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## QUESTION 1

*Select the correct answer.*

If the mass of two objects remain the same, but the force of gravitational attraction decreases by a factor of 4, which of the following has likely occurred?




- *r* is halved.
- *r* is decreased by a factor of 4.
- *r* is increased by a factor of 4.
- ✓ *r* is doubled.

## QUESTION 2

*Select the correct answer from the drop-down menu.*

If the mass of one of two objects is tripled, the force of gravity ($F$) between them becomes

3F ✓ .

## QUESTION 3

*Select the correct answer from the drop-down menu.*

The planet in the solar system with the highest gravitational force is the planet that has the

greatest mass ✓ .

## QUESTION 4

*Select the correct answer from the drop-down menu.*

Two heavy stationary objects are set in motion with the same mass and distance maintained between them. The gravitational force between them will remain the same ✓ .

## QUESTION 5

*Select the correct answer.*

As an asteroid approaches Earth, it accelerates though the masses of the Earth and the asteroid remain the same. What is the explanation?

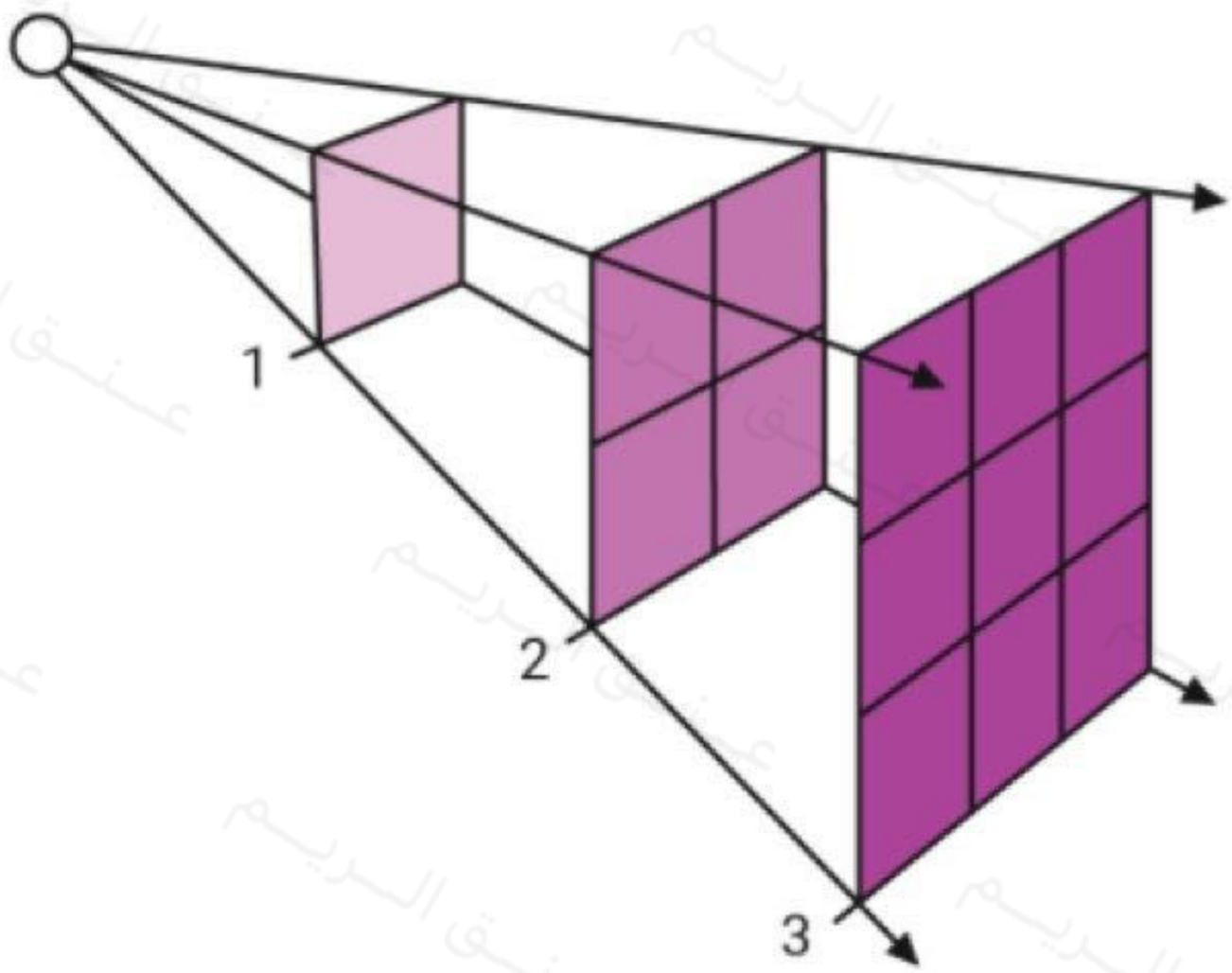


- ○ The asteroid's path is not affected by the Earth's gravitation.
- ○ The gravitational force decreases as the asteroid gets closer to the Earth.
- ✓ The gravitational force increases as the asteroid gets closer to the Earth.
