View hints View feedback

Play All

QUESTION 1

Select the correct answer.

Two satellites with different masses are launched at the same time but deployed at different orbital heights above the Earth's surface. Which satellite will have a greater orbital speed?



- The satellite with smaller mass.
- The satellite with a smaller orbital radius. ✓
- The satellite with a larger orbital radius.
- The satellite with greater mass.

QUESTION 2

Select the correct answer.

A satellite orbits the Earth at a speed of

1.5×10^{3}

m/s. How many kilometers above the Earth's surface is the satellite orbiting? (Given that

$m_E = 5.97 \times 10^{24}$ kg

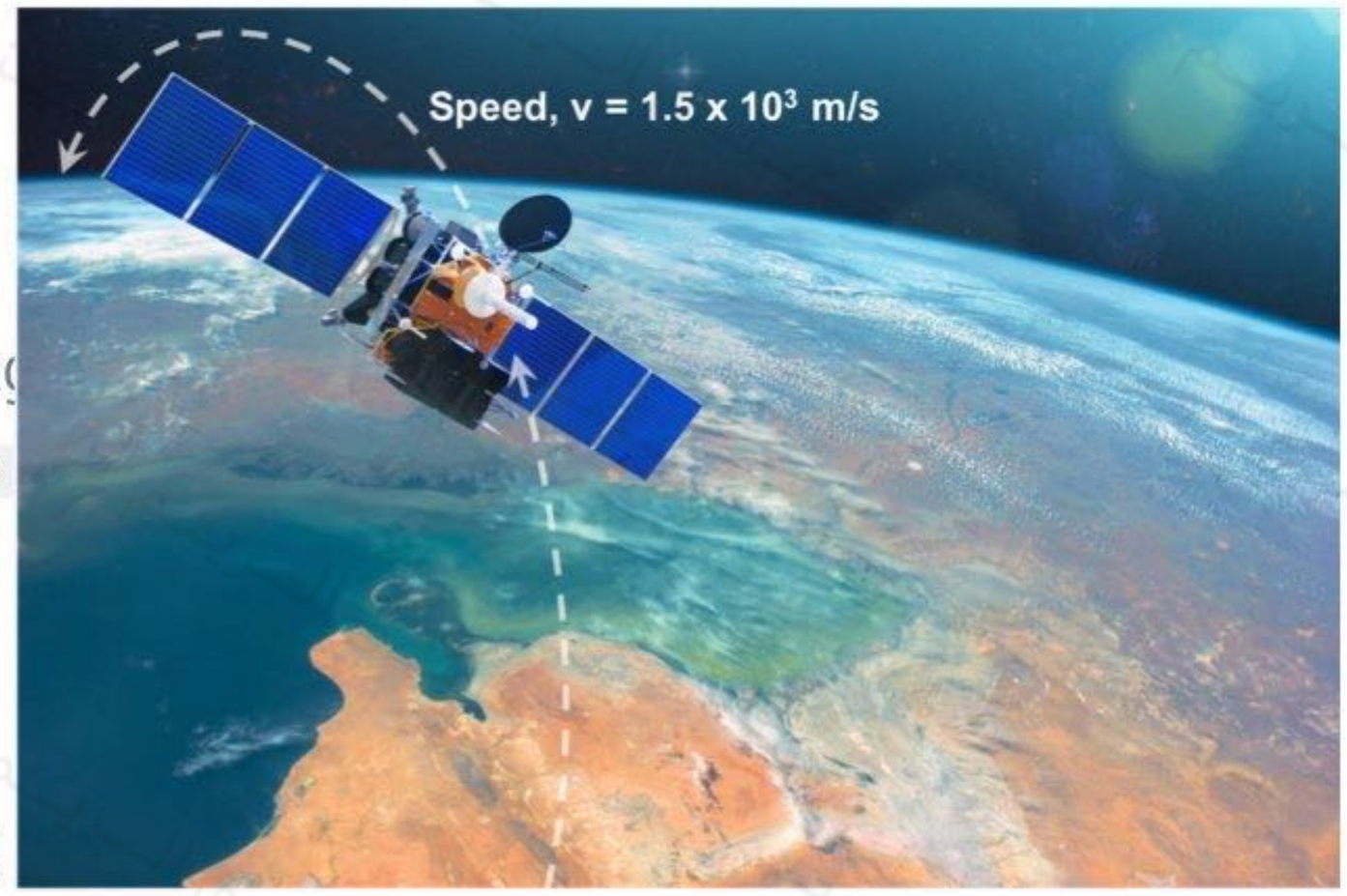
,

$r_E = 6.38 \times 10^{6}$ m

, and

$G = 6.67 \times 10^{-11}$ N

)



- [x] 1.7×10^{5} km
- [ ] 2.5×10^{5} km
- [ ] 1.7×10^{8} m
- [ ] 6.6×10^{6} km

QUESTION 3

Select the correct answer.

