

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

● Lecture 34 - Fundamentals of battery pack design

● Lecture 35 - Electrical Design of Battery Pack - Part 1

● Lecture 36 - Electrical Design of Battery Pack - Part 2

● Lecture 37 - Electrical Design of Battery Pack - Part 3

● Lecture 38 - Mechanical Design of Battery Pack - Part 1

● Lecture 39 - Mechanical Design of Battery Pack - Part 2

● Lecture 40 - Mechanical Design of Battery Pack - Part 3

● Lecture 41 - Mechanical Design of Battery Pack - Part 4

● Lecture 42 - Thermal Design of Battery Pack - Part 1

● Lecture 43 - Thermal Design of Battery Pack - Part 2

● Lecture 44 - Thermal Design of Battery Pack - Part 3

● Lecture 45 - Thermal Design of Battery Pack - Part 4

○ Quiz: **Week 6: Assignment 1**

○ Quiz: Week 6: Assignment 2

○ Quiz: Week 6: Assignment 3

● Week 6 - Lecture notes

● Week 6 - Feedback form: Electric Vehicles and Renewable Energy

○ Quiz: Week 2: Assignment 2 Alternate

● Week 6: Solutions

● Week 2: Assignment 2 alternate solutions

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

Module 6 - EV Motors and Controllers

Module 7&8 - Battery Charging and Swapping, Analytics

Module 9: Renewable Energy - Introduction

○ Quiz: **Week 6: Assignment 1**

○ Quiz: Week 6: Assignment 2

○ Quiz: Week 6: Assignment 3

● Week 6 - Lecture notes

● Week 6 - Feedback form: Electric Vehicles and Renewable Energy

○ Quiz: Week 2: Assignment 2 Alternate

● Week 6: Solutions

● Week 2: Assignment 2 alternate solutions

Module 5 and 6 - Battery Pack Design, Motors and

Week 6: Assignment 1

The due date for submitting this assignment has passed.

Due on 2021-09-08, 23:59 IST.

As per our records you have not submitted this assignment.

Electrical Assignment

1) A battery of 72V and 42Ah must be designed using Prismatic 14Ah cells. The nominal Voltage of the cell is 3.65V. The configuration of the pack is nPmS (nPmS theory). The summation of n and m is:

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 23

1 point

2) A busbar is designed for the battery pack made in previous question. The length of busbar is 30mm. Calculate the thickness of the busbar (in mm) if current density is 5A/mm² considering the charge rate of 0.5C and discharge rate of 1C.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.25,0.32

0 points

3) With **proper surface preparations** and proper application of torque over fasteners:

- Contact resistance is increased and Streamline resistance is decreased
- Contact resistance can be decreased and Streamline resistance is increased
- Both Streamline resistance and Contact resistance is increased
- Both contact resistance and Streamline resistance is decreased

No, the answer is incorrect.

Score: 0

Accepted Answers:

Both contact resistance and Streamline resistance is decreased

1 point

In a battery pack, Voltage harness used is of the specification:

Wire gauge/ diameter : 22AWG/ 0.64mm

Length : 300mm

Resistivity (Copper) : $1.68 \times 10^{-8} \Omega \cdot m$

4) Calculate resistance offered by voltage harness in m Ω

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 15,16

0.5 points

5) Calculate voltage drop in mV if current flowing in it is 20mA.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.3,0.35

0.5 points

6) A 48V, 28Ah battery pack of a 2-wheeler EV runs at an environmental temperature of 35 °C. Copper Busbars used in the battery pack are of dimension 80x20mm. It was found that busbar temperature shoots up to 45°C when 28Ah of current is flown through it and dissipates 0.05W of heat. Calculate the thickness of the busbar (in mm) . $\rho_{45^{\circ}C} = 1.78 \cdot 10^{-8} \Omega \cdot m$

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 1,1.5

1 point

7) Which of these forms of welding uses friction to generate heat:

- Laser Welding
- Spot Welding
- Arc Welding
- Ultra-sonic Welding.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Ultra-sonic Welding.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.3,0.35

0.5 points

6) A 48V, 28Ah battery pack of a 2-wheeler EV runs at an environmental temperature of 35 °C. Copper Busbars used in the battery pack are of dimension 80x20mm. It was found that busbar temperature shoots up to 45°C when 28Ah of current is flown through it and dissipates 0.05W of heat. Calculate the thickness of the busbar (in mm) . $\rho_{45^{\circ}C} = 1.78 \cdot 10^{-8} \Omega \cdot m$

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 1,1.5

1 point