- ○ The asteroid is accelerated by the Sun's gravitational force

## QUESTION 6

*Select the correct answer.*

This is a model for the effect of distance on the strength of a gravitational field. The thickness of the layer resembles the gravitational force and the distance between the sprayer and the canvas resembles the distance between the two massive objects.




The paint sprayer can spraypaint a 1 mm thick

layer on a canvas from a distance ($r$) of 1 meter. If the distance is doubled, what will the thickness of the layer of paint be?

- 2 mm
- 4 mm
- 0.25 mm ✓
- 0.5 mm

## QUESTION 7

*Select the correct answer.*



The Earth and Moon have a gravitational force acting between them. Earth's mass is $5.98 \times 10^{24}$ kg and the Moon's mass of $7.30 \times 10^{22}$ kg. The average distance ($r$) between Earth and Moon is taken as $3.93 \times 10^{5}$ km. Calculate the gravitational force acting between Earth and Moon.

$(G = 6.67 \times 10^{-11}\ Nm^2/kg^2)$

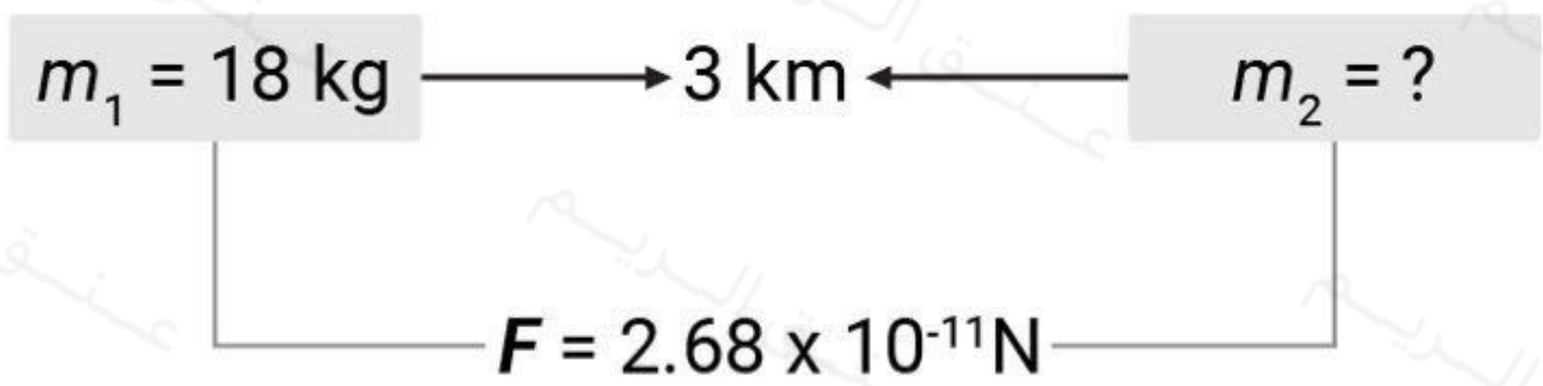
- $7.41 \times 10^{28}$ N

- $1.88 \times 10^{26}$ N
- $1.91 \times 10^{20}$ N ✓
- $1.52 \times 10^{24}$ N

## QUESTION 8

*Select the correct answer.*

An object weighs 18 kg. A gravitational force of $2.68 \times 10^{-11}$ N is measured acting between it and another object whose mass is unknown. The distance between the two objects is 3 kilometres. Find the mass of the other object.