NASA's Aqua satellite orbits the Earth at 705 km above the Earth's surface. Given that the mass of Earth is

$m_E = 5.97 \times 10^{24}$ kg

, its radius is

$r_E = 6.38 \times 10^6$ m

, and the gravitational constant is

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

, what is the orbital period of this satellite?

Take

$\pi = 3.14$

- 135 min
- 99 min ✓
- 219 min
- 1,200 min

QUESTION 4

Select the correct answer.

NASA's Aqua satellite orbits the Earth at 705 km above the Earth's surface. Given that the mass of Earth is

$m_E = 5.97 \times 10^{24}$ kg

, its radius is

$r_E = 6.38 \times 10^6$ m

, and the gravitational constant is

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

, what is the orbital speed of this satellite?

- 5.6×10^3 m / s

- $6.6 \times 10^{3}\ m/s$
- $8.2 \times 10^{3}\ m/s$
- $7.5 \times 10^{3}\ m/s$ ✓

QUESTION 5

Select the correct answer.

When a satellite reaches a characteristic distance,

$r_{geosync}$

, from the center of the Earth, it is said to be in a geosynchronous orbit in which its orbit matches the Earth's rotation. The satellite then seems to stay in place over a single longitude because it is obiting at the same speed as the Earth is turning. If the mass of Earth is

$5.97 \times 10^{24}\ kg$

and

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

, Calculate that specific distance.

