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Total No. of Pages : 02

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B.Tech. (EE) PT (Sem.–3)

ASYNCHRONOUS MACHINES

Subject Code : BTEE-401

M.Code : 72163

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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. Answer briefly :

a) What is the use of wound rotor induction motor?

b) What is the effect of large air gap in three phase induction motor?

c) Why the power of induction motor is very low at starting?

d) Why the no load current of an induction motor is much higher than that of an equivalent transformer.

e) What is working principle of induction generator?

f) What is crawling?

g) What is meant by regenerative breaking?

h) What is working principle of universal motor?

i) How induction motor can run as induction generator without external supply.

j) What is the use of double cage induction motors?

SECTION-B

2. A 4 pole, 50Hz, 3 phase induction motor has a rotor resistance and standstill rotor reactance of 0.025ohm and 0.1 ohm per phase respectively. Calculate the speed at which maximum torque occurs and the value of external rotor resistance to be inserted to obtain 80% of maximum torque at starting.

3. Explain the construction & working of star delta starter.

4. Explain the double revolving field theory of single phase induction motor.

5. Explain the construction & working of universal motor.

6. Why an induction generator is not a self-excited generator? How does an isolated induction generator works?

SECTION-C

7. A 440V, 3 phase 50Hz, 4 pole, Y connected induction motor has a full load speed of 1425 rpm. The rotor has an impedance of 0.4 j4 ohm and rotor/stator turn ratio of 0.8. Calculate : (10)

   a) Full load torque.

   b) Rotor current and full load rotor Cu loss.

   c) Power output if windage and friction losses amount to 500 watt.

   d) Maximum torque and speed at which it occurs.

   e) Starting torque.

8. a) A 440 V three phase 50 Hz 10 pole IM has stator resistance and leakage reactance of 1.2 ohm and 2.4 ohm per phase respectively. Its rotor resistance and stand still reactance is 0.006 ohm and 0.022 ohm per phase respectively effective turn ratio is 10:1 and full load slip is 0.04 ohm.

   If the stator winding is star connected calculate the breaking torque immediately after Plugging. Neglect magnetizing current. (7)

   b) A 4 pole 50 Hz three phase induction motor has a speed of 1410 rpm with its slip rings short circuited at full load torque. If the rotor speed is reduced to 1200 rpm at constant torque by inserting additional resistance in the rotor circuit, compare the rotor copper losses at the two speeds. (3)

9. a) Explain the construction and working of shaded pole motor. (5)

   b) Explain the construction and working of a linear induction motor. (5)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.