

Course outline

How does an NPTEL online course work?

Module 1 - Overview of Electric Vehicles in India

Module 2 - Vehicle Dynamics

Module 2 and 3 - Vehicle Dynamics and EV Subsystems

Module 4 - Storage for EVs

Module 4 - Storage for EVs (contd)

Module 5 - Fundamentals of battery pack design

Module 5 and 6 - Battery Pack Design, Motors and Controllers

Module 6 - EV Motors and Controllers

Lecture 58 - Torque Production - Part 1

Lecture 59 - Torque Production - Part 2

Lecture 60 - Torque Production - Part 3

Lecture 61 - Speed and Back EMF

Lecture 62 - The d-q Equivalent circuit - Part 1

Lecture 63 - The d-q Equivalent circuit - Part 2

Lecture 64 - Field-oriented Control

Lecture 65 - Three phase AC - Part 1

Lecture 66 - Three phase AC - Part 2

Lecture 67 - Thermal Design - Part 1

Lecture 68 - Thermal Design - Part 2

Lecture 69 - Thermal Design - Part 3

Lecture 70 - Engineering Considerations - Part 1

Lecture 71 - Engineering Considerations - Part 2

Lecture 72 - Future Frontiers

Quiz: Week 8: Assignment 1

Quiz: Week 8: Assignment 2

Quiz: Week 8: Assignment 3

Quiz: Week 8: Assignment 4

Week 8: Feedback form: Electric Vehicles and Renewable Energy

Week 8: Lecture notes

Week 8: Solutions

Module 7&8 - Battery Charging and Swapping, Analytics

Module 9: Renewable Energy - Introduction

Module 10: Renewable Energy - Solar and Wind Energy

Module 11: Renewable Energy

Live Session

DOWNLOAD VIDEOS

Week 8: Assignment 2

The due date for submitting this assignment has passed.

Due on 2021-09-22, 23:59 IST.

As per our records you have not submitted this assignment.

Specifications of a motor are as follows: Rated Current: 160A; Rated Torque: 22Nm; Rated Voltage: 34V; Rated speed: 3500 rpm; Max speed at no-load: 4400 rpm.

