Questions from the same exercise can be combined together to increase difficulty.

13.1

Which one of the following statements about three phase inductions motors is NOT correct?

a) Three phase induction motors can have variable rotating speed.

b) It is possible to change the resistance of a squirrel cage three phase induction motor through external resistances.

c) The stator of a three phase induction motor creates a rotating magnetic field in the gap.

d) The stator induces currents into the rotor.

mine

Step A: A 3-phase, 20-pole induction motor is connected to a 600V, 60Hz source.
Step B: The input voltage is reduced to 300V.
Step C: The frequency is changed to 120Hz.

What is the synchronous speed in the three aforementioned steps?

a) The synchronous speed will be the same in all steps at the value of 360rpm.

b) Step A: n = 360rpm, Step B: n=180rpm, Step C: n=360rpm.

c) Step A: n=360rpm, Step B: n=360rpm, Step C: n=180rpm.

d) Step A: n=360rpm, Step B: n=360rpm, Step C: n=720rpm.

mine

Step A: A 3-phase, 20-pole induction motor is connected to a 600V, 60Hz source.
Step B: The input voltage is reduced to 300V.
Step C: The number of poles is changed to 10.

What is the synchronous speed in the three aforementioned steps?

a) The synchronous speed will be the same in all steps at the value of 360rpm.

b) Step A: n = 360rpm, Step B: n=180rpm, Step C: n=360rpm.

c) Step A: n=360rpm, Step B: n=360rpm, Step C: n=180rpm.

d) Step A: n=360rpm, Step B: n=360rpm, Step C: n=720rpm.

mine

Which of the following induction motors rotates at ~1200rpm (±2rpm)? (Taking all the following data of each choice into consideration)

a) f=53Hz, 5 poles, slip=3.1%

b) f=105Hz, 10 poles, slip=2.3%

c) f=208Hz, 20 poles, slip=3.8%

d) f=40Hz, 4 poles, slip=1%

13.18

A 3-phase, 75hp, 440V induction motor has a full-load efficiency of 91% and a power factor of 83%. What is the nominal current per phase?

a) 97.2A

b) 56.1A

c) 168.4A

d) 292A

13.24

The rotor resistance of an induction motor is slightly increased.

Which of the following statements is NOT true:

a) The starting torque is increased.

b) The starting current is increased.

c) The efficiency is decreased.

d) The power factor is increased.

13.12

What are the approximate values of the starting current, full-load current and no-load current of a 150hp, 575V, 3-phase induction motor? (not precise values, +-5A)

a) starting current: 1627A, full load current: 271A, no load current: 81A

b) starting current: 2022A, full load current: 1213A, no load current: 606A

c) starting current: 939A, full load current: 156.5A, no load current: 46.8A

d) starting current: 701A, full load current: 117A, no load current: 35A

mine

Which of the following statements about an induction motor is NOT true?

a) If we double the number of poles on the stator of an induction motor, its synchronous speed will be half.

b) The rotor turns slower than the rotating magnetic field created by the stator.

c) The rotor current decreases when the mechanical load increases.

d) There is no torque developed in the rotor when it is rotating in the synchronous speed.