

Unit 3 - Week-1

Course outline
How to access the portal?
Week 0
Week-1
<ul style="list-style-type: none"> Lecture-1: Introduction to Electric Drives Lecture-2: Dynamics of Electric Drives, Four Quadrant Operation, Equivalent Drive Parameters Lecture-3: Equivalent Drive Parameters, Friction Components, Nature of Load Torque Lecture-4: Steady State Stability, Load Equalization Lecture-5: Load Equalization, Characteristics of DC Motor
<ul style="list-style-type: none"> Quiz : Assignment-1 Assignment-1 Solutions Feedback For Week 1
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Assignment-1

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

Due on 2019-08-14, 23:59 IST.

- 1) What is the overhead power supply for mainline AC traction locomotive in India? 1 point
- 3.3 kV, 50Hz
 6.6 kV, 50Hz
 11 kV, 50Hz
 25 kV, 50Hz
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
25 kV, 50Hz
- 2) Which of the following is an interface between Electric Power Supply and the motor? 1 point
- Load
 Sensing Unit
 Power Modulator
 Mechanical Gear
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Power Modulator
- 3) Fixed voltage Fixed Frequency AC can be converted to Variable Voltage Variable Frequency AC by 1 point
- AC voltage regulator
 Cycloconverter
 Fully controlled converter
 Half controlled converter
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Cycloconverter
- 4) Which of the following is called the inertial torque? (J is moment of inertia in $\text{kg}\cdot\text{m}^2$, B is the coefficient of viscous friction in $\text{Nm}/(\text{rad}/\text{s})$ and ω is the rotor speed in rad/sec) 1 point
- $J d\omega/dt$
 $J d^2\omega/dt^2$
 $B\omega$
 $B\omega^2$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $J d\omega/dt$
- 5) A motor drives two loads. One has rotational motion. It is coupled to the motor through a reduction gear with $a=0.2$ and efficiency of 95%. The load has moment of inertia of 5 kgm^2 and load torque of $20 \text{ N}\cdot\text{m}$. The other load has translational motion and has a weight of 500 kg which has to be lifted at a constant speed of $1 \text{ m}/\text{sec}$. The coupling between the translational load and the motor has an efficiency of 90%. The motor inertia can be taken as 0.5 kgm^2 and the motor runs at a speed of 960 rpm . The equivalent inertia referred to the motor shaft is 3 points
- 0.54 kgm^2
 0.64 kgm^2
 0.74 kgm^2
 0.84 kgm^2
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 0.74 kgm^2
- 6) The power developed by the motor in Q5 is 3 points
- 3873 Watt
 4873 Watt
 5873 Watt
 6873 Watt
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
5873 Watt
- 7) Which of the following Load Speed-Torque characteristics represents a hyperbola? 1 point
- Fan type of load
 Traction load
 Low speed hoist load
 Constant power load
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Constant power load
- 8) Which of the following types of friction is independent of speed? 1 point
- Coloumb Friction
 Static Friction
 Viscous Friction
 Windage Friction
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Coloumb Friction
- 9) Which of the following load offers a constant load torque? 1 point
- Traction Load
 Low speed hoist
 Fan type of load
 High speed hoist
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Low speed hoist
- 10) A motor-load combination has the following speed torque characteristics: 2 points
- $T=100-0.1N(\text{N}\cdot\text{m})$
 $Tl=0.05N(\text{N}\cdot\text{m})$
 where T =motor torque in $\text{N}\cdot\text{m}$, Tl =load torque in $\text{N}\cdot\text{m}$ and N =speed of the motor-load combination in rpm . The steady state speed of the drive is
- 333.33 rpm
 455.55 rpm
 666.66 rpm
 721.66 rpm
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
666.66 rpm
- 11) A drive has the following motor and load speed-torque equation 2 points
- Motor: $T=1+2\omega$
 Load: $Tl=3(\omega^2/0.5)$
 The steady state equilibrium speeds are
- 1 & 1/4
 1 & 1/2
 2 & 1/4
 2 & 1/2
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1 & 1/4
- 12) The drive in Q11 will operate stably in the steady state at a speed of 2 points
- 2
 3/2
 1
 1/4
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1/4
- 13) What is the most appropriate way to smoothen the motor torque for a pulsating type load torque? 1 point
- By connecting an inductance in series with the motor
 By connecting a flywheel with the motor-load combination
 By controlling the triggering angle of the converter feeding the motor
 By introducing a gear with appropriate gear ratio
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
By connecting a flywheel with the motor-load combination
- 14) The motor torque speed characteristic is given by the equation: 3 points
- $\omega_m=100-T$ (ω_m is in rad/sec and T is in Nm)
 The initial motor torque is 10 Nm . A step load torque of 50 Nm is applied at $t=0$. If the total inertia of the motor load combination is 5 kgm^2 , the value of the motor torque after 5 sec is
- 50.0 Nm
 45.2 Nm
 35.2 Nm
 25.2 Nm
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
35.2 Nm
- 15) The speed of the motor in rad/sec in Q14 at $t=5 \text{ sec}$ is 2 points
- 100 rad/s
 64.7 rad/s
 356.9 rad/s
 37.7 rad/s
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
64.7 rad/s