**Gravity (answers)**

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| Instructions to students  • You have 50 minutes to complete the test.  • Please answer all questions in the spaces provided.  • There is to be no talking during the test. | Marks  Section I: Multiple-choice questions: 5 marks  Section II: Short-answer questions: 11 marks  Section III: Extended-response questions: 9 marks  Total: 25 marks |

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| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Score: /25  Grade: % |
| Comments: | |

Section I: Multiple-choice questions

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| For each question, circle or highlight the correct answer.  1 If a brick has a mass of 1 kg on Earth, it will have: | |  |
| A | A mass of 1 kg on the Moon |
| B | A weight of 19.6 N on the Earth |
| C | A mass of only 0.3 kg on the Moon |
| D | A weight of 9.8 N on the Moon |
| 2 The scientist most commonly regarded as having first identified gravity is: | | |
| A | Albert Einstein | |
| B | Galileo Galilei | |
| C | Isaac Newton | |
| D | Nicolas Copernicus | |
| 3 High and low tides are caused by | | |
| A | The gravitational pull of the Earth on the oceans of the Moon | |
| B | The gravitational pull of the Sun on the Moon. | |
| C | The gravitational pull of the Moon on the oceans of Earth | |
| D | The gravitational pull of the Sun on the oceans of Earth | |
| 4 The Earth’s gravity is a force that attracts: | | |
| A | Objects to the North and South Poles | |
| B | Objects towards the surface of the Earth | |
| C | Objects to the moon’s surface | |
| D | Objects towards the centre of the Earth | |

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| 5 When comparing the Moon and the Earth, it is true to say that a person will have a greater weight on: | |
|  | |
| A | the Earth than on the Moon, because the Moon’s gravity is greater than the Earth’s. |
| B | the Earth than on the Moon, because the Earth’s gravity is greater than the Moon’s |
| C | the Moon than on the Earth, because the Moon’s gravity is greater than the Earth’s. |
| D | the Moon than on the Earth, because the Earth’s gravity is greater than the Moon’s. |

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|  | Section I  Total marks:  /5 marks |

Section II: Short-answer questions

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| 6 Explain why the mass of the brick remains the same both on Earth and the Moon, yet the brick’s weight changes. | |
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| The mass of an object is the amount of matter it is made up of, which does not change (1 mark). The weight of an object is the gravitational pull on an object (1 mark). Because gravity on the Moon is much less than on Earth, the weight of the brick is also less (1 mark). | |
|  | /3 marks |
| 7 “There is no gravity on the International Space Station, which is why the astronauts float.” Explain why this statement is incorrect. | |
| The Earth’s gravitation force is weaker, the farther from the centre of the planet but still affects the ISS (1 mark). The astronauts appear weightless because they are falling towards the Earth at the same speed as the ISS (1 mark). | |
|  | /2 marks |

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| 8 Write the following in decreasing order of height:  spring high tide; spring low tide; neap high tide; neap low tide; high tide; low tide | |
| spring high tide; high tide; neap high tide; neap low tide; low tide; spring low tide | |
|  | /2 marks |
| 9 Explain why neap tides are lower than normal high tides. | |
| Both the gravitation force of the Moon and the Sun influence the tides on Earth (1 mark). Neap tides occur when the Sun and the Moon’s gravitational forces are at right angles to each other and are interfering with each other (1 mark). | |
|  | /2 marks |
| 10 Explain why the Moon has a greater influence on the tides than the Sun. | |
| Although the Sun has a greater gravitational pull than the Moon (1 mark), the Moon is much closer to the Earth than the Sun (1 mark) and so has a greater influence on the tides. | |
|  | /2 marks |
|  | Section II  Total marks:  /11 marks |

Section III: Extended-response questions

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| 12 A skydiver jumps out of a plane and opens their parachute to slow their fall. Identify the forces involved and decide which force is stronger. Justify your decision. | | |
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| Gravity causes the skydiver to fall (1 mark). Air resistance/friction between the parachute and the air causes the skydiver to slow down (1 mark). The force of gravity must be stronger than air resistance (1 mark) because the skydiver eventually lands on the Earth (1 mark). | | |
|  | | /4 marks |
| 13 Imagine you’ve been asked to design an experiment to compare the gravity on Earth with that on the Moon. Write a method for your experiment and make a prediction about the likely results. | | |
| Answers will vary. Most students will suggest dropping an object on the Moon and timing how long it takes to fall compared to the same object on Earth. 1 mark for writing the method as a numbered or bullet point list. 1 mark for indicating multiple trials and averaging the times for the Earth and the Moon. 1 mark for considering confounding variables (e.g. the object and the same height above the surface should be used for all trials). 1 mark for clear instructions. Students should predict that it would take longer for the object to fall on the Moon than on Earth (1 mark). | | |
|  | /5 marks | |
|  | Section III  Total marks:  /9 marks | |