Take

$\pi = 3.14$

- 46,100 km
- 36,200 km

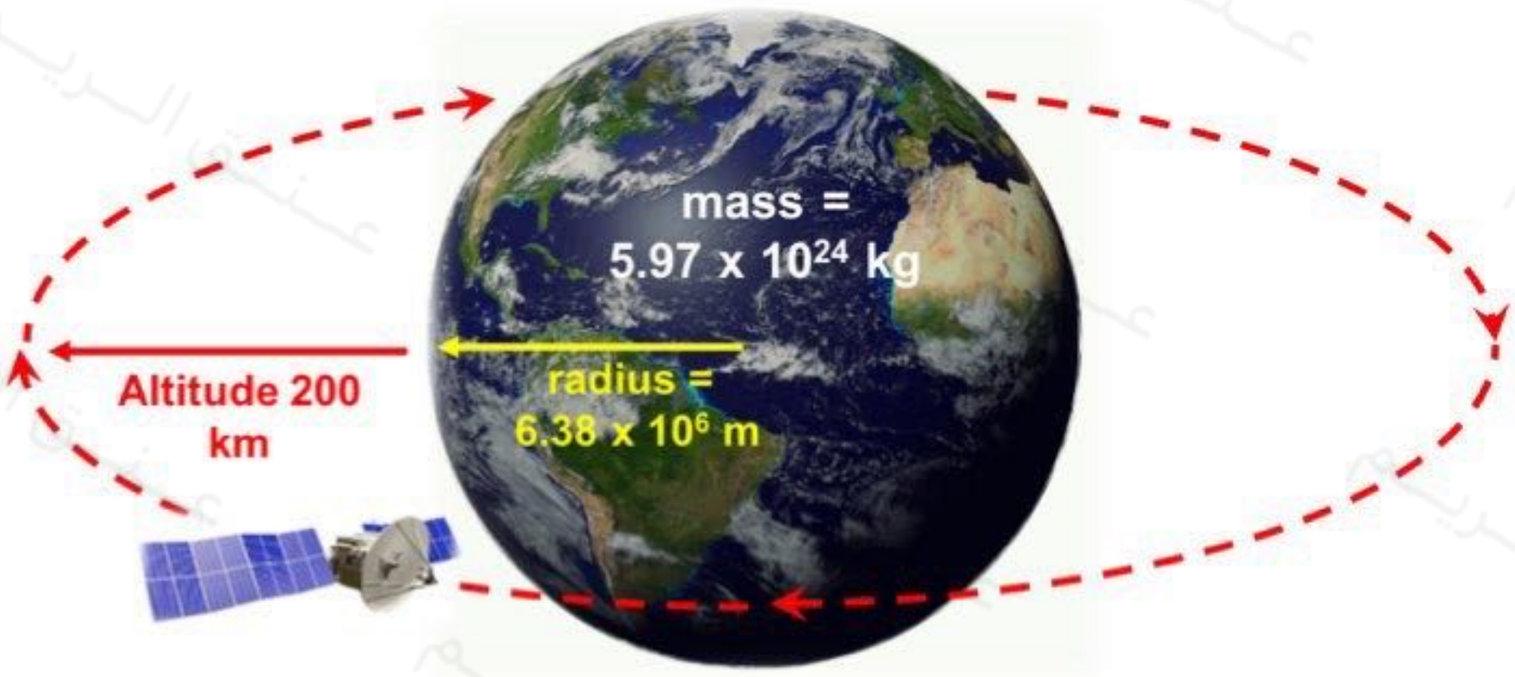
35,900 km

42,200 km ✓

QUESTION 6

Select the correct answer.

Consider a satellite which is in a low orbit about the Earth at an altitude of 200 km above the Earth's surface. What is the orbital speed of this satellite?



(Given

$m_E = 5.97 \times 10^{24}$ kg

,

$r_E = 6.38 \times 10^{6}$ m

, and

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

)

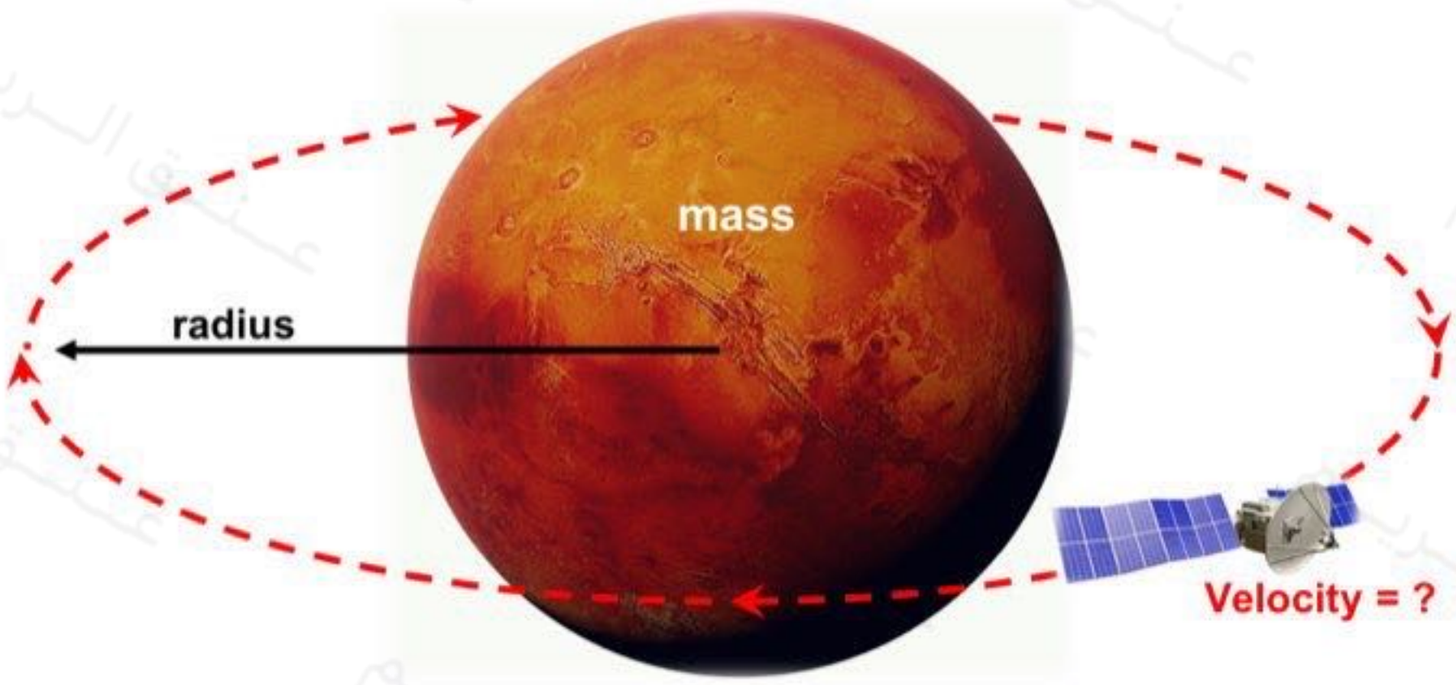
- $v = 7.8 \times 10^{-4}$ m / s
- $v = 6.19 \times 10^{3}$ m / s
- $v = 7.8 \times 10^{3}$ m / s ✓

- $v = 5 \times 10^{2}\ \mathrm{m/s}$

QUESTION 7

Select the correct answer.

