

Unit 9 - Week-7

Course outline

How to access the portal?

Week 0

Week-1

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Week-7

- Lecture 31: Various types of synchronous motors, Equivalent circuit and phasor diagram of cylindrical synchronous motor, Speed-torque characteristics of cylindrical synchronous motor
- Lecture 32: Phasor diagram of salient pole synchronous motor, Expression of power and torque for a salient pole synchronous motor, Synchronous reluctance motor, Open-loop V/f control of synchronous motor
- Lecture 33: Open-loop V/f control, Torque-speed characteristics, Self controlled synchronous motor drive employing load commutated thyristor inverter
- Lecture 34: Detailed analysis of commutation of load commutated thyristor inverter, Derivation of overlap angle and margin angle, Closed-loop speed control scheme for load commutated inverter-fed synchronous motor drive
- Lecture 35: Low cost brushless DC motor (BLDCM), Trapezoidal permanent magnet AC motor

Quiz : Assignment 7

Feedback For Week 7

Assignment-7 Solutions

Week-8

Live Session

Lecture Notes

Assignment 7

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

Due on 2019-09-18, 23:59 IST.

- 1) In which of the following permanent magnet synchronous motors, the permanent magnets are buried within the rotor? 1 point
- Projecting pole type permanent magnet
 Inset permanent magnet
 Interior permanent magnet
 Surface mounted permanent magnet
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Interior permanent magnet
- 2) A wound field synchronous motor can operate in 1 point
- Lagging power factor only
 Leading power factor only
 Unity power factor only
 Leading or lagging or unity power factor
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Leading or lagging or unity power factor
- 3) The maximum value of torque angle (δ) for a synchronous motor is 1 point
- 45°
 90°
 135°
 180°
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 90°
- 4) A 400 kW, 3-phase, 3.3 kV, 50 Hz, 0.85(lagging) power factor, 4 pole, star connected synchronous motor has the following parameters: 3 points
 $X_s = 15 \Omega$, $R_s = 0 \Omega$
 The rated stator current of the motor is
- 69.9 A
 82.3 A
 95.6 A
 98.4 A
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
82.3 A
- 5) The torque angle in Q4 for operation at rated power and rated excitation is 3 points
- 39.9°
 29.5°
 25.6°
 21.3°
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 39.9°
- 6) Which of the following statements is true for a salient pole wound rotor synchronous motor? 1 point
- $X_{sd} < X_{sq}$
 $X_{sd} > X_{sq}$
 $X_{sd} = X_{sq}$
 $X_{sd} = X_{sq}^2$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $X_{sd} > X_{sq}$
- 7) In a synchronous reluctance motor, for a given applied voltage, the motor torque is proportional to 2 points
- $\cos\delta$
 $\cos 2\delta$
 $\sin\delta$
 $\sin 2\delta$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\sin 2\delta$
- 8) The DC link current of a load commutated thyristor inverter fed synchronous motor drive is primarily controlled by 2 points
- Source side thyristor converter
 Load side thyristor inverter
 The back emf of the synchronous motor
 The speed of the synchronous motor
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Source side thyristor converter
- 9) For a load commutated thyristor inverter fed synchronous motor drive, the following parameters are given: 3 points
 $\alpha_f =$ triggering angle of the load side inverter= 140°
 Per-phase induced emf of the motor is 230 V(rms).
 Fundamental frequency of operation= 50 Hz
 DC link current= 40 A
 Commutating inductance per phase of the motor= 1.5 mH
 The overlap angle(μ) for the load commutated inverter is
- 6.39°
 7.15°
 7.81°
 8.23°
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 6.39°
- 10) For Q9, the margin angle(γ) of the load commutated inverter is 2 points
- 32.8°
 33.6°
 34.3°
 35.6°
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 33.6°
- 11) A BLDC motor requires a 1 point
- rotor position feedback
 rotor speed feedback
 rotor acceleration feedback
 rotor current feedback
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
rotor position feedback
- 12) The opaque region of the optical encoder for a three phase unipolar low cost two pole BLDC motor is 2 points
- 30°
 60°
 120°
 240°
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 240°
- 13) The direction of speed of a BLDC motor can be changed by 1 point
- Changing the polarity of DC supply
 Changing the connection of optical encoder to the gate drive
 Manually applying a negative torque at the starting
 Reducing the mechanical load torque
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Changing the connection of optical encoder to the gate drive
- 14) The torque ripple of a low cost unipolar BLDC motor is 1 point
- Twice the rotational frequency
 Thrice the rotational frequency
 Four times the rotational frequency
 Six times the rotational frequency
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Thrice the rotational frequency
- 15) For successful commutation of inverter thyristor in a load commutated thyristor inverter, how is the margin angle(γ) related to turn off time (t_q)? 0 points
- $\gamma = t_q$
 $\gamma = \omega t_q$
 $\gamma > \omega t_q$
 $\gamma < \omega t_q$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\gamma < \omega t_q$