SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | Total number of pages:[2]

Total number of questions: 06

May 2018
Reappear
2015 Batch onw

B.Tech. || EE || 5th Sem
ASYNCHRONOUS MACHINES
Subject Code: BTEE-501A
Paper ID:

Time allowed: 3 Hrs

Max Marks: 60

Important Instructions:

- **All questions are compulsory**
- **Assume any missing data**

PART A (2×10)

All COs

Q. 1. Short-Answer Questions:

(a) What is phase sequence and how does it affect the operation of an induction motor?

(b) What is meant by split phase method of motor starting?

(c) Why voltage to frequency ratio is kept constant during speed control of an induction motor?

(d) State two reasons for skewing rotor slots in case of an induction motor.

(e) What is stepper motor? Write down the types of stepper motor.

(f) Why efficiency of an induction motor is less as compared to a transformer?

(g) The rotor resistance and standstill reactance per phase of a 3-Φ, slip-ring induction motor are 0.02 Ω and 0.1 Ω respectively. What should be the value of external resistance per phase to be inserted in the rotor circuit to give maximum torque at the starting?

(h) Why starter is necessary for a three phase induction motor?

(i) A slip-ring induction motor runs at 290 rpm at full load, when connected to 50 Hz supply. Determine the number of poles and slip.

(j) Why the air gap between stator core and rotor is made as small as possible?

PART B (8×5)

Q. 2. Show that a rotating magnetic field can be produced by the use of 3-phase currents of equal magnitude. CO3

OR

What is an induction generator? How does it operate? What are its principle fields of application?

Q. 3. Describe the cascade running of 3-Φ induction motors for the speed control. CO1

OR

State and explain the double revolving field theory of single phase induction motor.

Q. 4. An 18.65 KW, 4 pole, 50 Hz, 3-phase induction motor has friction and windage losses of 2.5% of the output. The full load slip is 4%. Compute for full load - (i) The rotor copper losses (ii) the rotor input (iii) the shaft torque (iv) the gross electromagnetic torque. CO2

OR

A 50 Hz, 8-pole induction motor has full load slip of 4%. The rotor resistance per phase is 0.01 Ω and standstill reactance per phase is 0.1 Ω. Find the ratio of maximum to full load torque and speed at which the maximum torque occurs.

Q. 5. Describe with neat sketches the performance characteristics of three-phase self-excited induction generator. CO4

OR

Discuss the construction, principle of operation and applications of Linear Induction Machines.

Q. 6. (a) Draw and explain the torque-slip characteristics of three phase induction motor. CO1

(b) Name various starting methods of three phase induction motors. Explain any one of them in detail.

OR

Write short notes on any two of the following-

(a) Double cage & Deep bar motors

(b) Shaded Pole motor

(c) Equivalent circuit of a 3-Φ induction motor. (4 each)