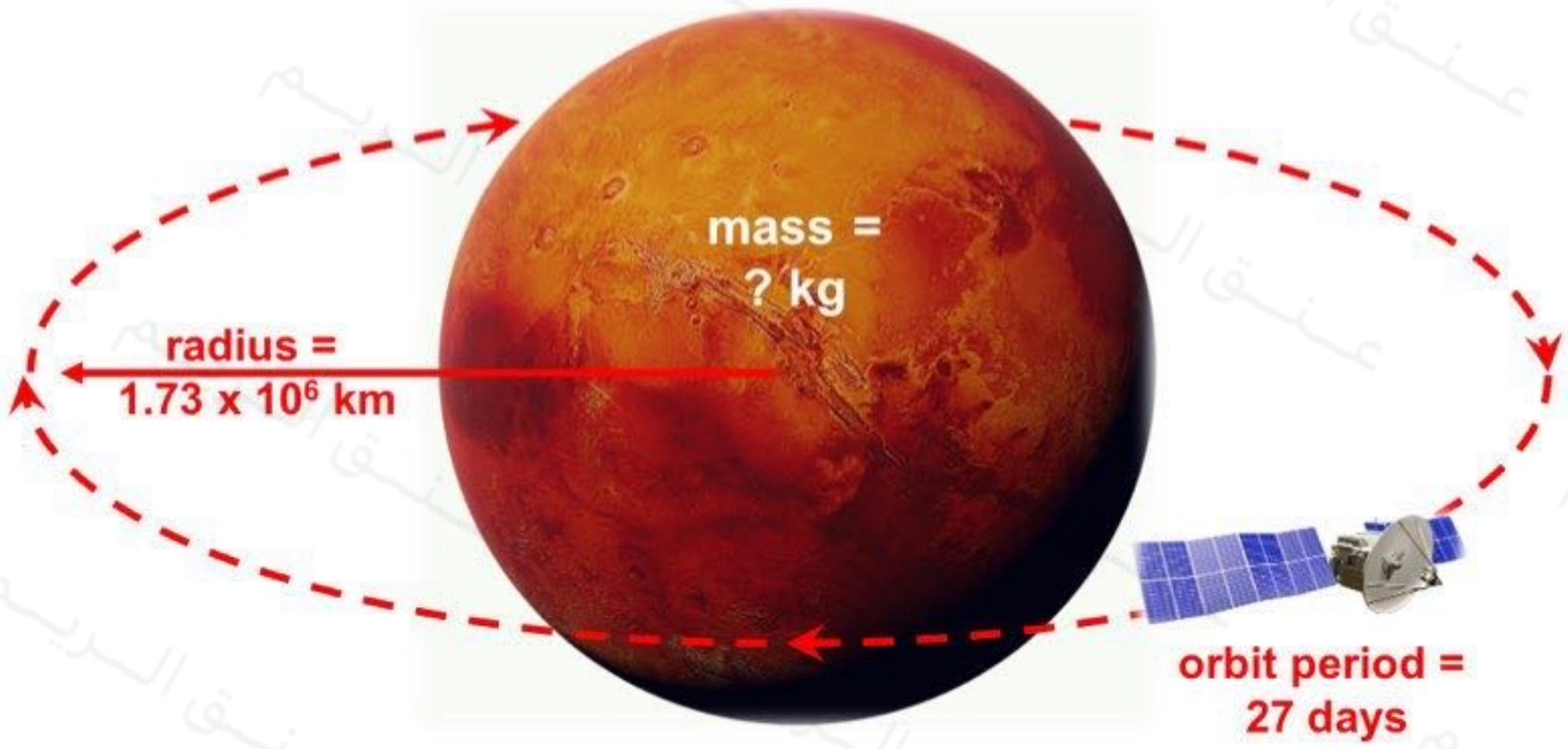
What is the formula for calculating the speed of a satellite?



