motor is running at 1440 rpm. Calculate
- (i) Slip
 - (ii) Rotor copper loss
 - (iii) Shaft power
 - (iv) Efficiency. (8)

UNIT – IV

- IX (a) Explain no load and blocked rotor testing of induction motor. (8)
(b) Explain construction and working of double cage induction motor. (7)

OR

- X (a) Draw karnar system of speed control of induction motor. (7)
(b) Explain autotransformer method of starting a squirrel cage induction machine with neat sketch. (8)
