

Course outline

How does an NPTEL online course work?

Module 1 - Overview of Electric Vehicles in India

Module 2 - Vehicle Dynamics

- Announcement on Week 2
- Lecture 10 - Forces acting when a vehicle move
- Lecture 11 - Aerodynamic drag, Rolling Resistance and Uphill Resistance
- Lecture 12 - Power and Torque to accelerate
- Lecture 13 - Putting it all together - 1
- Lecture 14 - Putting it all together - 2
- Lecture 15 - Concept of Drive Cycle - 1
- Lecture 16 - Concept of Drive Cycle - 2
- Week 2 Slide Content
- Week 2 Feedback Form: Electric Vehicles and Renewable Energy

- Quiz: Week 2: Assignment 1
- Quiz: Week 2: Assignment 2
- Quiz: Week 2: Assignment 3
- Quiz: Week 2: Assignment 4
- Quiz: Week 2: Assignment 5
- Week 2: Solutions

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

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 2: Assignment 1

The due date for submitting this assignment has passed.

Due on 2021-08-18, 23:59 IST.

As per our records you have not submitted this assignment.

Q 2.1 Compute Forces due to drag, rolling resistance and gradient for the following vehicles assuming $\rho = 1.2 \text{ (kg/m}^3\text{)}$ and $\theta = 8^\circ$. For the three vehicles given in the table 1, find Aerodynamic drag at velocity V_1 and V_2 ; also find rolling resistance at two velocities.

Table 1							
Vehicle	GVW (kg)	C_D	Area (m ²)	μ	V_1 (km/h)	V_2 (km/h)	Tyre Radius (m)
2-wheeler	200	0.9	0.6	0.015	30	80	0.28
3-wheeler	600	0.45	1.6	0.015	30	80	0.2
4-wheeler	1500	0.3	2.5	0.015	30	80	0.3

If,

$AV_i \rightarrow$ Aerodynamic drag force at velocity V_i

$RV_i \rightarrow$ Rolling resistance force at velocity V_i

$GF \rightarrow$ Gradient force

For the three vehicles given in Table 1, find the missing values in Table 2 (Correct up to 2 decimal places):

Vehicle	AV_1 (N)	AV_2 (N)	RV_1 (N)	RV_2 (N)	GF (N)
2-wheeler	25	160	29.4	29.4	273
3-wheeler	$[AV_1^{3w}]$	$[AV_2^{3w}]$	$[RV_1^{3w}]$	$[RV_2^{3w}]$	$[GF^{3w}]$
4-wheeler	$[AV_1^{4w}]$	$[AV_2^{4w}]$	$[RV_1^{4w}]$	$[RV_2^{4w}]$	$[GF^{4w}]$

1) $[AV_1^{3w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 29,31

0.5 points

2) $[AV_2^{3w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 211,214

0.5 points

3) $[RV_1^{3w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 87,89

0.5 points

4) $[RV_2^{3w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 87,89

0.5 points

5) $[GF^{3w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 815,820

0.5 points

6) $[AV_1^{4w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 31,32

0.5 points

7) $[AV_2^{4w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 222,223

0.5 points

8) $[RV_1^{4w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 218,221

0.5 points

9) $[RV_2^{4w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 218,221

0.5 points

10) $[GV^{4w}]$

Accepted Answers:
(Type: Range) 31,32

0.5 points

7) $[AV_2^{4w}]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 222,223

0.5 points