

Unit 11 - Week 10

Course outline

How does an NPTEL online course work?

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Braking Analysis - Part 01

Braking Analysis - Part 02

Steering System - Part 01

Steering System - Part 02

Manual Steering Systems - Part 01

Manual Steering Systems - Part 02

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Assignment 10

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

Due on 2020-04-08, 23:59 IST.

1) During straight line braking of a car, dynamic longitudinal load transfer takes place from

1 point

- right wheels to left wheels.
- front wheels to rear wheels.
- left wheels to right wheels.
- rear wheels to front wheels.

No, the answer is incorrect.
Score: 0

Accepted Answers:
rear wheels to front wheels.

Consider a 4-wheeled vehicle weighing 107.8 kN and a wheelbase of 4.2 m. Its centre of gravity is at a distance of 2.7 m from the front wheel centre and a height of 1.45 m from the ground. Consider the rolling resistance coefficient to be 0.006.

2) Considering a tyre-road interface with a peak friction coefficient of 0.8, the ideal brake force distribution (front:rear) is

1 point

- 64:36.
- 71:29.
- 55:45.
- 75:25.

No, the answer is incorrect.
Score: 0

Accepted Answers:
64:36.

3) Considering the brake force distribution calculated in question 2), the vehicle longitudinal deceleration (normalized by g) at which the front wheels would lock on a tyre-road surface with a peak friction coefficient of 0.6 is

1 point

- 0.45.
- 0.62.
- 0.5.
- 0.58.

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.5.

4) Considering the brake force distribution calculated in question 2), the vehicle longitudinal deceleration (normalized by g) at which the rear wheels would lock on a tyre-road surface with a peak friction coefficient of 0.6 is

1 point

- 0.55.
- 0.68.
- 0.48.
- 0.62.

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.68.

5) From questions 3) and 4), it can be concluded that, on the tyre-road surface with a peak friction coefficient of 0.6,

1 point

- the front wheels would lock before the rear wheels.
- the rear wheels would lock before the front wheels.

No, the answer is incorrect.
Score: 0

Accepted Answers:
the front wheels would lock before the rear wheels.

6) From questions 3) and 4), the braking efficiency (in %) on the tyre-road surface with a peak friction coefficient of 0.6 is

1 point

- 98.
- 93.
- 88.
- 83.

No, the answer is incorrect.
Score: 0

Accepted Answers:
83.

7) Which of the following statements is true about steering a typical road vehicle?

1 point

- the inner wheel has to be rotated by a smaller angle than the outer wheel.
- the inner wheel has to travel on a path of smaller radius than the outer wheel.
- the outer wheel has to be rotated by a larger angle than the inner wheel.
- the outer wheel has to travel on a path of smaller radius than the inner wheel.

No, the answer is incorrect.
Score: 0

Accepted Answers:
the inner wheel has to travel on a path of smaller radius than the outer wheel.

8) Consider a four wheeled vehicle with a track of 1 m and a wheelbase of 2 m. If the inner wheel is rotated by 20°, the angle of rotation (in °) of the outer wheel to satisfy the Ackerman steering condition is

1 point

- 17.1.
- 18.2.
- 17.7.
- 18.5.

No, the answer is incorrect.
Score: 0

Accepted Answers:
17.1.

9) In problem 8), let the vehicle CG be exactly halfway between the front and rear wheels. Then, the corresponding turning radius (in m) is

1 point

- 5.4.
- 4.5.
- 6.8.
- 6.1.

No, the answer is incorrect.
Score: 0

Accepted Answers:
6.1.

10) Which one of the following is not a typical power-assist steering system in road vehicles?

1 point

- Pneumatic.
- Hydraulic.
- Electro-Hydraulic.
- Electric.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Pneumatic.

11) Consider a steering ratio of 18. If the steered wheels have to be rotated by 30° from centre to lock on either side, the number of lock-to-lock turns of the steering wheel is

1 point

- 1.5.
- 2.
- 3.
- 4.

No, the answer is incorrect.
Score: 0

Accepted Answers:
3.

12) The mechanical advantage in a Pitman arm type steering system is typically provided by a

1 point

- bevel gear.
- spur gear.
- helical gear.
- worm gear.

No, the answer is incorrect.
Score: 0

Accepted Answers:
worm gear.

13) Which one of the following is not correct about a recirculating ball steering box?

1 point

- It reduces friction.
- It reduces wear.
- The worm is directly connected to the sector gear.
- The sector gear is connected to the Pitman arm.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The worm is directly connected to the sector gear.

14) If the C-factor of a rack and pinion steering is increased by 50%, then the torque on the pinion to achieve the same rack force increases by

1 point

- 25%.
- 50%.
- 100%.
- 125%

No, the answer is incorrect.
Score: 0

Accepted Answers:
50%.