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Exam Preparation and Free Resources

Name of the Student:_____
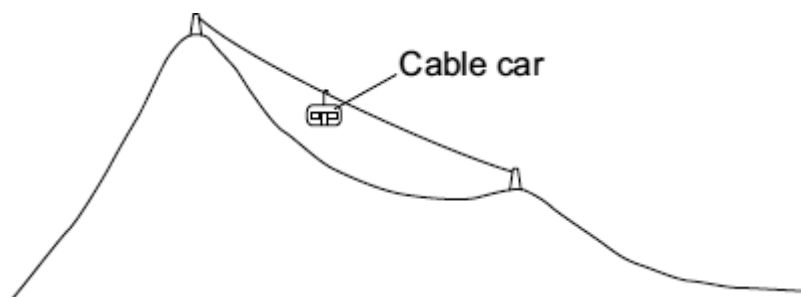
Max. **Marks : 19 Marks**   **Time : 19 Minutes**

Q1.

(a)   The diagram shows a cable car used to take skiers to the top of a mountain.

Cable car

(i)   The total mass of the cable car and skiers is 7500 kg.

Calculate the weight of the cable car and skiers.

gravitational field strength = 10 N/kg

Show clearly how you work out your answer and give the unit.

_____

_____

Weight = _____

(3)

(ii)   The cable car moves at a constant speed. It lifts skiers through a vertical height of 800 metres in 7 minutes.

Calculate the work done to lift the cable car and skiers.

Show clearly how you work out your answer.

_____

_____

Work done = _____ J

(2)

(b)   The diagram shows a skier who is accelerating down a steep ski slope.

(i)   Draw an arrow on the diagram to show the direction of the resultant force acting on the skier.

(1)

(ii) How and why does the kinetic energy of the skier change?

_____

_____

_____

_____

(2)

(c) Last year, 18 000 skiers suffered a head injury. It is thought that nearly 8000 of these injuries could have been avoided if the skier had been wearing a helmet.
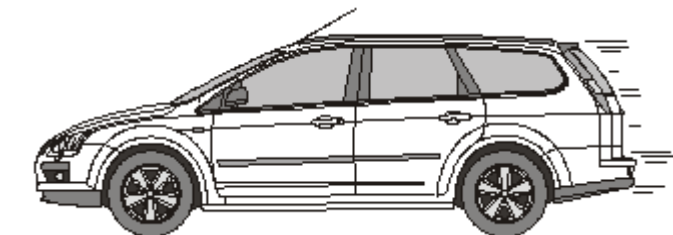However, at present, there are no laws to make skiers wear helmets.

Suggest why skiers should be made aware of the benefits of wearing a helmet.

_____

_____

(1)
(Total 9 marks)

Q2.

(a) The diagram shows a car travelling at a speed of 12 m/s along a straight road.

(i)   Calculate the momentum of the car.

Mass of the car = 900 kg

Show clearly how you work out your answer.

_____

_____

_____

_____

Momentum = _____ kg m/s

(2)

(ii)   Momentum has direction.

Draw an arrow on the diagram to show the direction of the car's momentum.

(1)

(b)   The car stops at a set of traffic lights.

How much momentum does the car have when it is stopped at the traffic lights?

_____

Give a reason for your answer.

_____

_____
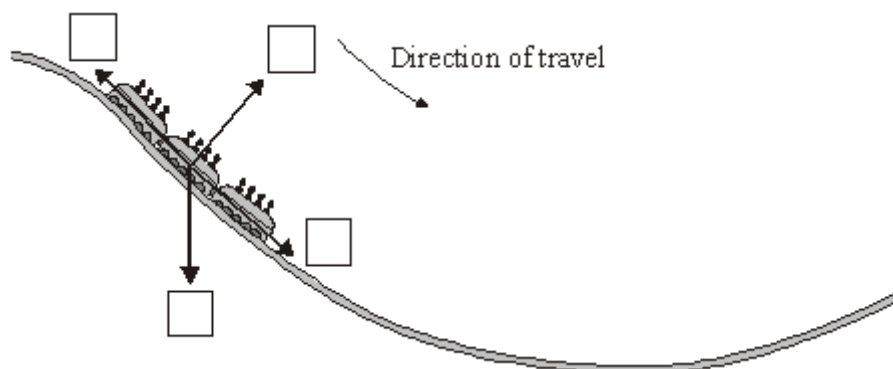
_____

_____

(2)
(Total 5 marks)

Q3.

The diagram shows the passenger train on part of a rollercoaster ride.

(a)   Which arrow shows the direction of the resultant force acting on the passenger train?

Put a tick (✔) in the box next to your choice.

Direction of travel

(1)

(b)   At the bottom of the slope, the passengers in the train all have the same speed but they each have a different kinetic energy.

Why is the kinetic energy of each passenger different?

_____

_____

(1)

(c)   For part of the ride, the maximum gravitational field strength acting on the passengers seems 3 times bigger than normal.

   Normal gravitational field strength = 9.8 N/kg

   (i)   Calculate the maximum gravitational field strength that seems to act on the passengers during the ride.

   _____

   _____

   Maximum gravitational field strength = _____ N/kg

(1)

   (ii)   One of the passengers has a mass of 80 kg.

   Calculate the maximum weight this passenger seems to have during the ride.

   Show clearly how you work out your answer.

   _____

   _____

   Maximum weight = _____ N

(2)
(Total 5 marks)