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

Module 10: Renewable Energy - Solar and Wind Energy

Module 11: Renewable Energy

Live Session

DOWNLOAD VIDEOS

Week 6: Assignment 3

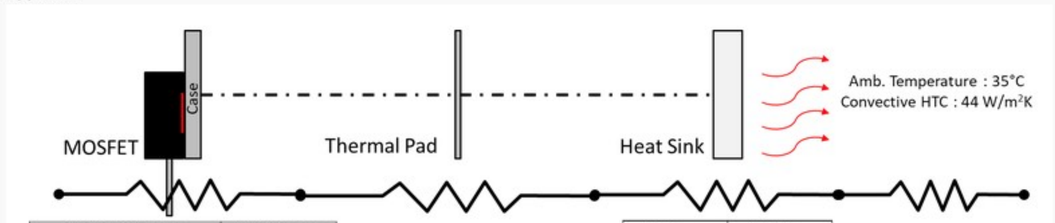
The due date for submitting this assignment has passed.

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

As per our records you have not submitted this assignment.

1) **MOSFET thermal management**

A MOSFET + Heat Sink arrangement with below Specifications is arranged as shown. Find the MOSFET Junction Temperature (in °**C**) using Thermal Network Approach



MOSFET Resistance	0.003429 ohms
Heat Loss	0.168021 W
Case Height	0.01525 m
Case Width	0.01 m
Case Area	0.0001525 m^2
Thermal Resistance, Case to Junction	0.48 °C/W

Thickness	0.0005 m
Area	0.0001525 m^2
Thermal Conductivity	0.437 W/m.K

Thickness	0.0035 m
Height	0.01525 m
Width	0.01 m
Area	0.0001525 m^2
Thermal Conductivity	201 W/m.K

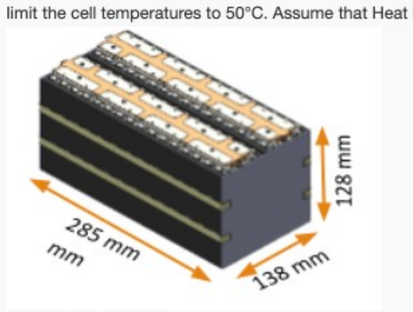
No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 60,63

1 point

2) **Battery pack thermal management** ***1 point***

Consider the 2P16S Pack with shown dimensions. The pack is present at 45°C. Consider 2C discharge & identify suitable thermal management method to limit the cell temperatures to 50°C. Assume that Heat is extracted only using the bottom surface of the pack.

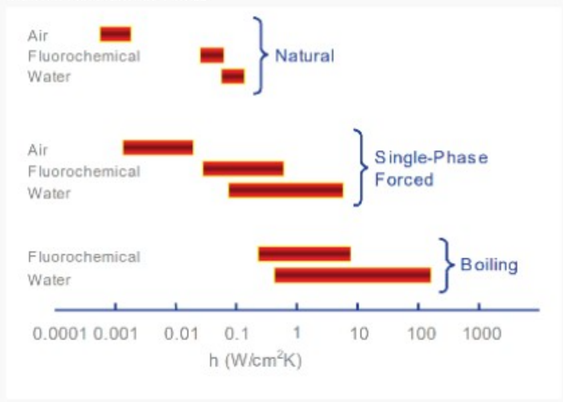


Cell Specifications:

Voltage: 3.65V

Capacity: 15Ah

Internal Resistance: 10mΩ



- Natural Air Cooling
- Forced Air Cooling
- Forced Water Cooling
- PCM based cooling

No, the answer is incorrect.
Score: 0

Accepted Answers:
Forced Water Cooling

3) A busbar of **length 5cm and width 3cm** generates a heat of **0.3W** due to ohmic heating. If the ambient temperature is 30°C and maximum busbar temperature is 45°C. Then which type of cooling should be used (according to heat transfer coefficient) to keep the busbar from failure? ***1 point***

- Natural Air Cooling
- Forced Air Cooling
- Forced Water Cooling
- PCM based cooling

No, the answer is incorrect.
Score: 0

Accepted Answers:
Forced Water Cooling

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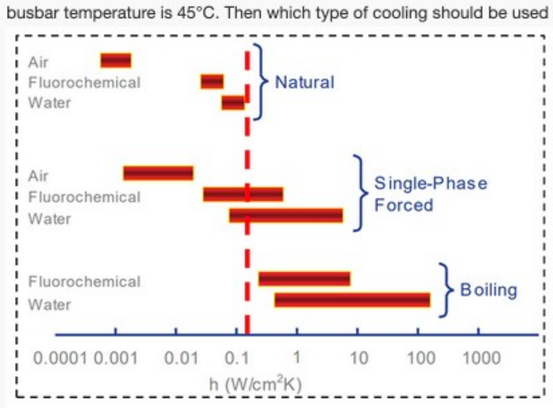

- Natural Air Cooling
- Forced Air Cooling
- Forced Water Cooling
- Both Natural and Air forced cooling

No, the answer is incorrect.