Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

A student investigates the relationship between force and acceleration for a trolley on a runway.

Figure 12 shows some of the apparatus the student uses.

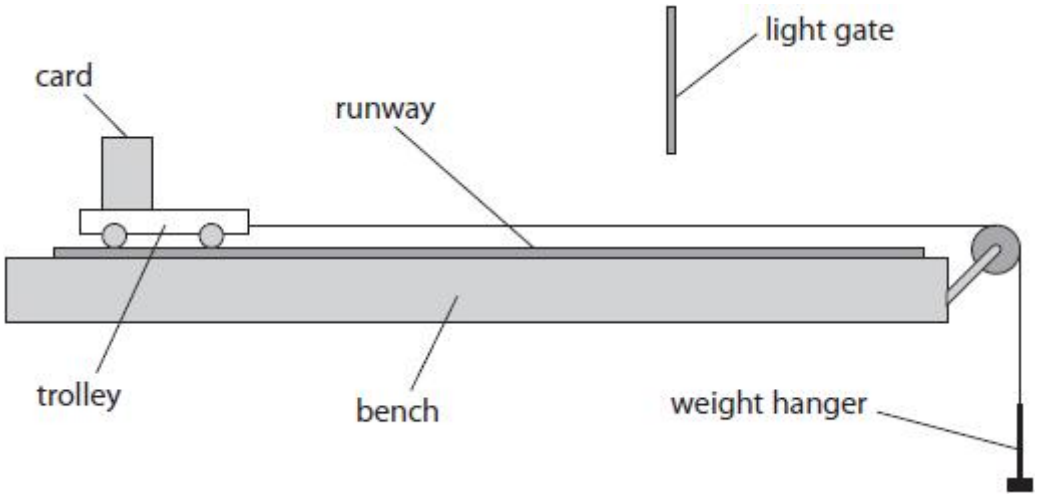


Figure 12

(i) Describe how the student could increase the accelerating force applied to the trolley.

(2)

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(ii) Describe how the mass of the moving system can be kept constant.

(2)

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(iii) Explain how the student could improve the procedure to compensate for the effects of frictional forces acting on the trolley.

(2)

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(Total for question = 6 marks)

Q10.

(i) An aircraft starts from rest and accelerates along the runway for 36 s to reach take-off velocity.

Take-off velocity for this aircraft is 82 m/s.
Show that the acceleration of the aircraft along the runway is about 2 m/s^2 .
Assume the acceleration is constant.

(2)

(ii) Calculate the distance the aircraft travels along the runway before take-off.

Use the equation

$$v^2 - u^2 = 2ax$$

(3)

distance = ... m

(iii) Suggest **one** reason why the length of the runway used is always much longer than the calculated distance that the aircraft travels along the runway before take-off.

(1)

.....

.....

(Total for question = 6 marks)

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Q11.

Figure 8 shows an object moving in a circular path.

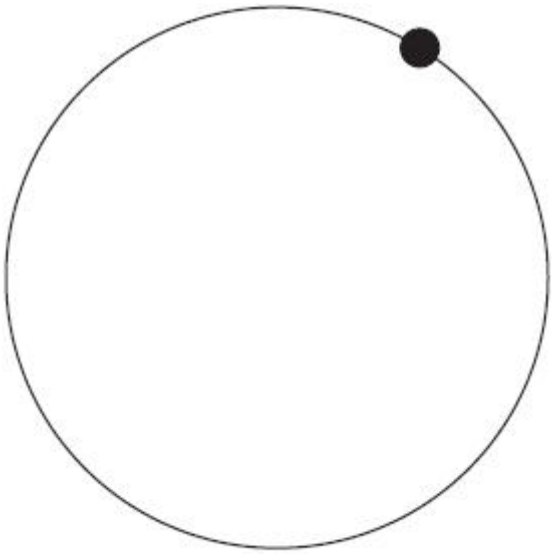


Figure 8

(i) Draw an arrow on Figure 8 to show the direction of the force that keeps the object moving in a circular path.

(1)

(ii) The object in Figure 8 is moving at constant speed.

Explain why it is not moving with constant velocity.

(2)

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(Total for question = 3 marks)

Q12.

