

# WORKSHEET 2

## CHAPTER 3 – GRAVITATION

### A. Tick (✓) the correct option.

- The SI unit of universal gravitational constant is
  - $\text{N m}^2/\text{kg}^2$ .
  - $\text{N}^2 \text{ m}/\text{kg}^2$ .
  - $\text{N}^2 \text{ m}^2/\text{kg}$ .
  - $\text{N m}/\text{kg}^2$ .
- Acceleration due to gravity at the centre of the earth is
  - $9.8 \text{ m/s}^2$ .
  - $4.9 \text{ m/s}^2$ .
  - 0.
  - none of these.
- What is the mass of an object whose weight on earth is 196 N?
  - 20 kg
  - 0.20 kg
  - 19.60 kg
  - 2 kg
- How much would a man, whose mass is 60 kg weigh on the moon?
  - 9.8 N
  - 600 N
  - 60 N
  - 98 N
- SI unit of weight is
  - Newton.
  - kg.
  - W.
  - kg·W.

### B. Fill in the blanks.

- The mass of an object is the measure of its \_\_\_\_\_
- The weight of a body is the force with which it is attracted towards the centre of the \_\_\_\_\_
- At the centre of the earth, the weight of a body is \_\_\_\_\_
- Mass of an object is 20 kg on earth. The mass of the same object on moon is \_\_\_\_\_
- The weight of a body on earth is 600 N. The weight of the same body on the moon will be \_\_\_\_\_

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

- The force acting on a body due to gravity is called its mass.
- The weight is equal to the product of mass and acceleration due to gravity.
- Weight is a vector quantity.
- Acceleration due to gravity on earth is  $\frac{1}{6}$  th of that on the moon.
- As we go below the surface of the earth, acceleration due to gravity goes on decreasing.

### D. Match the following.

- |  |  |
|--|--|
| 1. Force ( $F$ )                       | quantity of matter                               |
| 2. Acceleration due to gravity ( $g$ ) | $6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$ |
| 3. Mass                                | $\frac{G Mm}{R^2}$                               |
| 4. Gravitational constant              | beam balance                                     |
| 5. Instrument used to measure mass     | $\frac{G M}{R^2}$                                |

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Date: .....

**E. Answer the following questions.**

**Very Short Answer Questions**

1. Does the universal gravitational constant change with depth?
2. How does acceleration due to gravity changes as we go down below the surface of the earth?

**Short Answer Questions**

1. State the relation between acceleration due to gravity on moon and earth.
2. Define weight and give its SI unit.

**Long Answer Questions**

1. What are the characteristics of mass?
2. A ball is thrown up and attains a maximum height of 90 m. Calculate its initial speed (Take  $g = 10 \text{ m/s}^2$ ).

# ANSWERS

## WORKSHEET 2

### A. Tick (✓) the correct option.

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

### B. Fill in the blanks.

1. Inertia
2. Earth
3. Zero
4. 20 kg
5. 100 N

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

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

### D. Match the following.

- |  |  |
|--|--|
| 1. Force ( $F$ )                       | $\frac{G Mm}{R^2}$                               |
| 2. Acceleration due to gravity ( $g$ ) | $\frac{G M}{R^2}$                                |
| 3. Mass                                | quantity of matter                               |
| 4. Gravitational constant              | $6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$ |
| 5. Instrument used to measure mass     | beam balance                                     |

### E. Answer the following questions.

#### Very Short Answer Questions

1. No, it is same at all places.
2. As we go down below the earth, acceleration due to gravity decreases.

#### Short Answer Questions

1. Acceleration due to gravity on the moon is  $\frac{1}{6}$ th of that on earth.
2. The weight of a body is the force with which it is attracted towards the centre of the earth. Its SI unit is Newton (N).

#### Long Answer Questions

1. The characteristics of mass are:
  - Mass is scalar quantity.
  - The mass of an object does not change from place to place. It is constant.
  - The mass of a body can never be zero.
  - The mass of a body can be measured with the help of a two-pan balance.

2.  $h = 90 \text{ m}$

$$u = ?$$

$$v = 0$$

$$g = 10 \text{ m/s}^2$$

We know,

$$v^2 = u^2 + 2gh$$

$$0 = u^2 + 2(-10)(90)$$

$$u^2 = 1800$$

$$u = \sqrt{1800}$$

$$= 42.42 \text{ m/s}$$

The initial speed with which the ball was thrown up is equal to 42.42 m/s.