

Unit 6 - Week-4

Course outline

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Lecture 16: Dynamic Braking of DC Motor by Chopper Controlled Resistor, Closed-loop Operation of DC Drives, Induction Motor Drives

Lecture 17: Speed Torque Characteristics of Induction Motor, Operation of Induction Motor from Non-sinusoidal Supply

Lecture 18: Operation of Induction Motor from Non-sinusoidal Supply

Lecture 19: Stator Current of Induction Motor with Non-sinusoidal Supply, Operation of Induction Motor with Unbalanced Voltage Supply

Lecture 20: Single Phasing of Induction Motor, Braking of Induction Motor

Quiz : Assignment 4

Assignment-4 Solutions

Feedback For Week 4

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Lecture Notes

Assignment 4

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

Due on 2019-08-28, 23:59 IST.

- 1) A 230 V, 960 rpm, 200 A separately excited dc motor has an armature resistance of 0.02 Ω . The motor is operated in dynamic braking with chopper control with a braking resistance of 2 Ω . Calculate the duty ratio of the chopper for a motor speed of 600 rpm and braking torque equal to the rated value. **3 points**
- 0.35
 0.65
 0.75
 0.85
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 0.65
- 2) In a closed loop dc drive having speed and current feedback, which of the following statements is correct? **1 point**
- Speed controller is faster than the current controller
 Current controller is faster than the speed controller
 Speed controller and current controller have equal bandwidth
 Output of current controller gives the reference speed
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 Current controller is faster than the speed controller
- 3) A 3-phase, 50 Hz, 4 pole induction motor runs at a speed of 1400 rpm. The slip of the motor is **2 points**
- 0.023
 0.034
 0.066
 0.072
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 0.066
- 4) The rotor of an induction motor carries **1 point**
- No conductors
 Open circuited conductors
 Short circuited conductors
 A solid iron core
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 Short circuited conductors
- 5) A 4 pole, 50 Hz star connected induction motor is supplied with square wave voltage from an inverter. The motor rotates at a speed of 1425 rpm. The slip of the motor with respect to 5th harmonic field is **2 points**
- 1
 1.05
 1.13
 1.19
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 1.19
- 6) The slip of the motor in Q5 with respect to 7th harmonic field is **2 points**
- 0.75
 0.86
 0.95
 1
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 0.86
- 7) The average torque due to harmonic voltages is **1 point**
- quite significant and it adds to the fundamental torque
 quite significant and it subtracts from the fundamental torque
 quite insignificant
 pulsating in nature
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 quite insignificant
- 8) An unbalance is created in the rotor circuit of an induction motor which is started from rest. The motor speed will settle down to **1 point**
- a value close to half the synchronous speed
 a value close to the synchronous speed
 a value close to one fourth of the synchronous speed
 a value close to zero
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 a value close to half the synchronous speed
- 9) A 400 V, 50 Hz, 4 pole, 1440 rpm induction motor has following parameters:
 $R_s = 1.5 \Omega$, $R_r' = 0.4 \Omega$, $X_s = X_r' = 1.2 \Omega$, $X_m = 50 \Omega$
 The peak value of the motoring torque(T_{max}) of the motor is **0 points**
- 142.4 Nm
 165.3 Nm
 172.5 Nm
 192.3 Nm
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 172.5 Nm
- 10) What is the effect of unbalanced voltage on the operation of induction motor? **1 point**
- It results in reduced torque and reduced power
 It results in reduced torque but rated power
 It results in rated torque but reduced power
 It results in zero torque and zero power
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 It results in reduced torque and reduced power
- 11) A three phase induction motor was running in steady state with a slip of $s=0.04$. One of the motor phases got open circuited. Assuming the speed change to be insignificant, the slip of induction motor with respect to the reverse rotating field is **2 points**
- 0.04
 0.96
 1.04
 1.96
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 1.96
- 12) For regenerative braking of induction motor **1 point**
- Synchronous speed should be a little higher than the rotor speed
 Synchronous speed should be a little lower than the rotor speed
 Synchronous speed should be doubled
 Synchronous speed should be increased by a factor of 1.5
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 Synchronous speed should be a little lower than the rotor speed
- 13) A star connected induction motor is fed from a square wave inverter. The rms values of various harmonic components of the stator current are the following **3 points**
- $I_{s1} = 10A$, $I_{s5} = 3A$, $I_{s7} = 1.5A$
 Harmonics higher than 7th harmonic can be neglected. The rms value of the total stator current is
- 10 A
 10.31 A
 10.54 A
 14.5 A
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 10.54 A
- 14) Plugging of induction motor involves **1 point**
- Increase of synchronous speed
 Decrease of synchronous speed
 Reversal of the phase sequence of the stator
 Increase of the stator voltage magnitude
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 Reversal of the phase sequence of the stator
- 15) A delta connected three phase induction motor is supplied from a square wave 3-phase inverter. Which of the frequency components of current will flow in the stator phases? **1 point**
- 1,2,3,4,5...
 1,5,7,11,13...
 1,3,5,7,9...
 2,4,6,8,10...
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 1,3,5,7,9...