

Gravitational Fields

Question Paper

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| Level | Pre U |
| Subject | Physics |
| Exam Board | Cambridge International Examinations |
| Topic | Gravitational Fields |
| Booklet | Question Paper |

Time Allowed: 8 minutes

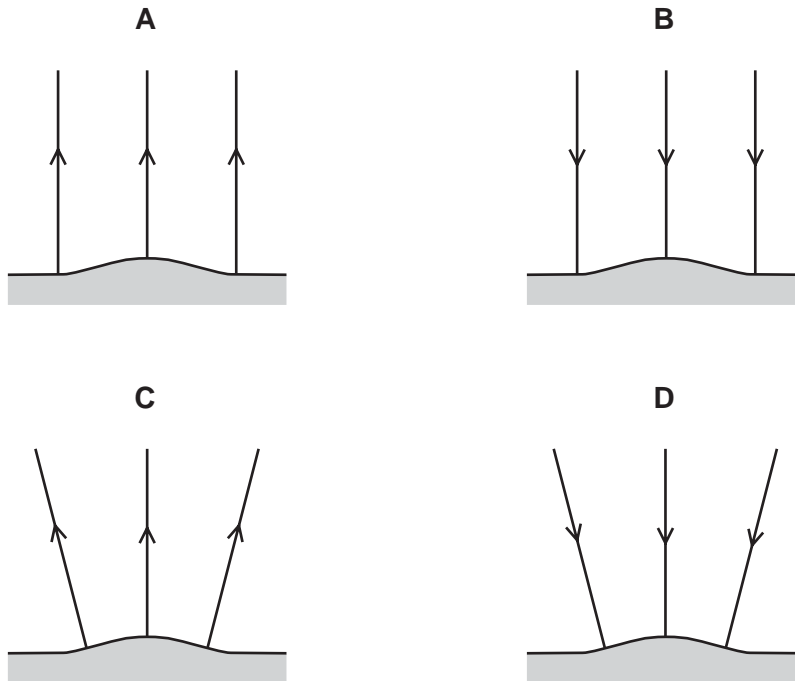
Score: /6

Percentage: /100

Grade Boundaries:

- 1 A space probe is leaving a large asteroid. During the initial part of its journey, the weight of the probe in the asteroid's gravitational field does not change.

Which diagram shows the gravitational field line pattern close to the surface of the asteriod?



Space for working

- 2 A satellite is in a circular orbit around the Earth at a height where the Earth's gravitational field strength is 9.0 N kg^{-1} .

What is the weight of the satellite at this point?

- A zero
- B much smaller than its weight on the surface of the Earth, but not zero
- C slightly less than its weight on the surface of the Earth
- D equal to its weight on the surface of the Earth

Space for working

- 3 A piece of rock, which weighs 15.0 N on the Earth, weighs 2.46 N on the Moon.

What is the mass of the rock and the gravitational field strength on the Moon?

| | mass / kg | gravitational field strength / N kg^{-1} |
|----------|-----------|---|
| A | 1.53 | 1.61 |
| B | 1.53 | 6.10 |
| C | 147 | 0.0167 |
| D | 147 | 6.10 |

- 4 On the asteroid Ceres, a stone dropped from rest from a height of 1.0 m would take 2.8 s to reach the surface of the asteroid.

What would be the weight of a 70 kg astronaut on Ceres?

- A** 18 N **B** 70 N **C** 250 N **D** 700 N

- 5 Object X has a mass of 10 kg and object Y has a mass of 60 kg. The gravitational field strength on the Moon is 1.6 N kg^{-1} .

Which statement about objects X and Y is correct?

- A The inertia of X on the Earth is greater than its inertia on the Moon.
- B The weights of X and Y do not change when they are taken from the Earth to the Moon.
- C X experiences the same gravitational field strength as Y on the Moon.
- D X has about the same weight on the Moon as Y has on the Earth.

Space for working

- 6 On the surface of Titan, Saturn's largest moon, a mass of 5.0 kg experiences a gravitational force of 6.8 N.

What is its speed of impact on the surface when released from rest at a height of 5.0 m?

- A** 3.7 m s^{-1} **B** 8.2 m s^{-1} **C** 9.9 m s^{-1} **D** 13.5 m s^{-1}

Space for working