- $v = \sqrt{\dfrac{r}{G\,m_E}}$
- $v = \sqrt{\dfrac{G\,m_E^{\,2}}{r}}$
- $v = \sqrt{\dfrac{G\,m_E}{r^2}}$
- $v = \sqrt{\dfrac{G\,m_E}{r}}$ ✓

QUESTION 8

Select the correct answer from the drop-down menu.



The mass of a planet which has a satellite orbiting at a radius of

1.73×10^{6} km

and orbital period of 27 days is 5.63×10^{26} kg ✓ . Take

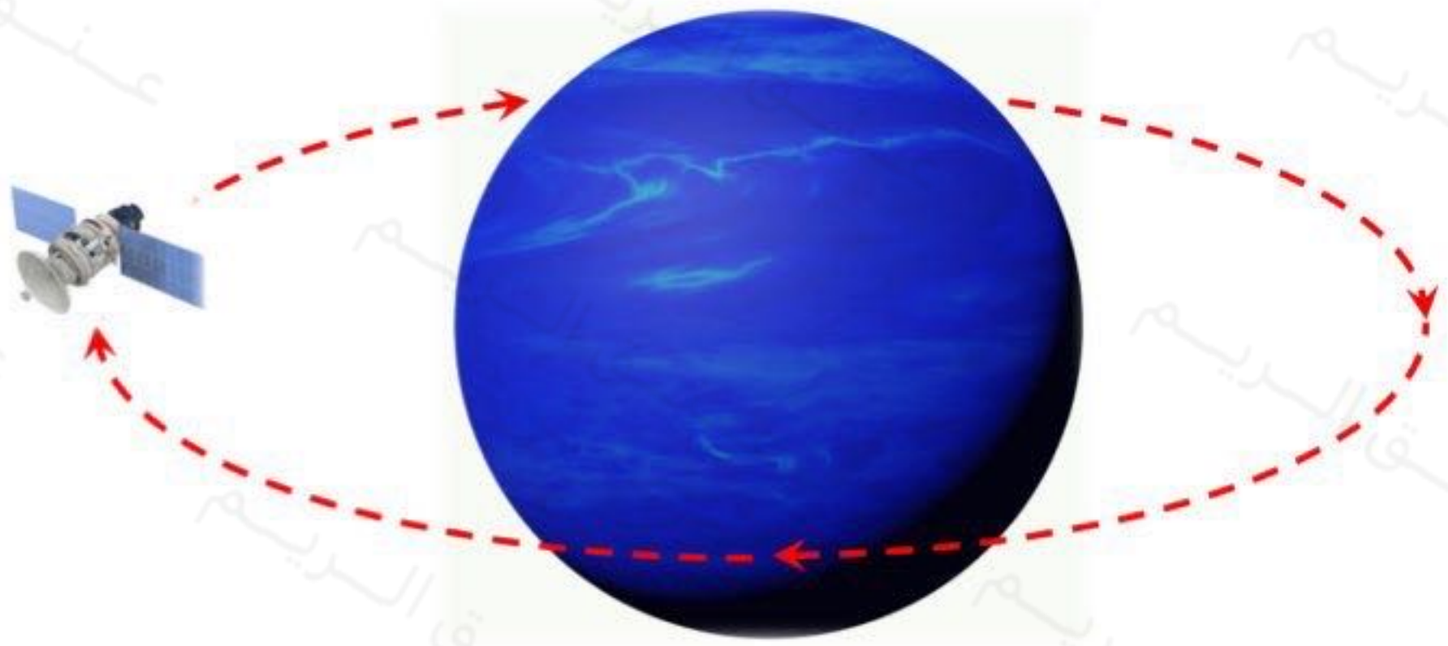
$\pi = 3.14$

.

QUESTION 9

Select the correct answer.

What is the effect of the satellite's mass on its orbit?

