

Universal Gravitational Law: Exam Revision Tracker

Attempt #1		Attempt #2		Attempt #3		Attempt #4		Attempt #5	
Total	Score	Total	Score	Total	Score	Total	Score	Total	Score
10		9		8		13		8	
Percentage =		Percentage =		Percentage =		Percentage =		Percentage =	

Universal Gravitational Law: Attempt #1

Total = 10 Marks

1. Write down Newton's law of universal gravitation in words. (2)

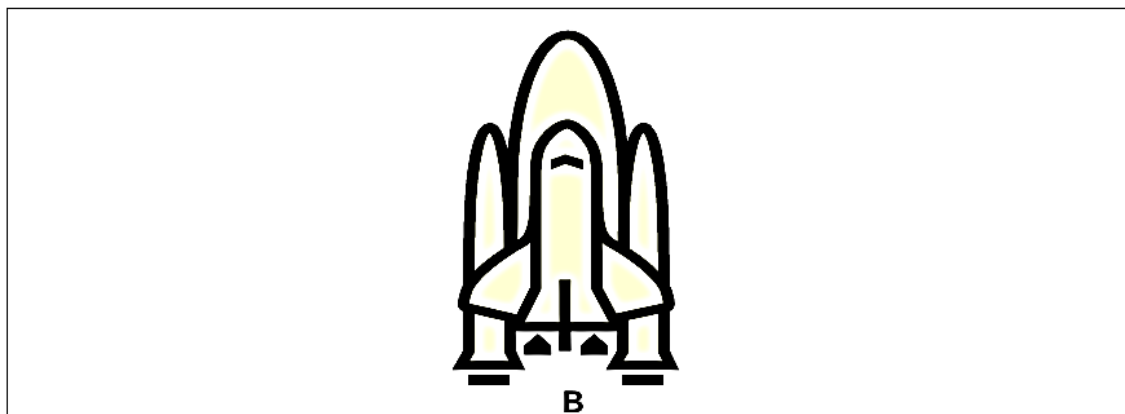
An object weighing 140 N on the surface of the earth is moved to a position which is $6,7 \times 10^6$ m above the surface of the earth.

2. Calculate the percentage by which its weight will change. (8)

Universal Gravitational Law: Attempt #2

Total = 9 Marks

NASA fires a space shuttle off the ground and into space. It accelerates from rest to 160 m.s^{-1} in the first 400s of its journey. The total mass of the space shuttle and its fuel tanks is 2 600 tons ($2,6 \times 10^6$ kg). The space shuttle's propulsion system consists of exhaust gases, which are pushed out of an outlet in its base, B.



1. Name an action-reaction pair of forces acting on the astronaut as the space shuttle accelerates upwards. (2)
2. Calculate the resultant force on the space shuttle during the first 400 s of its flight. (5)
3. Give TWO reasons why the space shuttle's acceleration increases as it moves away from the surface of the earth. (2)

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Universal Gravitational Law: Attempt #3 ⚡

Total = 8 Marks

The gravitational force on a probe, called Curiosity, on the surface of Mars is 3 338 N. The radius of Mars is 3 390 km and the mass of the planet is $6,39 \times 10^{23}$ kg.



1. State *Newton's Law of Universal Gravitation* in words. (2)
2. Calculate the mass of the probe. (4)
3. Calculate the weight of the probe on Earth. (2)

Universal Gravitational Law: Attempt #4 ⚡

Total = 13 Marks

Halley's comet, of approximate mass of 1×10^{15} kg, was $1,3 \times 10^8$ km from the Earth (mass = 6×10^{24} kg) at its point of closest approach during its last sighting in 1986.

1. State *Newton's Law of universal gravitational* in words. (2)
2. Is the magnitude of gravitational force experienced by the comet **GREATER THAN, EQUAL TO, OR LESS THAN** the gravitational force experienced by the earth? (1)
3. State the Physics Law in words that is applicable to the answer given in QUESTION 5.2 above. (2)
4. Does the acceleration of the comet **INCREASE, DECREASE** or **REMAIN THE SAME** as it moves closer to the earth? Explain. (3)
5. Calculate the magnitude of the gravitational force exerted by the earth on Halley's comet at a point of closest approach. (5)

Universal Gravitational Law: Attempt #5 ⚡

Total = 8 Marks

The acceleration due to gravity on planet X is $2,7 \text{ m} \cdot \text{s}^{-2}$. The radius of this planet is a third ($\frac{1}{3}$) of the radius of Earth.

1. Explain the difference between *weight* and *mass*. (2)
2. Calculate the mass of planet X. (4)
3. Determine the factor by which the weight of an object on planet X will differ from the weight of the same object on Earth. (2)

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