Mass and Weight – 2020 IGCSE 0625

1. March/2020/Paper_12/No.4

Diagram 1 shows a piece of flexible material that contains many pockets of air. Diagram 2 shows the same piece of flexible material after it has been compressed so that its volume decreases.

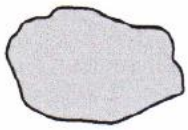


diagram 1
(before compression)

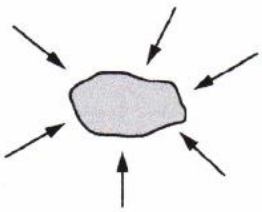


diagram 2
(after compression)

What happens to the mass and to the weight of the flexible material when it is compressed?

	mass	weight
A	increases	increases
B	increases	no change
C ✓	no change	increases
(D)	no change	no change

- Mass is amount matter in a substance.
- Compressing does not change amount of matter in the material.
- So mass does not change
- Since $W = m \times g$
  so weight also remains same.

2. March/2020/Paper_12/No.5

On the Moon, the gravitational field strength g is 1.6 N/kg.

An object has a mass of 2.0 kg.

What is the weight of the object on the Moon?

$W = m \times g$
$= 2.0\,kg \times 1.6\,N/kg$
$= 3.2\,N$

A 0 N **B** 1.3 N **(C)** ✓ 3.2 N **D** 20.0 N

3. March/2020/Paper_32/No.3(a)

A student drops a ball from a high window.

(a) The mass of the ball is 0.12 kg.

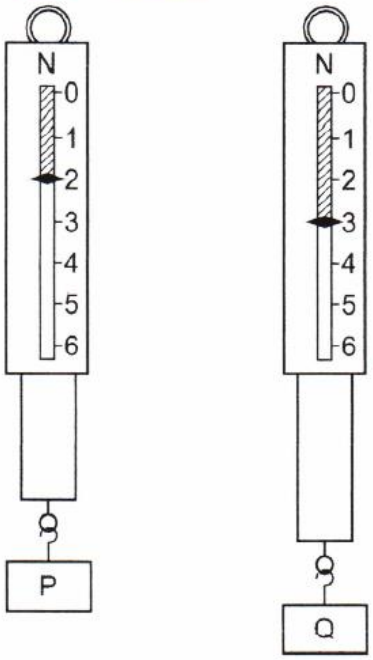
Calculate the weight of the ball.

$W = m \times g$
$= 0.12\,kg \times 10\,N/kg$
$= 1.2\,N$

weight = 1.2 N. N [3]

4. June/2020/Paper_11,12,13/No.4

Two metal blocks P and Q have identical dimensions. They hang on identical spring balances.



- Identical dimension Means same volume
- Weight of P = 2N
  Weight of Q = 3N
- Weight is different for the two metal blocks.

Which statement about P and Q is correct?

A They have different volumes and different weights.

B They have different volumes and equal weights.

C They have equal volumes and equal weights.

(D) They have equal volumes and different weights.

5. June/2020/Paper_11/No.5

A mass of 6.0 kg rests on the surface of a planet.

On this planet, g = 20 N/kg.

What is the weight of the object?

$m = 6.0\,kg$
$g = 20\,N/kg$
$w = ?$

$W = m \times g$
$= 6.0\,kg \times 20\,N/kg$
$= 120\,N$

A 0.30 N B 0.60 N C 60 N (D) 120 N

6. June/2020/Paper_12/No.5

A space probe is taken from the Earth to Mars.

The force of gravity on the surface of Mars is less than the force of gravity on the surface of the Earth.

How do the weight and the mass of a space probe on the surface of Mars compare to their values when the probe is on the surface of the Earth?

	weight on Mars	mass on Mars
A	decreased	decreased
B	decreased	unchanged
C	unchanged	decreased
D	unchanged	unchanged

- Mass is quantity of matter, so it will remain unchanged.
- Weight is the pull of gravity, so it will have less weight in Mars, since gravity on Mars is less than on Earth.

$W = m \times g$.

7. June/2020/Paper_12/No.6

Water has a density of 1000 kg / m^3.

A rectangular swimming pool has an average depth of 1.6 m.

The length of the pool is 25 m.

The width of the pool is 10 m.

$V = 1.6 \times 25 \times 10$
$= 400\ m^3$

$\rho = \frac{m}{V}$

$m = \rho \times V$
$= 1000 \times 400\ m^3$
$= 400{,}000\ kg$

What is the mass of the water in the swimming pool?

A 2.5 kg B 400 kg C 400 000 kg D 800 000 kg

8. June/2020/Paper_13/No.5

Which row gives the correct weight for the mass shown?

The value of g is 10 N / kg.

	mass / kg	weight / N
A	2	20
B	10	1
C	10	10
D	20	2

A: $W = m \times g = 2 \times 10 = 20\ N$

B: $W = 10\ kg \times 10\ \frac{N}{kg} = 100\ N$

C: $W = 10 \times 10 = 100\ N$

D: $W = 20 \times 10 = 200\ N$

9. June/2020/Paper_13/No.6

A rectangular gymnasium is 50 m long, 25 m wide and 8.0 m high.

The density of air is 1.2 kg / m^3.

