## 2.3 Free Fall Motion

1.

Diagram 10.1 shows a long vacuum container, in which a bundle of cotton of mass 2 g and a small ball bearing of mass 20 g are dropped simultaneously from the same height. It is noted that both the cotton and the ball bearing are falling to the bottom of the container.

**Free fall and acceleration**

**TSTS**
- *Analysing*
- *Attributing*

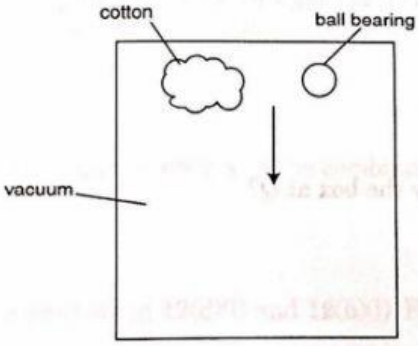


Diagram 10.1

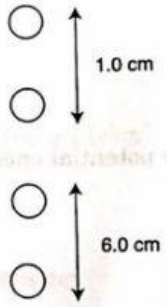


Diagram 10.2

(a) (i) Compare the time taken by the cotton and the ball bearing to reach the floor of the container.

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[1 *mark*]

(ii) Name **one** factor which causes both the cotton and the ball bearing to fall.

_____

[1 *mark*]

(iii) What would happen to the falling time if the mass of the cotton and the ball bearing is the same? Explain your answer.

HOTS

_____

_____

[2 *marks*]

(b) Diagram 10.2 is a stroboscopic photograph showing the motion of the ball bearing in a state of free fall. The time between 2 images is 0.05 s.

(i) What is the meaning of *free fall*?

_____

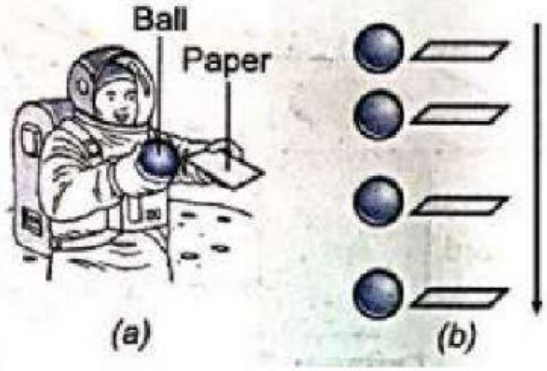
[1 *mark*]

(ii) Determine the acceleration of the ball bearing.

(c) Which object will reach the ground first if **there is air** in the container? Why?

LIVEWORKSHEETS

2). Figure 2.41(a) shows an astronaut standing on the surface of the Moon. He releases a piece of paper and a rubber ball from the same height at the same time. Figure 2.41(b) is a stroboscopic photograph that shows how the piece of paper and the rubber ball undergo free fall and reach the ground at the same time. HOTS




(a) What is meant by free fall?

(b) What inference can you make based on the observations?

(c) When the activity is repeated on the Earth, which of the two objects will reach the ground first? Explain your answer.

LIVEWORKSHEETS