

ACTIVITY # 2.1 Mass and Weight

Date due: _____

12

1. The mass and weight of an object are related by the equation

$$\text{weight} = \text{mass} \times \text{gravity}$$

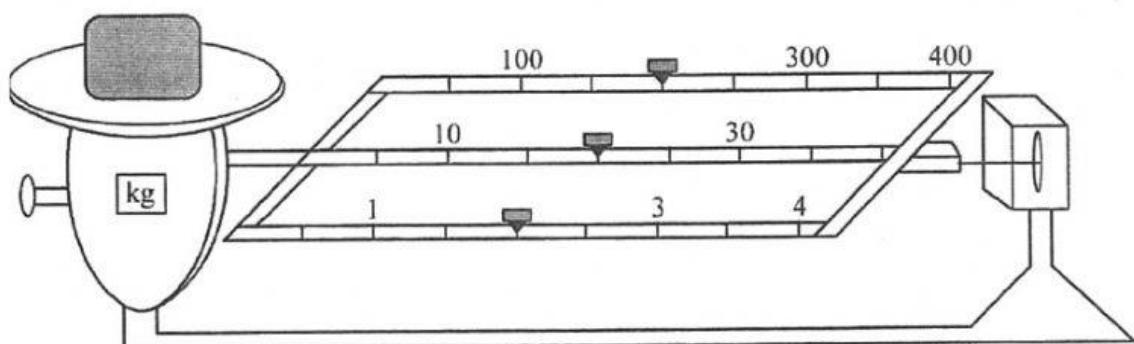
Value for g on Earth = 10 N/kg, value for g on the Moon = 1.6 N/kg

- (a) Distinguish between the terms mass and weight.

mass _____ [1]

weight _____ [1]

- (b) This apparatus is used to measure mass.



- (i) Name the apparatus.

_____ [1]

- (ii) State the value of the mass of the object shown.

_____ [1]

(iii) Find the weight of the object on Earth. (Show working).

13

[2]

(iv) Find the **mass** and **weight** of the same object on the Moon. Give a reason for your answer in both cases. (Show working).**mass****reason** _____ [2]**weight****reason** _____ [2]

2. This question is about mass, weight and the stretching of springs.

(a) An astronaut of mass 70 kg flies on a mission to the Moon.

(i) Calculate the astronaut's weight on Earth. (Use $g = 10 \text{ N/kg}$).

[2]

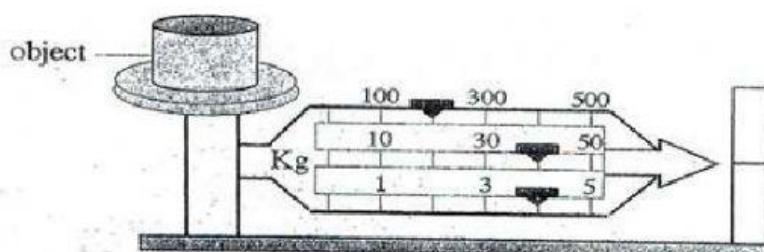
(ii) Find the astronaut's mass on the Moon.

[1]

(iii) The Moon has an acceleration due to gravity that is $\frac{1}{6}$ of that of the Earth's. Calculate the weight of the astronaut on the Moon.

[2]

3. The apparatus shown is used to measure mass.



- (a) (i) Name the apparatus.

_____ [1]

- (ii) Define **mass**.

_____ [1]

- (iii) Find the mass of the object shown on the apparatus. [2]

- (iv) If the gravitational force (g) on a 1 g mass is 10 N/kg, find the weight of this object. [2]

- (b) (i) Give **TWO** differences between mass and weight.

1 _____

2 _____

_____ [2]

- (ii) State the reading on this apparatus if it were taken to the Moon, give a reason for this new reading.

new reading _____ reason _____

_____ [2]

Total marks [10]

4. This question is about forces, weight and mass

- (a) Complete the table by placing ticks (✓) to show if the quantities are vector or scalar. An example is done for you.

quantity	vector	scalar
force	✓	
mass		
weight		

[2]

- (b) Write the equation that represents the relationship between mass and weight.

[2]

- (c) A balance is used to measure the mass of a stone on earth. The balance reads 9.0 kg. The stone is then weighed with a spring scale graduated in newtons. ($g = 10 \text{ N/kg}$) Calculate the reading on the spring scale.

[2]

- (d) The stone is transported to the moon. Given that gravity is one-sixth of that on the Earth near the surface of the Moon, find

- (i) the mass of the stone on the Moon;

[1]

- (ii) the weight of the stone on the Moon.

[1]

- (e) On Mars, the stone weighs 34.2 N. Calculate the gravitational field strength of Mars.

[2]

Total marks [10]