

Model Question Paper
Sixth Semester B.Tech Electrical and Electronics
EE 010 602 INDUCTION MACHINES

Max: 100 Marks

Time:3Hrs

PART A

1. Explain the constructional details of 3-phase squirrel cage induction motor.
2. Explain the frequency control of 3-phase induction motor
3. Explain the Phasor diagram of induction generator
4. Explain working principle and applications of universal motor
5. With a neat diagram, explain the operation of linear induction motor

3*5=15

PART B

1. Explain cogging and crawling and methods of their elimination
2. Explain star- delta starter with a neat diagram
3. Explain capacitor start - capacitor run single-phase induction motor.
4. Explain the constructional details and working of hysteresis motor
5. Explain BLDC Motor

5*5=25

PART C

6. 20hp, 440V, 50HZ, 3 Φ , 4 pole star connected IM gave the following test results
- | | | |
|---------------------|--------------|------|
| No load test: | 440V, 1110W, | 9.2A |
| Blocked rotor test: | 150V, 4.5KW, | 40A |

Draw the circle diagram and determine at full load 1) line current ii) pf iii) speed and iv) efficiency at half load

(12 Marks)

OR

7. a) A 6 pole, 3 phase 50Hz induction motor develops a maximum torque of 20 kg.m at a speed of 970rpm. Determine the torque exerted by the motor at 4% slip. The rotor resistance per phase is 0.5Ω . (6 Marks)
- b) The full load power input to a 3 Φ IM is 50Kw and the slip is 3%. Neglecting stator losses, calculate the full load cu losses and total mechanical power developed. (6 Marks)
8. a) Explain the method of speed control by pole changing (6 Marks)
- b) A cage induction motor when started by a star delta starter takes 200% of full load current and develops 44% of full load torque at starting. Calculate the starting current if an auto transformer with 75% tappings were employed (6 Marks)

OR

9. Design a 6 stud rotor starter for a wound rotor induction motor. The slip at full load is 2% and the starting current is 1.5 times the full load current. The resistance of rotor is 0.02 ohms per phase (12 Marks)

10. (a) Explain the working of a shaded pole induction motor. (6 marks)
(b) A 125KW, 4 pole, 50Hz, single phase induction motor delivers rated output at a slip of 6%. The total copper loss at full load is 25 w. Calculate the full load efficiency and the rotor copper loss caused by the backward field. Rotational losses may be assumed to be 25W. Neglect stator copper loss. (6 Marks)

OR

11. a) Explain the construction and principle of operation of an induction generator with Phasor diagram and equivalent circuit (6 Marks)
b) Explain the working of a single-phase series motor with Phasor diagram and circle diagram. (6 Marks)

13. Explain commutator motor and Emf induced in commutator winding (12 Marks)

OR

14. Explain the working of Repulsion motor and Reluctance motor (12 Marks)

15. Explain construction, operating characteristics and principle of operation of stepper motor (12 Marks)

OR

16. Write short notes on

- a) Permanent magnet reluctance motor
b) Switched Reluctance motor (12 Marks)