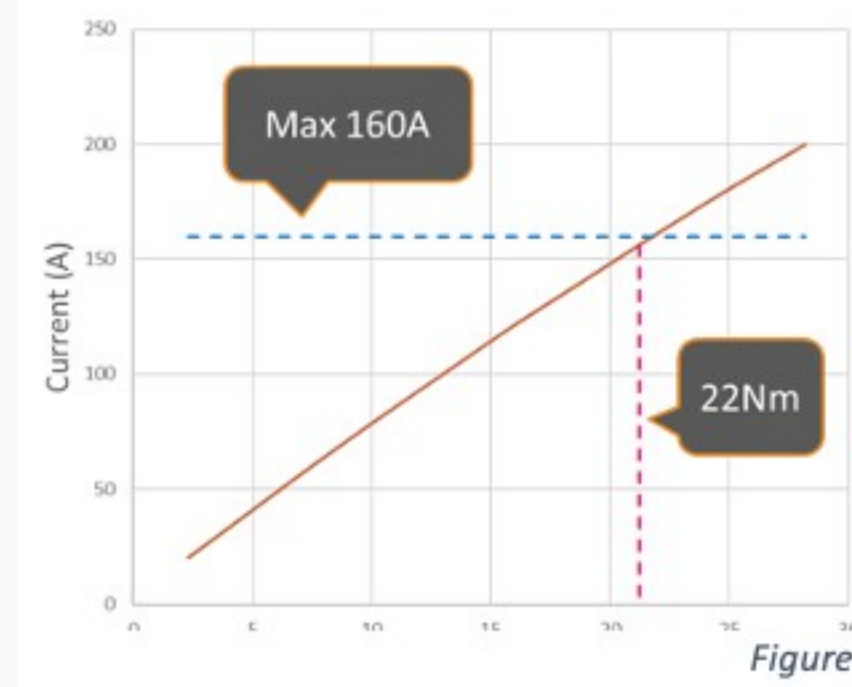


Figure 7

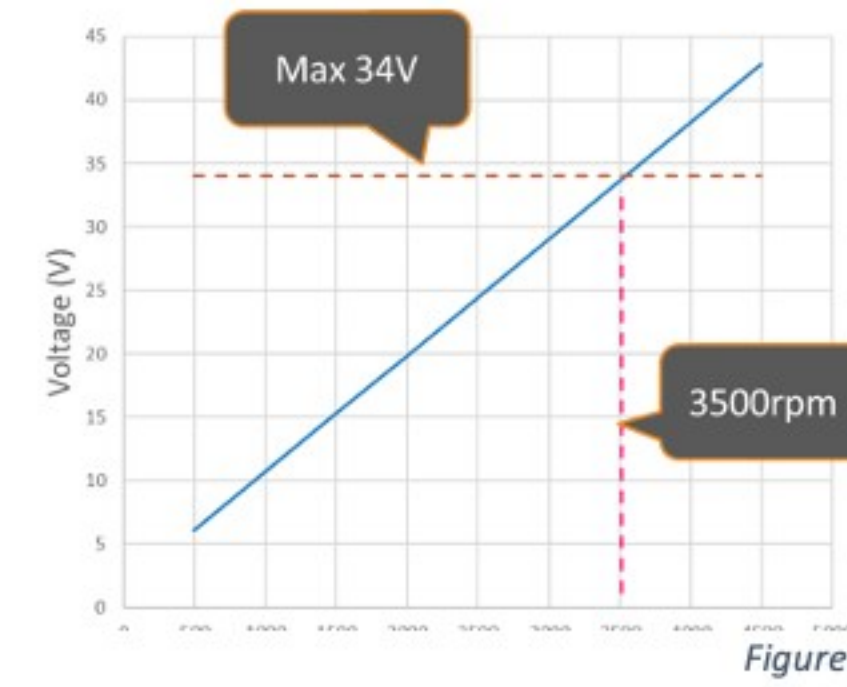


Figure 8

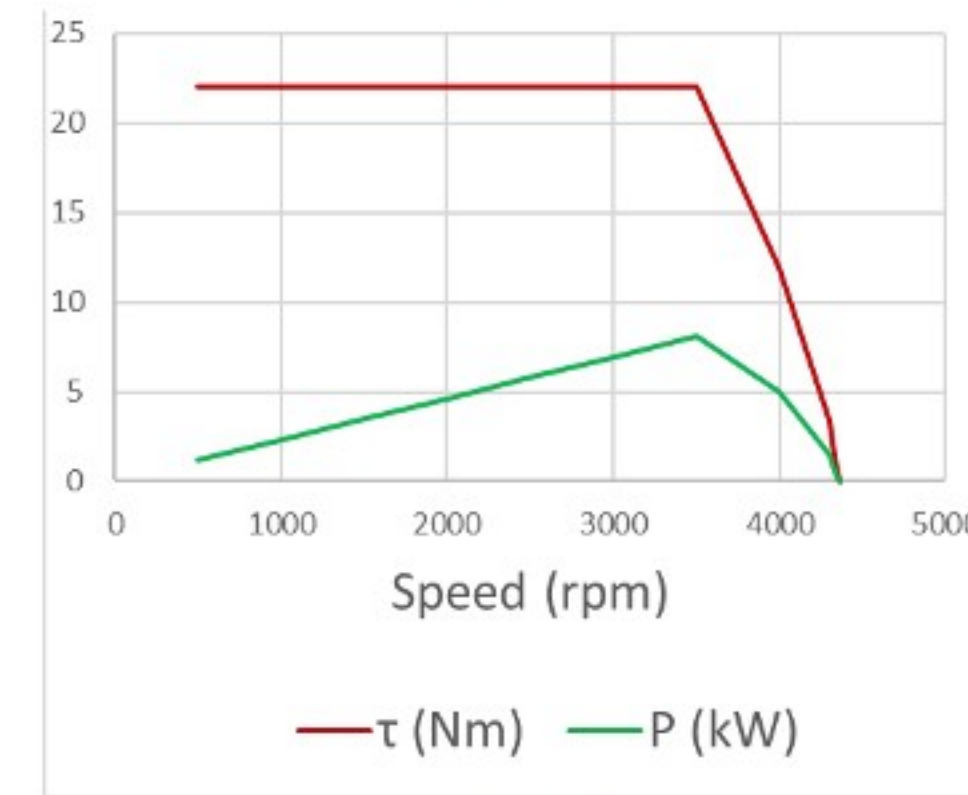


Figure 9

If the motor is operated with a new controller of 80A current limit (the voltage limit being unchanged, at 34V):

1) What is the rated torque of this motor-controller combination?

1 point

- 22 Nm
 11 Nm
 44 Nm
 None of the above

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 11 Nm

2) What is the rated speed of this motor-controller combination? (Choose the nearest value)

1 point

- 3500 rpm
 1750 rpm
 7000 rpm
 Between 3500 to 4400 rpm

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 Between 3500 to 4400 rpm

3) What is the rated power of this motor-controller combination? (rounded off in kW, to the nearest whole number?)

1 point

- 8 kW
 4 kW
 2 kW
 None of the above

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 None of the above

4) What is the maximum speed, at no load, of this motor-controller combination? Assume no flux-weakening.

1 point

- 3500 rpm
 8800 rpm
 4400 rpm
 None of the above

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 4400 rpm

If the same motor is operated with a new voltage limit of 68 V (the current limit is unchanged, at 80 A):

5) What is the rated torque of this motor-controller combination?

1 point

- 22 Nm
 11 Nm
 44 Nm
 None of the above

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 11 Nm

6) What is the rated speed of this motor-controller combination? (Choose the nearest value)

1 point

- 3500 rpm
 1750 rpm
 7000 rpm
 >7000 rpm

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 >7000 rpm

7) What is the rated power of this motor-controller combination?

1 point

- 8 kW
 16 kW
 4 kW
 None of the above

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 None of the above

8) What is the max speed, at no load, of this motor-controller combination? Assume no flux-weakening.

1 point

- 8800 rpm
 5000 rpm
 None of the above

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 11 Nm

6) What is the rated speed of this motor-controller combination? (Choose the nearest value)

1 point

- 3500 rpm
 1750 rpm
 7000 rpm
 >7000 rpm

No, the answer is incorrect.