



Unit 7 • Motion and Force: mass, weight and free fall

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

1 Key words

[4]

Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

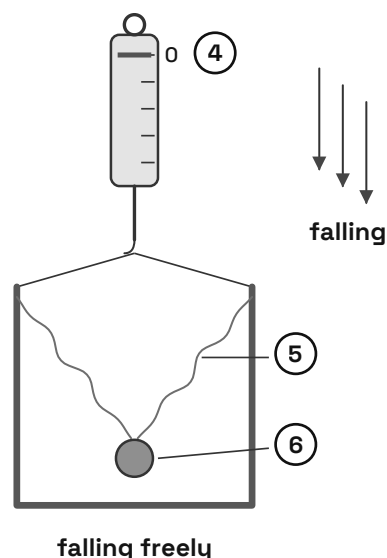
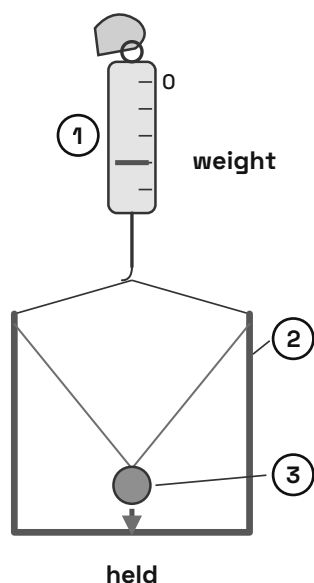
beam balance free fall inertia mass newton spring balance terminal velocity
upthrust weight weightlessness

The quantity of matter in an object is its _____. It is measured with a _____. The force of gravity on an object is its _____. Its SI unit is the _____, and it is measured with a _____. An object falling under the force of gravity alone is in _____. A parachute comes down at a steady speed, called the _____, once the air resistance on it equals its weight. An object in free fall presses on nothing and pulls on nothing; this is called _____.

2 Label the diagram

[3]

The diagram shows Activity 7.7: a stone tied by a thread inside a frame, hung from a spring balance, first held up (left) and then falling freely (right). Write the name or the observation at the places numbered 1 to 6. Each carries 0.5 mark.



1. _____
3. _____
5. _____

2. _____
4. _____
6. _____



3 Multiple choice

[5]

Choose the correct option for each of the following questions.

- i. At which of these places do you weigh the most? [1]
a. the peak of Mount Everest b. the peak of Api Himal
c. Kechana Kawal in Jhapa d. Chandragiri Hills
- ii. An astronaut of mass 70 kg goes from the Earth to the Moon. On the Moon, his [1]
a. mass and weight are both 6 times less
b. mass is 6 times less, his weight is the same
c. mass is still 70 kg, his weight is about 6 times less
d. mass and weight are both the same
- iii. A man weighs 750 N on the Earth. What does he weigh on the Moon? (g on the Moon = 1.63 m/s^2 , on the Earth 9.8 m/s^2) [1]
a. 124.74 N b. 125 N
c. 126.8 N d. 127.8 N
- iv. Watching a freely falling object second by second, which is true? [1]
a. the distance covered each second stays the same
b. the velocity increases uniformly
c. the acceleration increases uniformly
d. the displacement increases uniformly
- v. A girl stands on a bathroom scale inside a lift. The cable snaps and the lift falls freely. While it falls, the scale reads [1]
a. her normal weight b. more than her normal weight
c. zero d. her mass in kilograms, but not her weight

4 Very short answers

[3]

Write very short answers to the following questions.

- a. What is weightlessness? [1]

- b. Under what conditions is an object said to be in free fall? [1]

- c. Write the equation of motion that connects the final velocity v , the initial velocity u , the acceleration due to gravity g and the height h . [1]



[6]

Write short answers to the following questions.

[2]

[2]

[2]

[4]

Write a long answer to the following question.

How is it possible to land safely when jumping from an airplane with a parachute? Is it possible to land safely on the Moon the same way? Explain.

[6]

Solve the following problems. Show your working. (g on the Earth = 9.8 m/s^2)

[2]

[illegible]

Answer:



- b. A stone is dropped from a height of 15 m. How long does it take to reach the ground, and with what velocity does it hit the ground?

[4]

Answer:

8 Think

[2]

Think, then answer.

A student suggests a trick to make a profit: buy oranges in the mountains and sell them in the Terai at the same price per kilogram. If a beam balance is used to weigh them, would his trick work? Explain scientifically.

9 Activity: Measure your reaction time with a ruler

(not marked)

A friend holds a 30 cm ruler hanging down, with its zero end between your open finger and thumb. Without warning, the friend lets go and you catch it as fast as you can. Read how far it fell, h , and work out your reaction time, $t = \sqrt{2h/g}$. Use h in meters.

Trial	Distance fallen, h (m)	Reaction time, $t = \sqrt{(2h/g)}$ (s)
1		
2		
3		
Average		

Why is the ruler a free-fall experiment?