$(G = 6.67 \times 10^{-11}\ N.m^2/kg^2)$

- $2 \times 10^5$ kg ✓
- $2 \times 10^6$ kg
- 0.2 kg

200 kg

## QUESTION 9

*Select the correct answer.*

A space shuttle orbiting the Earth deploys a satellite into orbit and as a result, the shuttle loses half of its mass. Using Newton's law of universal gravitation, what change would you expect in the gravitational force between the Earth and the shuttle?



The gravitational force will increase slightly.

The gravitational force will reduce slightly.

The gravitational force will double.

The gravitational force will reduce by a half. ✓

## QUESTION 10

*Select the correct answer.*

The gravitational force between two gold plates placed 1 meter apart was calculated to be 20 N. One of the plates was replaced with a similar looking plate of another metal with twice the mass. What would be the new force of attraction between the two plates?

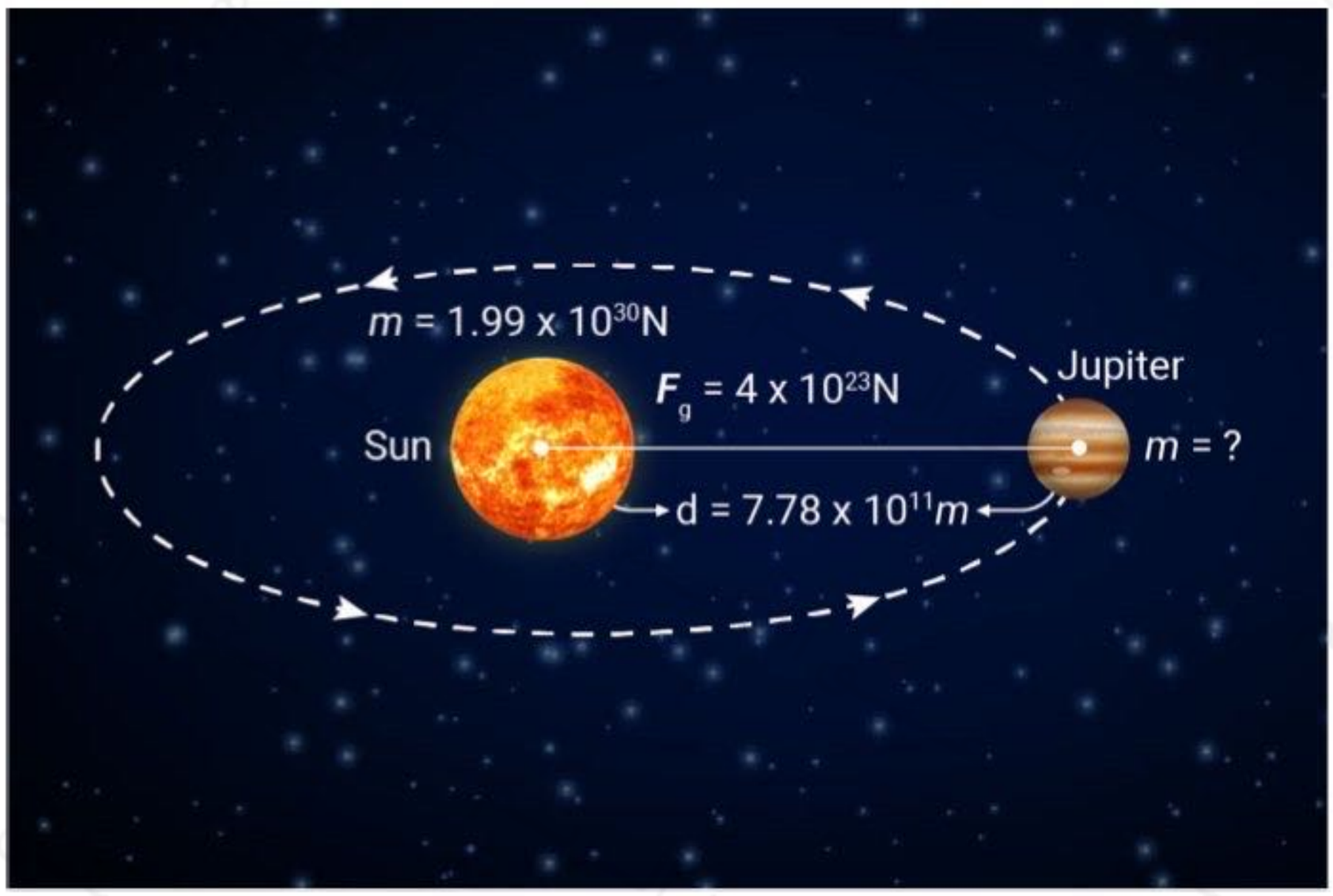
- ○ 60 N
- ✓ 40 N
- ○ 20 N
- ○ 10 N

## QUESTION 11

*Select the correct answer.*