What is the best estimate of the mass of air in the gymnasium?

A 0.00012 kg **B** 100 kg **C** 8300 kg **D** 12 000 kg ✓

$\rho = \frac{m}{V}$

$m = \rho \times V$

Vol = 50 × 25 × 8

= 10,000 m^3

= 1.2 kg/m^3 × 10000 m^3

= 12,000 kg

10. June/2020/Paper_21/No.4

Which statement correctly describes the effects of placing a heavy load in a car?

A It is easier to accelerate the car and easier to bring the car to rest.

B It is easier to accelerate the car but more difficult to bring the car to rest.

C ✓ It is more difficult to accelerate the car and more difficult to bring the car to rest.

D It is more difficult to accelerate the car but easier to bring the car to rest.

f = ma - when mass increases, acceleration decreases

$a = \frac{f}{m}$

11. June/2020/Paper_21/No.5

A mass of 6.0 kg rests on the surface of a planet.

On this planet, g = 20 N / kg.

What is the weight of the object?

A 0.30 N **B** 0.60 N **C** 60 N **D** ✓ 120 N

m = 6.0 kg

g = 20 N/kg

W = m × g

= 6.0 kg × 20 N/kg

= 120 N

12. June/2020/Paper_22/No.4

Which statement correctly describes the effects of placing a heavy load in a car?

A It is easier to accelerate the car and easier to bring the car to rest.

B It is easier to accelerate the car but more difficult to bring the car to rest.

C ✓ It is more difficult to accelerate the car and more difficult to bring the car to rest.

D It is more difficult to accelerate the car but easier to bring the car to rest.

13. June/2020/Paper_22/No.5

A space probe is taken from the Earth to Mars.

The force of gravity on the surface of Mars is less than the force of gravity on the surface of the Earth.

How do the weight and the mass of a space probe on the surface of Mars compare to their values when the probe is on the surface of the Earth?

	weight on Mars	mass on Mars
A	decreased	decreased
B	decreased	unchanged
C	unchanged	decreased
D	unchanged	unchanged

Weight = mass x gravity

$W_m < W_E$.

$m_m = m_E$.

- weight in mass is less than weight on Earth.
- Mass is same

14. June/2020/Paper_22/No.6

Water has a density of 1000 kg / m^3.

A rectangular swimming pool has an average depth of 1.6 m.

The length of the pool is 25 m.

The width of the pool is 10 m.

What is the mass of the water in the swimming pool?

$\rho = \frac{m}{V}$

$m = \rho \times V$

$V = 1.6 \times 25 \times 10 = 400$

$m = 1000\,kg \times 400$

$= 400{,}000\,kg$

A 2.5 kg **B** 400 kg **C** 400 000 kg **D** 800 000 kg

15. June/2020/Paper_23/No.4

Which statement correctly describes the effects of placing a heavy load in a car?

A It is easier to accelerate the car and easier to bring the car to rest.

B It is easier to accelerate the car but more difficult to bring the car to rest.

C It is more difficult to accelerate the car and more difficult to bring the car to rest.

D It is more difficult to accelerate the car but easier to bring the car to rest.

- mass is inertia
- Inertia - means its difficult to change the state of object.
  - If its in motion, its difficult to stop
  - If its at rest, its difficult to start moving
- More mass means more inertia.

16. June/2020/Paper_23/No.5

Which row gives the correct weight for the mass shown?

The value of g is 10 N / kg.

$W = m \times g$

	mass / kg	weight / N	
A	2	20	← $W = 2 \times 10 = 20N$
B	10	1	← $W = 10 \times 10 = 100N$
C	10	10	← $W = 10 \times 10 = 100N$
D	20	2	← $W = 20 \times 10 = 200N$

17. June/2020/Paper_23/No.6

A rectangular gymnasium is 50 m long, 25 m wide and 8.0 m high.

The density of air is 1.2 kg / m^3.

$\rho = \frac{m}{V}$, $m = \rho \times V$

What is the best estimate of the mass of air in the gymnasium?

$V = 50 \times 25 \times 8$
$= 10{,}000 m^3$
$\rho = 1.2 kg/m^3$
$m = 1.2 \frac{kg}{m^3} \times 10000 m^3$
$= 12{,}000 kg$.

A 0.00012 kg **B** 100 kg **C** 8300 kg **D** 12 000 kg

18. June/2020/Paper_43/No.3(c)

(c) A bus is travelling along a straight road. The bus and the driver have a combined mass of 16000 kg when there are no passengers in it. The bus has 73 passengers. The average mass of each of the passengers is 65 kg.

(i) Calculate the total mass of the bus, the driver and the 73 passengers.

Passengers mass = 73 × 65
= 4745 kg

Total mass = 16000 + 4745
= 20,745 kg
= 21,000 kg

mass = 20,745 kg. [2]

(ii) The fully loaded bus accelerates uniformly from rest to a speed of 14 m/s. The time taken to reach a speed of 14 m/s is 20 s.

Calculate the resultant force on the bus during the acceleration.

R.f = m × a
= 20,745 × $\left(\frac{14-0}{20}\right)$.
= 14,522 N

force = 14,522 N. [2]