FREE REVISION PACK

Gravitational Potential

Pearson Edexcel International Advanced Level Physics · Unit 5 (WPH15) · Specification points 158

Easy | Multiple choice · past-paper questions

4	4	≈ 5 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Change in GPE when a satellite is raised into orbit	Edexcel IAL June 2023 · Unit 5 · Q4	1 mark
2	Easy	Change in GPE as a shuttle falls from a height R	Edexcel IAL October 2022 · Unit 5 · Q7	1 mark
3	Easy	Change in GPE between two equipotentials	Edexcel IAL October 2024 · Unit 5 · Q5	1 mark
4	Easy	Potential and force as the Moon moves away	Edexcel IAL October 2023 · Unit 5 · Q6	1 mark

Key ideas to have ready

- $V_{grav} = -GM/r$ (negative, rising towards zero far away).
- Gravitational PE = $-GMm/r$; $\Delta E_{grav} = m\Delta V$.
- Moving away from a mass, potential and PE increase.
- Equipotentials are spheres around a planet.

How to use this pack

1. The questions are grouped into levels (Easy). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–4

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL June 2023 · Unit 5 · Q4

1 A satellite of mass m is on the Earth's surface.

The satellite is moved into a circular orbit of height h above the Earth.

The mass of the Earth is M and the radius of the Earth is R.

Which of the following gives the change in gravitational potential energy of the satellite?

☒ **A** $\frac{GM}{(R+h)} - \frac{GM}{R}$

☒ **B** $\frac{GMm}{R} - \frac{GMm}{(R+h)}$

☒ **C** $\frac{GM}{(R+h)^2} - \frac{GM}{R^2}$

☒ **D** $\frac{GMm}{R^2} - \frac{GMm}{(R+h)^2}$

Edexcel IAL October 2022 · Unit 5 · Q7

2 A space shuttle of mass m is returning to Earth of mass M. The space shuttle falls from a height R above the Earth, where R is equal to the radius of the Earth.

Which of the following gives the change in gravitational potential energy, ΔE_{grav}, of the space shuttle?

☒ **A** $\Delta E_{grav} = GMm\left(\frac{1}{2R} - \frac{1}{R}\right)$

☒ **B** $\Delta E_{grav} = GMm\left(\frac{1}{R} - \frac{1}{2R}\right)$

☒ **C** $\Delta E_{grav} = \frac{GMm}{R}$

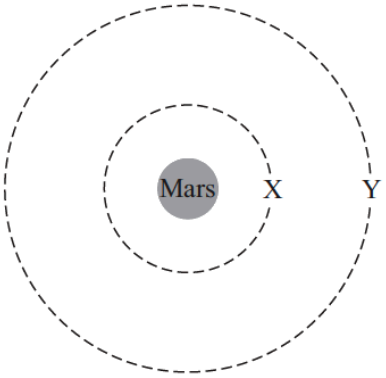
☒ **D** $\Delta E_{grav} = \frac{GMm}{2R}$

Edexcel IAL October 2024 · Unit 5 · Q5

3 The dashed circles on the diagram represent gravitational equipotentials about the planet Mars.

The gravitational potential at X is $-5.5\,\text{MJ kg}^{-1}$.

The gravitational potential at Y is $-3.7\,\text{MJ kg}^{-1}$.



A meteor of mass 250 kg falls from Y to X.

Which of the following is the change in gravitational potential energy of the meteor as it falls?

☒ **A** 450 MJ

☒ **B** 920 MJ

☒ **C** –450 MJ

☒ **D** –920 MJ

Edexcel IAL October 2023 · Unit 5 · Q6

4 The Moon is gradually moving away from the Earth.

The gravitational potential at the Earth due to the Moon, and the gravitational force between the Earth and the Moon, are both changing.

Which row of the table is correct?

	Gravitational potential	Gravitational force
☒ **A**	decreases	decreases
☒ **B**	increases	decreases
☒ **C**	decreases	increases
☒ **D**	increases	increases

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**