# Quiz ‒ Topic P2 Forces

## Instructions and answers for teachers

These instructions cover the learner activity section which can be found on [page 8](#_Learner_Activity). This quiz supports OCR GCSE (9-1) Gateway Science Physics A, J249.

**When distributing the activity section to the learners either as a printed copy or as a Word file you will need to remove the teacher instructions section.**

### The Activity

This quiz is a teaching and learning resource containing 10 multiple choice questions on the theme of Forces.

This resource can be used to test and consolidate understanding at the end of a topic or to revisit and refresh knowledge at a later point in the course.

### Learning Outcomes

This lesson element relates to the specification learning outcomes of

P2.1 – Motion

P2.2 – Newton’s laws

P2.3 – Forces in action

### Introduction

Multiple choice questions allow rapid coverage of a wide range of sub-topics.

Contrary to a widespread belief among learners, multiple choice questions are not necessarily easy – they can be easy, moderate or difficult.

The questions are written so that the incorrect answers are plausible distractors based on common errors or misconceptions.

### Quiz ‒ answers

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| --- | --- | --- | --- |
| **1** | | Which of these is the correct formula for acceleration? **[1]** | |
|  | | **A** | Change in velocity x time |
|  | |  | Incorrect |
|  | | **B** | Change in velocity ÷ time |
|  | |  | Correct answer - acceleration = change in velocity/time |
|  | | **C** | Velocity x time taken |
|  | |  | Incorrect |
|  | | **D** | Velocity ÷ time taken |
|  | |  | Incorrect  **B** |
|  | Your answer | | |

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| **2** | | The end of a syringe containing fluid is pushed in. The area of the plunger of the syringe is 0.5 cm2. What is the pressure exerted on the fluid? **[1]**  Syringe | |
|  | | **A** | 4 x 104 Pa |
|  | |  | Correct answer - calculation using the equation pressure = force/area = 2 x 0.00005 = 40000 |
|  | | **B** | 1 x 10–4 Pa |
|  | |  | Incorrect – pressure ≠ force x area |
|  | | **C** | 4 Pa |
|  | |  | Incorrect – pressure = force/area but area not converted into m2 |
|  | | **D** | 1 Pa |
|  | |  | Incorrect – pressure ≠ force x area (area not converted into m2)  **A** |
|  | Your answer | | |

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| **3** | | An athlete runs a 100m race in 11 seconds. What is their speed? **[1]** | |
|  | | **A** | 9.1 m/s |
|  | |  | Correct answer - Calculation using the equation speed = distance/time = 100/11 = 9.1 m/s |
|  | | **B** | 1100 m/s |
|  | |  | Incorrect- s ≠ d x t |
|  | | **C** | 0.11 m/s |
|  | |  | Incorrect- s ≠ t/d |
|  | | **D** | 89 m/s |
|  | |  | Incorrect- s ≠ d-t  **A** |
|  | Your answer | | |

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| **4** | | Two forces act on an object as shown in the diagram below.  What is the resultant force acting on the object? **[1]**  Question 4 diagram | |
|  | | **A** | 25N |
|  | |  | Incorrect - resultant Force (the force that causes the acceleration of the object) ≠ 25N the greatest force |
|  | | **B** | 15N |
|  | |  | Incorrect - resultant Force (the force that causes the acceleration of the object) ≠ 15N the smallest force |
|  | | **C** | 40N |
|  | |  | Incorrect - resultant Force (the force that causes the acceleration of the object) not ≠ 25N+15N =40N as the two forces are in opposite directions |
|  | | **D** | 10N |
|  | |  | Correct answer - resultant Force (the force that causes the acceleration of the object) = 25N-15N =10N as the two forces are in opposite directions  **D** |
|  | Your answer | | |

