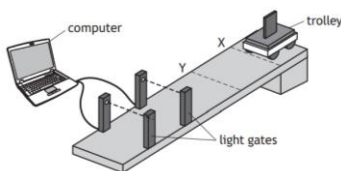## Section A

1. What equation is used to calculate average speed?

2. What are the units of average speed we use most often?

Section B

1. What is instantaneous speed?

2. What equation is used to calculate instantaneous speed?

3. What is the difference between average and instantaneous speed?

Section C

1. A trolley is released from rest at point X and moves with constant acceleration on a slope as shown.
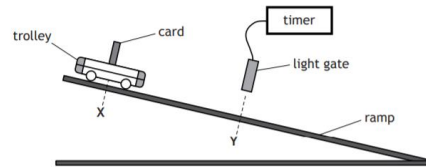

The computer displays the acceleration and average velocity of the trolley between the light gates. The trolley is now released from rest at point Y.
Which row in the table shows how the final speed released at X compares to the final speed when released at Y?

	Final speed when released at x compared to Y	Time to brake light gate when released (X vs Y)
A.	greater	greater
B.	greater	shorter
C.	same	same
D.	smaller	shorter
E.	smaller	greater

2. A student sets up the apparatus as shown.

The trolley is released from X and moves down the ramp.
The following measurements are recorded.

> time for card to pass through light gate = 0.08 s
> distance from X to Y = 0.5 m
> length of card = 40 mm

The instantaneous speed of the trolley at Y is

- A. 0.5 ms^{-1}
- B. 1.6 ms^{-1}
- C. 2.0 ms^{-1}
- D. 3.2 ms^{-1}
- E. 6.3 ms^{-1}

3. A car leaves Haymarket at 16:45, the car travels 2.5km to reach Waverly station at 17:00.
A tram leaves Haymarket at 16:45 and travels 2.1km to reach Waverly at 16:55.
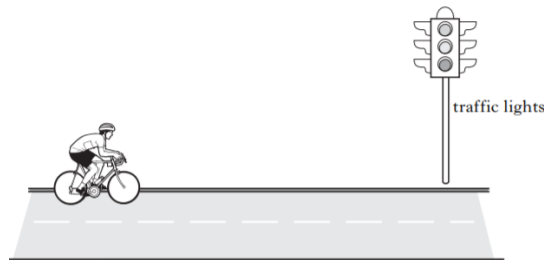
Which row of the table shows the correct average speed of the tram and the car?

	Average speed of car (ms^{-1})	Average speed of tram (ms^{-1})
A.	0.003	0.004
B.	0.17	0.21
C.	2.8	3.5
D.	166.67	210
E.	125.0	135.0

Section D

1.   A cyclist rides along a road.

a) Describe a method by which the average speed of the cyclist could be measured.   **3**
Your description must include the following
   • Measurements made
   • Equipment used
   • Any necessary calculations.

b) The table below shows the time taken for a cyclist to break a light gate during different tries.   **4**
The length of the bike is 1.26 m.

Try 1	0.09
Try 2	0.08
Try 3	0.07

Calculate the greatest instantaneous speed.