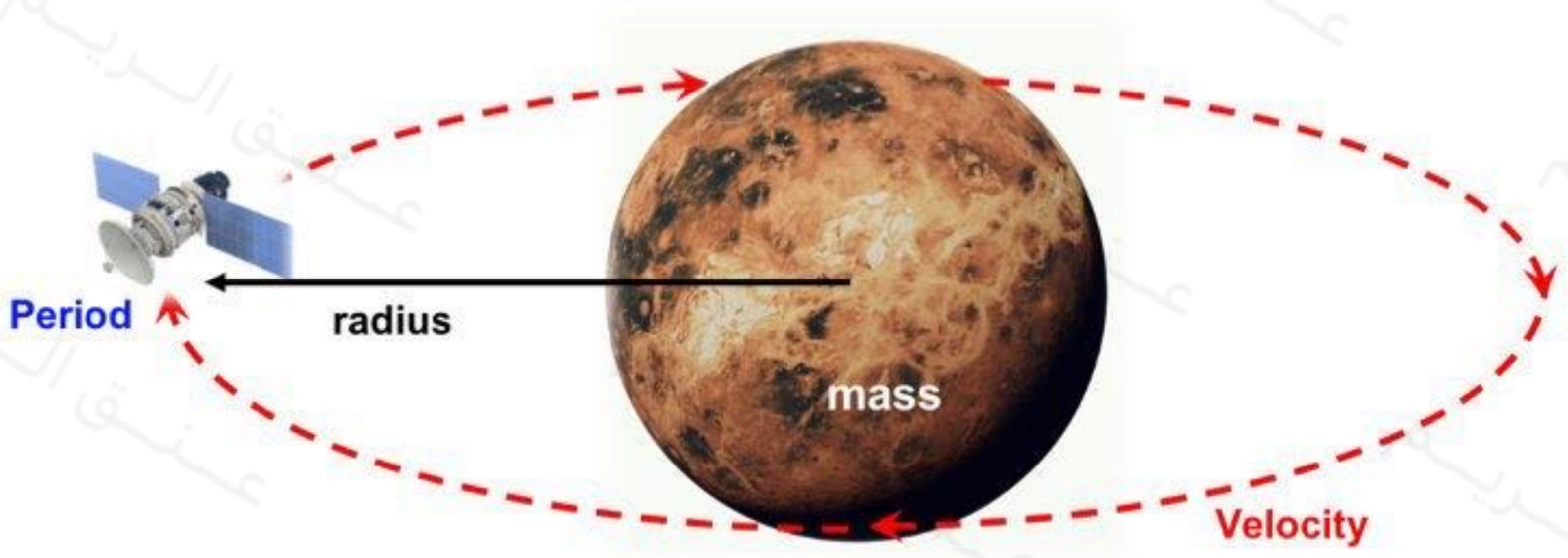


- [x] It does not affect its orbital speed or period.
- [ ] It is directly proportional to its orbital speed and period
- [ ] It is inversely proportional to its orbital speed.
- [ ] It is directly proportional to the cube of its orbital period.

QUESTION 10

Select the correct answer.

What is the formula for calculating the orbital period of a satellite around a planet (P)?