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| **5** | | A train accelerates from 10 m/s to 50 m/s in 20 seconds.  What is the train’s acceleration?**[1]** | |
|  | | **A** | 2 m/s2 |
|  | |  | Correct answer - acceleration = Change in Velocity/Time = (50 – 10)/20 |
|  | | **B** | 2.5 m/s2 |
|  | |  | Incorrect-acceleration ≠ final velocity ÷ time |
|  | | **C** | 800 m/s2 |
|  | |  | Incorrect- acceleration ≠ change in velocity x time |
|  | | **D** | 1000 m/s2 |
|  | |  | Incorrect - acceleration ≠ final velocity x time  **A** |
|  | Your answer | | |

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| **6** | | Which statement about mass and weight is true?**[1]** | |
|  | | **A** | Mass is a force and weight is a quantity. |
|  | |  | Incorrect - weight is a force due to gravity, mass is a quantity (it is the amount of a substance). |
|  | | **B** | Mass and weight are both forces. |
|  | |  | Incorrect - weight is a force but mass is a quantity |
|  | | **C** | Mass and weight are both quantities. |
|  | |  | Incorrect - weight is a force due to gravity |
|  | | **D** | Mass is a quantity and weight is a force. |
|  | |  | Correct answer - mass is a quantity and weight is a force due to gravity  **D** |
|  | Your answer | | |

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| **7** | | Which part of the velocity-time graph below shows the object moving at a constant speed?**[1]** | |
|  | | Question 7 diagram | |
|  | | **A** | Incorrect- line of increasing gradient on the graph shows the object is increasing in velocity (accelerating). |
|  | | **B** | Correct answer - horizontal line on the graph shows the object is moving at constant velocity (velocity does not change). |
|  | | **C** | Incorrect -this line shows object is increasing in velocity (accelerating but acceleration is less than A as the gradient is less steep). |
|  | | **D** | Incorrect -this line shows that the object is decelerating (curved line indicates deceleration is not constant).  **B** |
|  | Your answer | | |

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| **8** | | On Mars the strength of gravity is 4 m/s2.  What is the weight of a 60kg astronaut on Mars? **[1]** | |
|  | | **A** | 60 N |
|  | |  | Incorrect- has not taken the gravity on Mars into account |
|  | | **B** | 240 kg |
|  | |  | Incorrect - weight is a force due to gravity so measured in Newtons not kg |
|  | | **C** | 15 N |
|  | |  | Incorrect – weight ≠ mass/gravity |
|  | | **D** | 240 N |
|  | |  | Correct answer – weight = mass x gravity 60 x 4 |
|  | Your answer | | |

**D**

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| **9** | | A car is travelling at a constant velocity of 17.0 m/s. The car has a mass of 995.0 kg.  What is the momentum of the car? **[1]** | |
|  | | **A** | 58.5 kgm/s |
|  | |  | Incorrect – momentum ≠ mass/velocity |
|  | | **B** | 0.017 kgm/s |
|  | |  | Incorrect – momentum ≠ velocity/mass |
|  | | **C** | 16915.0 kgm/s |
|  | |  | Correct answer – momentum = mass x velocity = 995 x 17 |
|  | | **D** | 17.0 kgm/s |
|  | |  | Incorrect – momentum ≠ velocity  **C** |
|  | Your answer | | |

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| **10** | | A vehicle and driver with a total mass of 1000 kg is travelling at 20m/s.  The driver applies the brake and the vehicle comes to a stop in 4 seconds.  What is the mean force on the vehicle?**[1]** | |
|  | | **A** | 80000 N |
|  | |  | Incorrect – incorrect calculation of acceleration, acceleration ≠ 20 x 4 |
|  | | **B** | 5000 N |
|  | |  | Correct answer - force = mass x acceleration, acceleration = velocity /time = 20/4 = 5, so force = 1000 x 5 |
|  | | **C** | 200 N |
|  | |  | Incorrect- force ≠ m/a |
|  | | **D** | 20000 N |
|  | |  | Incorrect- force ≠ m x v  **B** |
|  | Your answer | | |



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## Learner Activity

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|  | | **D** | Mass is a quantity and weight is a force. |
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|  | | **C** | 200 N |
|  | | **D** | 20000 N |
|  | Your answer | | |