

Unit 8 - Week-6

Course outline

How to access the portal?

Week 0

Week-1

Week-2

Week-3

Week-4

Week-5

Week-6

Lecture 26: Closed-loop Volt/Hz control of induction motor with slip speed regulation, Multi-quadrant operation of induction motor drive

Lecture 27: Current Source Inverter (CSI) fed induction motor drive

Lecture 28: Closed-loop operation of current source inverter (CSI) fed induction motor drive, Control of slip ring induction motor - Static rotor resistance control

Lecture 29: Closed-loop operation of slip ring induction motor with static rotor resistance control, Slip power recovery in slip ring induction motor - Static Kramer drive

Lecture 30: Static Kramer drive and its closed-loop control, Introduction to synchronous motor

Quiz : Assignment 6

Feedback For Week 6

Assignment-6 Solutions

Week-7

Week-8

Live Session

Lecture Notes

Assignment 6

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

1) For multi-quadrant operation of induction motor with regenerative braking, how many converters are required? **1 point**

- One
 Two
 Three
 Four

No, the answer is incorrect.
Score: 0

Accepted Answers:
Two

2) The front end converter(Conv-1) for multi-quadrant induction motor drive operates with **1 point**

- Lagging input power factor
 Leading input power factor
 Unity input power factor
 Zero input power factor

No, the answer is incorrect.
Score: 0

Accepted Answers:
Unity input power factor

3) Which of the following converters in a multi-quadrant induction motor drive helps in regulating dc link voltage? **1 point**

- Front-end AC-DC converter
 Load-end DC-AC converter
 A separate converter connected to the dc link through a resistance
 A separate converter connected to the dc link through an inductance

No, the answer is incorrect.
Score: 0

Accepted Answers:
Front-end AC-DC converter

4) An induction motor is fed from a current source. At very low value of slip, the air gap flux of the motor will be **1 point**

- saturated
 unsaturated
 constant
 decreasing with decrease in slip

No, the answer is incorrect.
Score: 0

Accepted Answers:
saturated

5) The DC link current of a three phase thyristorized CSI is 10 A. The rms value of the fundamental component of the output current, assuming ac current waveform to be 120° quasi square wave, is **3 points**

- 5.19 A
 6.29 A
 7.79 A
 8.39 A

No, the answer is incorrect.
Score: 0

Accepted Answers:
7.79 A

6) To keep the air gap flux constant, the stator current of a CSI-fed induction motor is varied with slip speed. The value of the stator current for zero slip speed is **1 point**

- equal to the rotor current
 equal to the magnetization current
 equal to half the rotor current
 equal to half the magnetization current

No, the answer is incorrect.
Score: 0

Accepted Answers:
equal to the magnetization current

7) For Q6, the stator current is kept constant at the rated value beyond the slip speed $(w_{sl})_{rated}$. The increase of slip speed beyond $(w_{sl})_{rated}$ will lead to **1 point**

- Decrease in air gap flux
 Increase in air gap flux
 Constant air gap flux
 Flux saturation of induction motor

No, the answer is incorrect.
Score: 0

Accepted Answers:
Decrease in air gap flux

8) A 400 V, 50 Hz, 4 pole, 1370 rpm induction motor has the following parameters: **3 points**

$R_s = 2 \Omega, R_r' = 3 \Omega, X_s = X_r' = 3.5 \Omega, X_m = 55 \Omega$

It is controlled by a current source inverter with output fundamental rms current, $I_s = 10$ A. Calculate the torque at rated slip speed, with inverter frequency of 50 Hz.

- 12.5 Nm
 20.9 Nm
 30.7 Nm
 43.3 Nm

No, the answer is incorrect.
Score: 0

Accepted Answers:
43.3 Nm

9) For constant torque load, increasing rotor resistance of an induction motor, which is supplied from a balanced 3-phase supply, will **1 point**

- increase the speed
 decrease the speed
 keep the speed unchanged
 increase the stator current

No, the answer is incorrect.
Score: 0

Accepted Answers:
decrease the speed

10) A 400 V, 50 Hz, 4 pole, star connected, slip ring induction motor has the following parameters: **3 points**

$R_s = 0.5 \Omega, R_r' = 0.2 \Omega, X_s = X_r' = 1.0 \Omega, X_m$ can be neglected.

Stator to rotor turns ratio is 3.

The motor is controlled by static rotor resistance control. The external resistance is chosen such that the maximum torque is produced at starting for a duty ratio of 0. Calculate the value of external resistance.

- 0.21 Ω
 0.41 Ω
 0.61 Ω
 0.81 Ω

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.41 Ω

11) For static Kramer drive, the speed of the slip ring induction motor is controlled **1 point**

- below the synchronous speed
 above the synchronous speed
 below the rated torque
 above the rated torque

No, the answer is incorrect.
Score: 0

Accepted Answers:
below the synchronous speed

12) A 400 V, 50 Hz, 6 pole induction motor is controlled by a static Kramer drive. The stator to rotor turns ratio(n) is 3 and the primary(grid side) to secondary(converter side) turns ratio(m) of the transformer is 5. If the firing angle of the converter is 140° , the speed of the induction motor is **0 points**

- 100 rpm
 300 rpm
 600 rpm
 700 rpm

No, the answer is incorrect.
Score: 0

Accepted Answers:
700 rpm

13) A 400 V, 50 Hz, 4 pole, star connected slip ring induction motor is controlled by static Kramer drive. The stator to rotor turns ratio is 3.5. The dc link current is 100 A. Neglect the stator, rotor and dc link resistance. The motor runs at a speed of 1000 rpm. The torque developed by the motor is **3 points**

- 99 Nm
 109 Nm
 119 Nm
 149 Nm

No, the answer is incorrect.
Score: 0

Accepted Answers:
99 Nm

14) A wound rotor synchronous motor is usually employed for **1 point**

- Low power application
 Medium power application
 High power application
 Fractional hp application

No, the answer is incorrect.
Score: 0

Accepted Answers:
High power application

15) Which of the following motors have non-uniform air gap between the stator and rotor? **1 point**

- Squirrel cage induction motor
 Slip ring induction motor
 Cylindrical synchronous motor
 Salient pole synchronous motor

No, the answer is incorrect.
Score: 0

Accepted Answers:
Salient pole synchronous motor