$$T = 2\pi\sqrt{\frac{r^3}{G m_P{}^2}}$$

$$T = 4\pi\sqrt{\frac{r^3}{G m_P{}^2}}$$

$$T = 2\pi\sqrt{\frac{r^2}{G m_P}}$$

$$T = 2\pi\sqrt{\frac{r^3}{G m_P}}$$

QUESTION 11

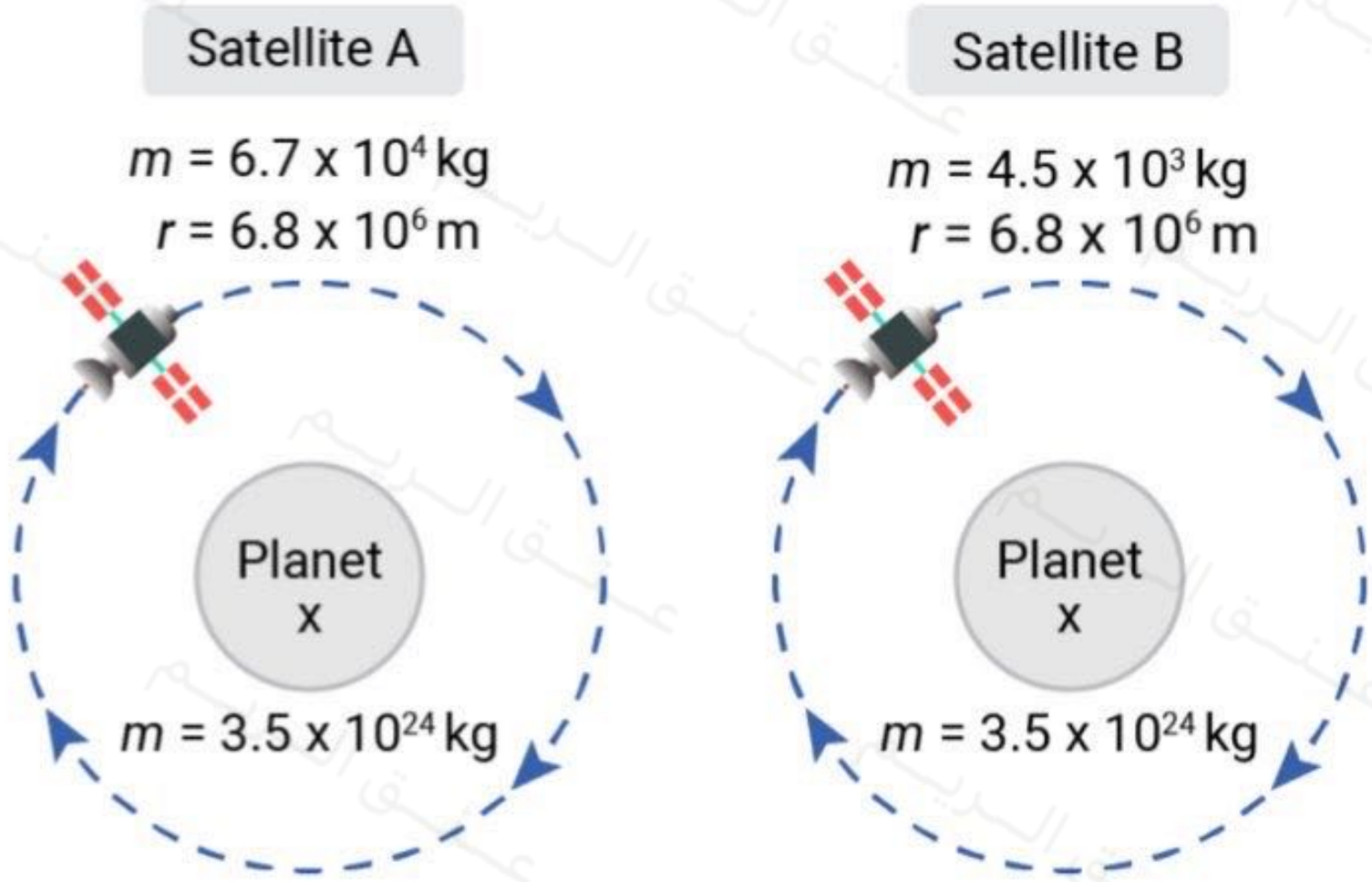
Select the correct answer.

Two satellites are in orbit around the same planet. Satellite A has a mass of 6.7×10^4 kg, and satellite B has a mass of 4.5×10^3 kg

. The mass of the planet is 3.5×10^{24}

. Both satellites have the same orbital radius of 6.8×10^{6} r

. What is the difference in the orbital periods of the satellites?



0 s ✓

2,500 s

600 s

4,735 s

QUESTION 12

Select the correct answer.

A satellite orbits the Earth at a height of 600 km above the surface of the Earth. Determine the orbital period of the satellite.