Two people, L and M, have a 100 m race.

L starts running before M.

Figure 3 shows a distance/time graph of the race.

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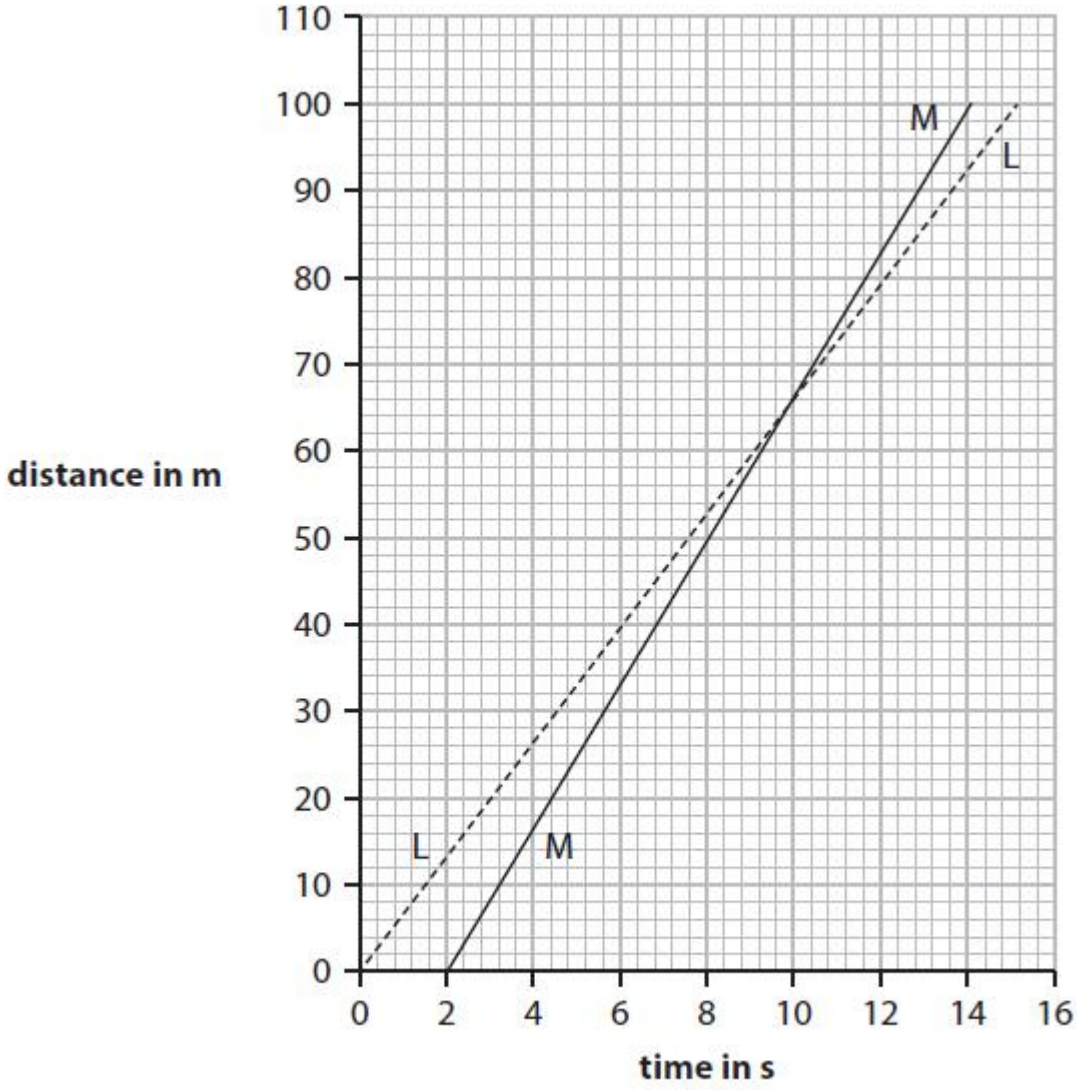


Figure 3

(i) State the **distance** that L has run when M overtakes.

(1)

distance = ... m

(ii) Calculate the velocity of L when running the 100 m race.

(2)

velocity = ... m/s

(Total for question = 3 marks)

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