

**Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

## SECTION-A

**1. Write briefly :**

- Name the two types of 3-phase induction motors. What are the differences in construction between the two?
- Why should the rotor of a 3-phase induction motor rotate in the same direction as that of its rotating magnetic field?
- Why does a 3-phase induction motor always run at a speed less than the synchronous speed?
- Draw the equivalent circuit of a single phase induction motor.
- What are the conditions, when the 3-phase induction machine will behave as an induction generator?
- Why starting torque is poor in squirrel cage induction motor?
- The rotor power output of 3-phase induction motor is 15 kW and the corresponding slip is 4%, find the rotor copper loss.
- What are the applications of linear induction machines?
- Draw the operating characteristics of single phase series motor.
- Discuss the basic working principle of shaded pole motor.

### SECTION-B

2. The no-load speed of a 3-phase 50 Hz induction motor is 1485 rpm. Find the number of alterations per minute which the rotor emf will make and the speed of rotor mmf with respect to rotor wound.
3. Discuss the double revolving field theory and develop the equivalent circuit of a single-phase induction motor.
4. Explain the working principle of stepper motor and also list out its applications.
5. How the space harmonics affects the performance of induction machine, explain in detail.
6. Discuss the basic concept of asynchronous and synchronous torques.

### SECTION-C

7. Explain Kramer scheme of speed and power factor control of induction motor.
8. Discuss various excitation method of induction generator.
9. The power input to a 500 V, 50 Hz, 6 pole, 3-phase squirrel cage induction motor running at 975 r.p.m. is 40 kW. The stator losses are 1 kW and friction and windage losses are 2 kW. Find : (a) slip, (b) rotor copper losses (c) output power (d) efficiency.