The gravitational force between Jupiter and the Sun is $4.0 \times 10^{23}$ N. Given that the mass of the Sun is $1.99 \times 10^{30}$ kg, and the distance between them is $7.784 \times 10^{11}$ m, calculate the mass of Jupiter.

$(G = 6.67 \times 10^{-11} N.m^2/kg^2)$

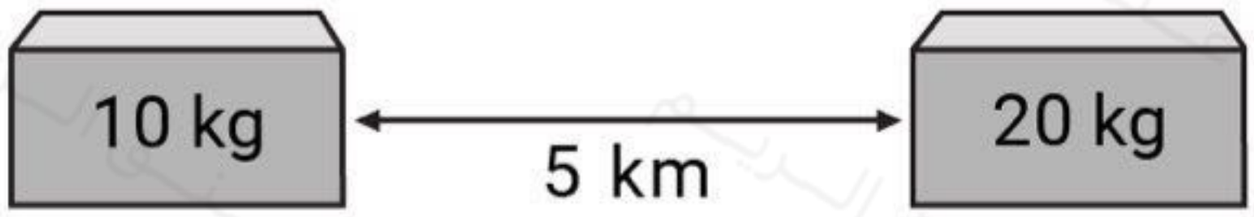


- $3.4 \times 10^{23}$ kg
- $1.6 \times 10^{28}$ kg
- $6.7 \times 10^{23}$ kg
- $1.8 \times 10^{27}$ kg ✓

## QUESTION 12

*Select the correct answer.*

Two stationary objects with masses of 10 kilograms and 20 kilograms, are placed 5 kilometres apart. What is the value of the gravitational force acting between them?




$(G = 6.67 \times 10^{-11}\ Nm^2 / kg^2)$

- $2.5 \times 10^{-12}$ N
- $5.3 \times 10^{-10}$

N

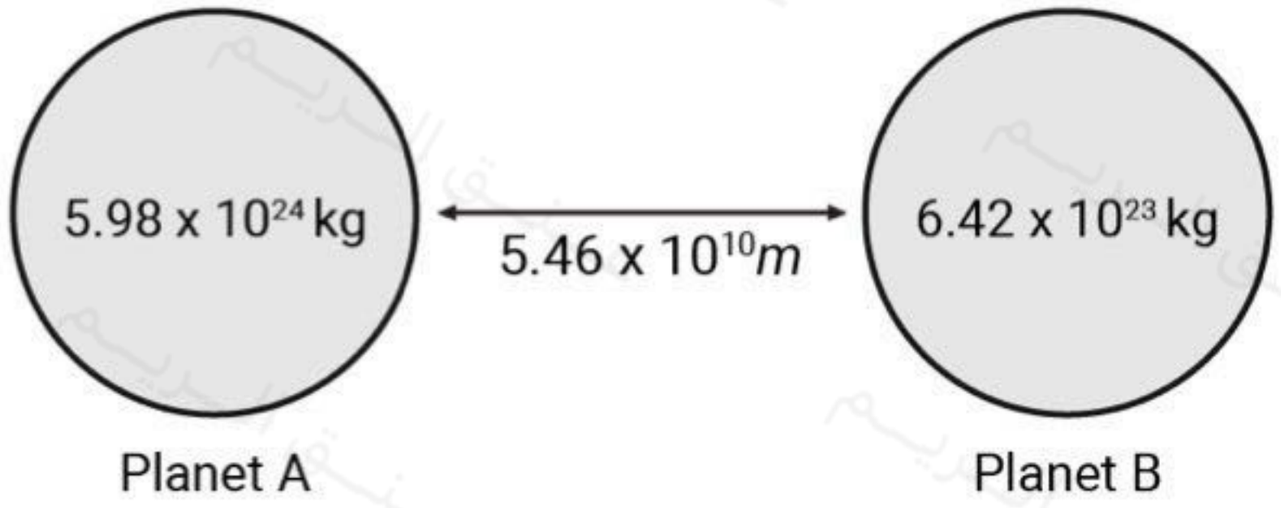
$5.3 \times 10^{-16}$ N

$2.3 \times 10^{-16}$ N

## QUESTION 13

*Select the correct answer.*

The mass of Planet A is $5.98 \times 10^{24}$ kg. The mass of Planet B is $6.42 \times 10^{23}$ kg. The distance between them is $5.46 \times 10^{10}$ m. What is the force of gravity between them? $(G = 6.67 \times 10^{-11}\ Nm^2/kg^2)$




