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TED (15) – 5031

Reg. No. ....

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

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. What is the principle of a transformer ?
2. Write two applications of autotransformer.
3. Define the term 'slip'.
4. State two methods of starting squirrel cage induction motors.
5. Write any two applications of 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 working of a single phase transformer.
2. Derive the E M F equation of a transformer.
3. State and explain the voltage regulation of a transformer.
4. Explain all day efficiency of a transformer.
5. Differentiate starting torque and maximum torque of an induction motor.
6. Draw the equivalent circuit of an induction motor and explain.
7. Explain about the starting method of slip-ring 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 ideal transformer. 7
- (b) The core of a 3-phase, 50 Hz, 11000/550 V Delta/Star, 3 kVA core type transformer is operating with a flux of 0.05 Wb. Find :
- (i) Number of HV and LV turns per phase
  - (ii) EMF per turn
  - (iii) Full load HV and LV phase currents. 8

OR

	Marks
IV (a) Explain the condition of a transformer on no-load.	7
(b) A 30 kVA, 2400/120 V, 50 Hz transformer HV winding has a resistance of $0.1\Omega$ and a leakage reactance of $0.22\Omega$ . The LV winding has a resistance of $0.035\Omega$ and leakage reactance of $0.012\Omega$ . Find the equivalent resistance, reactance and impedance of the winding referred (i) HV side and (ii) LV side.	8
UNIT — II	
V (a) Explain with figure, the working of an autotransformer.	7
(b) Derive the equation for saving of copper in autotransformer.	8
OR	
VI (a) Explain the different cooling methods of a transformer.	7
(b) What is meant by the efficiency of a transformer ? Explain the condition for maximum efficiency.	8
UNIT — III	
VII (a) Describe the construction of a 3-phase induction motor.	9
(b) A 3-phase induction motor is wound for 4 poles and is supplied from 50Hz system. Calculate: (i) Synchronous speed (ii) Rotor speed when slip is 4% and (iii) Rotor frequency when runs at 600 r p m	6
OR	
VIII (a) Explain the power stages of a 3-phase induction motor.	7
(b) A 18.65 kW, 4 Pole, 50 Hz, 3-phase induction motor has a friction and windage loss of 2.5% of the output. The full load slip is 4%. Compute the full-load : (i) Rotor copper loss (ii) Shaft torque (iii) Rotor input (iv) Gross electro-magnetic torque	8
UNIT — IV	
IX (a) Explain the no load and blocked rotor test of a 3-phase induction motor.	7
(b) Draw and explain the circle diagram of induction motor.	8
OR	
X (a) Describe with figure any two methods for starting of squirrel cage induction motor.	12
(b) Draw the equivalent circuit of a double squirrel cage induction motor.	3