**Forces (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: 12 marks  Section III: Extended-response questions: 8 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, in a game of ‘tug of war’, one team pulls with a total force of 1000 N to the left and the other team pulls with a total force of 1100 N to the right, the net force is: | |  |
| A | 100 N to the left. |
| B | 100 N to the right. |
| C | 2100 N to the left. |
| D | 2100 N to the right. |
| 2 The term used to describe how many particles an object is made up of is: | | |
| A | Newtons. | |
| B | weight. | |
| C | mass. | |
| D | gravity. | |
| 3 An axe is an example of a: | | |
|  | | |
| A | lever. | |
| B | screw. | |
| C | wedge. | |
| D | ramp. | |

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| 4 When a tennis player hits the ball with the racquet, their arm acts as a type of: | |
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| A | pulley. |
| B | first-class lever. |
| C | second-class lever. |
| D | third-class lever. |
| 5 Which of these will NOT cause electrostatic attraction? | |
| A | A positively charged object brought near a neutral object. |
| B | A north magnetic pole brought near a south magnetic pole. |
| C | Two neutral objects brought near each other. |
| D | A positively charged object brought near a negatively charged object. |

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|  | Section I  Total marks:  /5 marks |

Section II: Short-answer questions

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| 6 When objects have forces acting on them, six possible things can happen to them. Give two of these. | | |
| Any two of the following for 1 mark each: begin to move; speed up; slow down or stop; change direction; change shape or remain still. | | |
|  | | /2 marks |
| 7 What could cause an electric shock in everyday life? Give an example. | | |
| Many responses are possible, but must include contact between two objects that causes a charge to build. For example, sliding down a plastic slide, jumping on a trampoline, putting your hand near a running Van de Graaff generator. | | |
|  | | /1 mark |
| 8 Describe how to calculate the mechanical advantage of a simple machine. | | |
| Mechanical advantage is calculated by dividing the size of the load by the size of the effort. | | |
|  | | /2 marks |
| 9 Give an example of a situation where friction makes a task more difficult, and suggest a method of reducing the friction in that situation. | | |
| Any reasonable situation is acceptable, including when pushing an object across the floor, stopping us from slipping, providing unwanted grip. (1 mark)  Any reasonable solution for reducing friction, as long as it is appropriate for the example scenario. May include using rollers, ball bearings, lubrication, etc. (1 mark) | | |
|  | | /2 marks |
| 10 What are the only two possibilities for the motion of an object when it experiences a zero net force? | | |
| Remain stationary (1 mark) or remain at constant speed (1 mark) in the same direction (1 mark). | | |
|  | | /2 marks |
| 11 A see-saw is an example of a lever. Label the fulcrum, effort and load on the diagram below. | | |
| One mark for each correct label. | | |
|  | /3 marks | |
|  | Section II  Total marks:  /12 marks | |

Section III: Extended-response questions

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| 12 Explain how you could make a simple compass using a bar magnet and other items commonly found in a school science department. | | |
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| Students’ answers will vary as there are several methods: 1. Suspend a bar magnet from a piece of string and allow it to align with the Earth’s magnetic field. 2. Place a bar magnet on a piece of wood and float them on the surface of some water in a dish. 3. Stroke a sewing needle repeatedly with the N or S pole of a bar magnet, lifting off at the end of each ‘stroke’ and then hang the needle from some string. (Allocate 3 marks for a full and complete description.) | | |
|  | | /3 marks |
| 13 Design an experiment to compare the friction of three floor surfaces commonly found inside or around homes. Write an equipment list, and a method as a set of steps. | | |
| Students’ answers will vary. Most students will choose to drag a wooden block across the surfaces with a spring balance. Appropriate equipment list (1 mark). Writing the method as a numbered or bullet point list (1 mark). Indicating multiple trials and averaging the results for each surface (1 mark). Considering controlled variables (e.g. the same spring balance and wooden block should be used for all trials) (1 mark). Clear instructions (1 mark). | | |
|  | /5 marks | |
|  | Section III  Total marks:  /8 marks | |