$8.58 \times 10^{-16}$ N

$5.25 \times 10^{25}$ N

$8.59 \times 10^{16}$ N

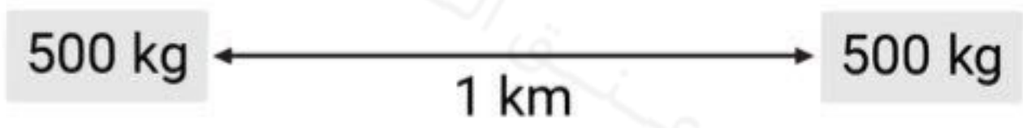
$8.84 \times 10^{11}$ N

## QUESTION 14

*Select the correct answer.*

What is the force of gravity between two objects, each of 500 kg mass, placed 1 km apart?

$(G = 6.67 \times 10^{-11} Nm^2 / kg^2)$




$1.67 \times 10^{-5}$ N

$1.26 \times 10^{-11}$ N

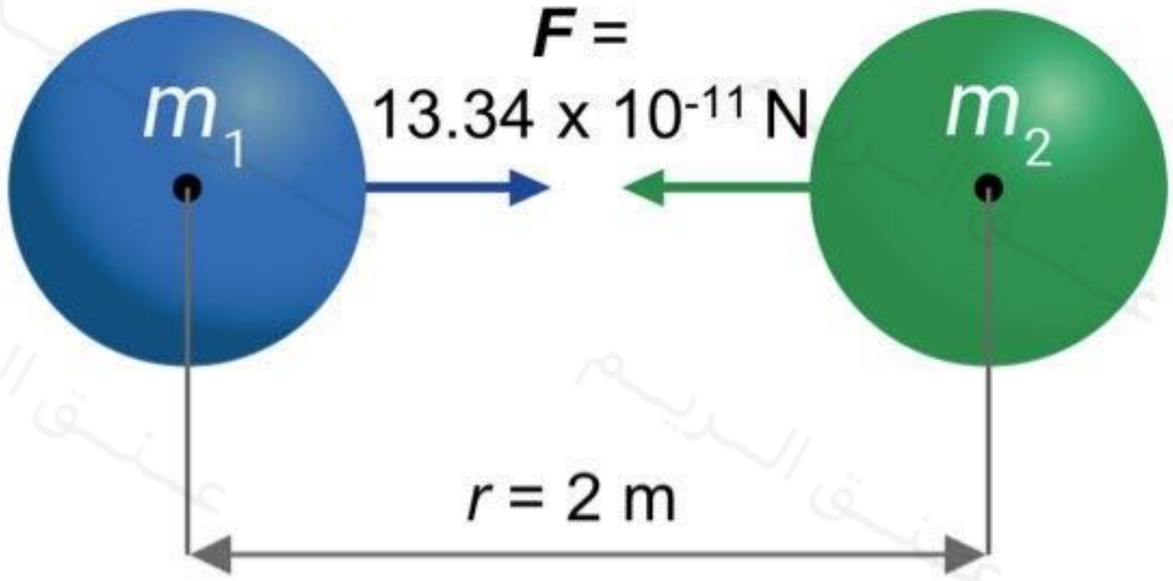
$1.67 \times 10^{-11}$ N

$3.33 \times 10^{-11}$ N

## QUESTION 15

*Select the correct answer.*

An experiment is done in the laboratory where a gravitational force of $13.34 \times 10^{-11}$ N is measured between two objects with equal mass, that are 2 m apart. What is the mass of each? ($G = 6.67 \times 10^{-11}$ N.m$^2$/kg$^2$).




- 8.0 kg
- 2.8 kg ✓
- 2.2 kg
- $8.4 \times 10^2$ kg