(Take

$m_E = 5.97 \times 10^{24}$ kg

,

$r_E = 6.38 \times 10^{6}$ m

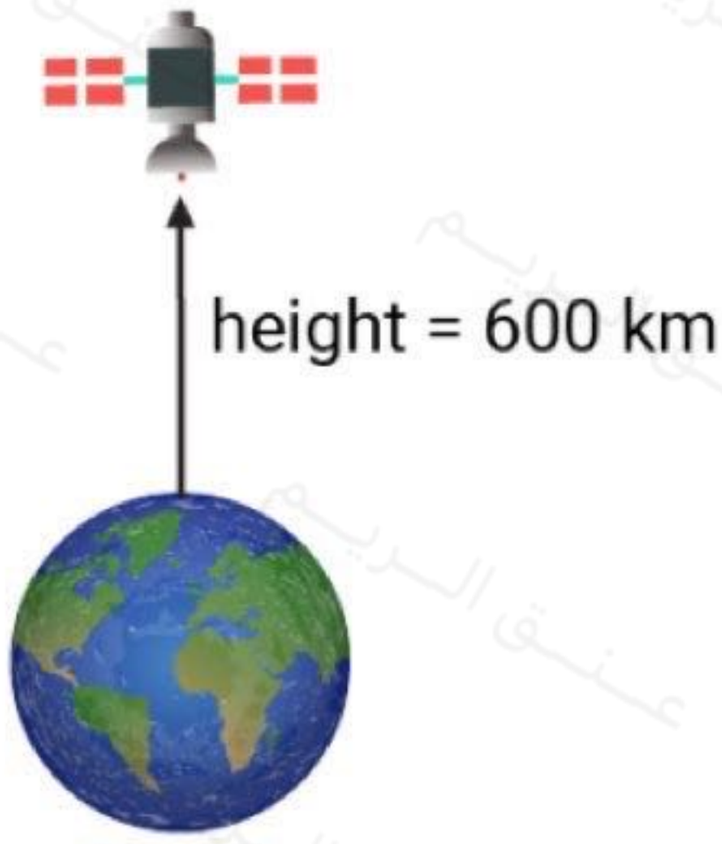
,

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

,

$\pi = 3.14$

)



- ○ 4.7×10^{3} s
- ○ 90.2 minutes
- ✓ 5.8×10^{3} s
- ○ 5 days

QUESTION 13

Select the correct answer.

The Earth's mass is

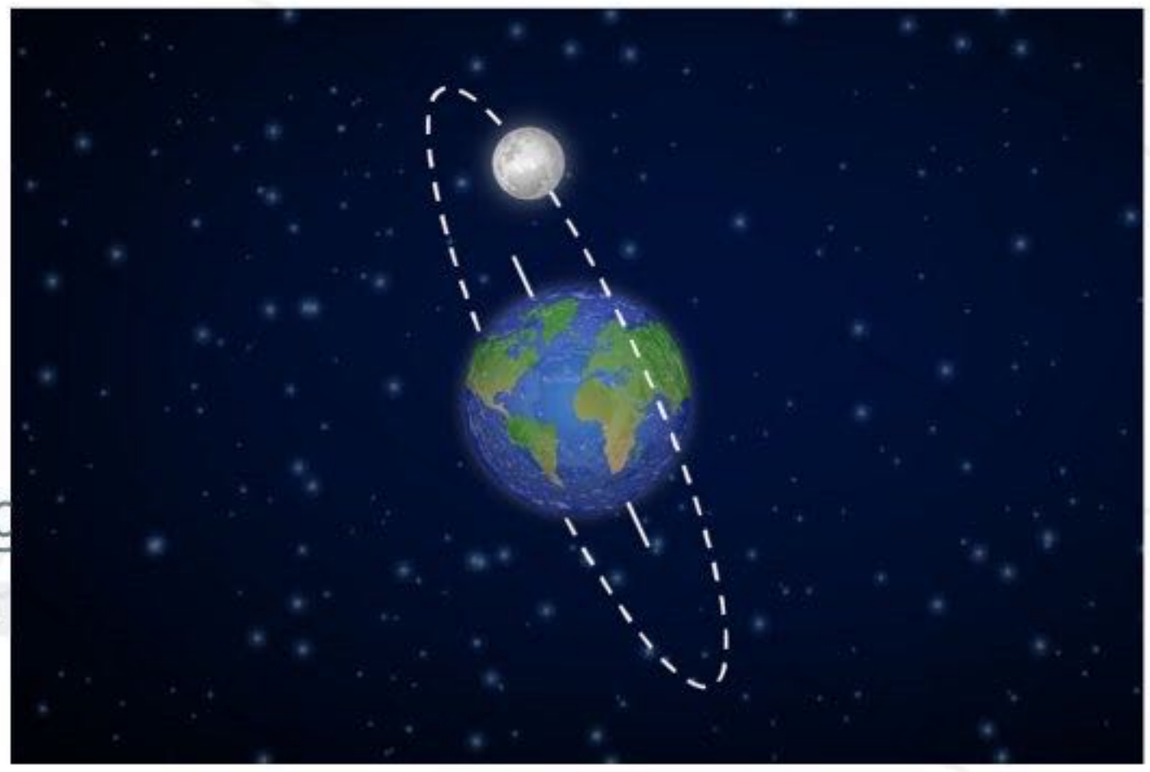
5.97×10^{24} kg

, and the Moon's orbital period around the Earth is 27 days. Calculate the distance between the Earth and Moon. Take

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

and

$\pi = 3.14$



- 3.80×10^{8} m ✓
- 2.33×10^{3} km
- 6.64×10^{8} m
- 1.73×10^{6} km