WORKSHEET 1

CHAPTER 3 – GRAVITATION

A. Tick (✓) the correct option.

1. The value of acceleration due to gravity at the surface of the earth is
   a. 2 m/s^2. b. 4.9 m/s^2. c. 9.8 m/s^2. d. 8 m/s^2.
2. The mass of an object
   a. varies at different location. b. remains constant.
   c. can be measured using spring balance. d. none of these.
3. The gravitational force between two bodies is
   a. always repulsive. b. always attractive.
   c. can be attractive or repulsive. d. neutral.
4. The force of attraction between two bodies each of mass 1 kg kept as a distance of 1 m is
   a. 9.8 N. b. 6.7 N. c. 980 N. d. 6.7×10^{-11} N.
5. Object moving in upward direction opposite to the gravitational force of earth performs
   a. accelerated motion. b. motion with constant velocity.
   c. oscillations. d. retarted motion.

B. Fill in the blanks.

1. The force of gravitation exerted by the earth is called _____
2. The SI unit of universal gravitational constant is _____
3. Universal law of gravitation is also known as the _____
4. Acceleration due to gravity on the moon is _____ of that on the earth.
5. The CGS unit of mass is _____

C. State whether the given statements are true or false.

1. Mass is a scalar quantity.
2. A body under free fall moves with constant velocity.
3. Acceleration due to gravity is taken as negative when body is dropped from a height.
4. The acceleration due to gravity increases as we move from the equator to the poles.
5. The value of *G* does not depend upon the nature, size or masses of the bodies.

D. Match the following.

1. Universal gravitational constant	Newton (N)
2. Weight	m/s^2
3. Acceleration due to gravity	kg
4. Mass	$N\ m^2/kg^2$

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Class: IX Date: .....

E. Answer the following questions.

Very Short Answer Questions

1. Define universal gravitational constant.
2. On what factors does the universal gravitational constant depends upon?

Short Answer Questions

1. What is acceleration due to gravity?
2. State the relationship between g and G.

Long Answer Questions

1. A stone is released from the top of a tower of height 39.2 m. Calculate its final velocity before hitting the ground.
2. A ball thrown up vertically returns to the thrower after 16 s. Find the velocity with which it was thrown up.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. c
2. b
3. b
4. d
5. d

B. Fill in the blanks.

1. gravity
2. N m^2/kg^2
3. Inverse, square law
4. $\frac{1}{6}$th
5. gram

C. State whether the given statements are true or false.

1. T
2. F
3. F
4. T
5. T

D. Match the following.

1. Universal gravitational constant	N m^2/kg^2
2. Weight	Newton (N)
3. Acceleration due to gravity	m/s^2
4. Mass	kg

E. Answer the following questions.

Very Short Answer Questions

1. The universal gravitational constant is equal to the force of attraction acting between two bodies each of mass 1 kg whose centres are placed unit distance apart.
2. The value of universal gravitational constant depends upon the nature of medium between two bodies.

Short Answer Questions

1. The uniform acceleration produced in the body when it falls freely under the effect of gravity alone is known as acceleration due to gravity.
2. $g = \frac{GM}{R^2}$

Long Answer Questions

1. $h = 39.2$ m

   $u = 0$

   $v = ?$

   $g = 9.8$ m/s^2

   $v^2 = u^2 + 2gs$

   $v^2 = 2(9.8)\ (39.2)$

   $v^2 = 768.32$

   $v = 27.718$ m/s

   So the velocity of the stone just before hitting the ground is 27.718 m/s.

2. Time taken to reach maximum height = $\frac{1}{2}$ (Total time taken)

$$= \frac{1}{2} (16)$$

$$= 8 \text{ s}$$

$v = 0$ (maximum point)

$u = ?$

$t = 8$ s

$v = u + gt$

$0 = u - 9.8\ (t)$

$u = 9.8\ (8)$

$= 78.4$ m/s