

Candidate 1

Question 1(a)(i)

The candidate was awarded **1 mark** because the correct symbol for a fuse has been drawn.

Question 1(a)(ii)

The candidate was awarded **1 mark** because 'to stop wires from over heating' is an acceptable response for the purpose of a fuse.

Question 1(a)(iii)

The candidate was awarded **0 marks** because the candidate has made an initial attempt to calculate the current, but has then crossed out their working and attempted the question again using the additional space at the back of the paper. As another attempt has been made, the crossed out working should not be considered. In the additional space an incorrect relationship has been selected (0) and no further marks are therefore accessible.

Question 1(b)

The candidate was awarded **0 marks** because 'alternating current flows in changing directions' does not describe alternating current in terms of electron flow.

Question 2(a)(i)

The candidate was awarded **4 marks** because a correct relationship has been stated, as per the additional guidance (1), a correct calculation of total resistance, '15+25', has been made (1), all substitutions are correct (1) and an acceptable final answer, including unit, has been stated (1).

Question 2(a)(ii)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, including unit, has been stated (1).

Question 2(b)(i)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, including unit, has been stated (1).

Question 2(b)(ii)

The candidate was awarded **0 marks** because an incorrect effect has been stated (0) and no further marks are therefore accessible.

Question 3(a)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, including unit, has been stated (1).

Question 3(b)

The candidate was awarded **2 marks** because 'pressure increases' is correct (1), 'faster and more frequent collisions' is an incorrect description in terms of the individual gas particles (0) and 'greater force' is a clear indication that the overall force has increased (1).

Question 3(c)

The candidate was awarded **2 marks** because the axes are correctly labelled (p and V may appear on either axis) (1), and the shape of graph is correct (1).
Note: as the candidate has not included the origin, the line may touch the axes.

Question 4(a)(i)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitution have been made (1) and an acceptable final answer, including unit, has been stated (1).

Question 4(a)(ii)

The candidate was awarded **0 marks** because the response 'repeat several times' is insufficient, as there is no indication of averaging the repeated measurements.

Question 4(b)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, including unit, has been stated (1).

Question 4(c)

The candidate was awarded **2 marks** because diffraction of waves into the 'shadow' regions behind the walls has been shown (1) and there are straight sections in the middle, with a consistent wavelength before and after the gap (1).

Question 4(d)

The candidate was awarded **0 marks** because there is no indication of waves losing energy.

Question 5

The candidate was awarded **2 marks** because they have demonstrated a reasonable understanding of the physics involved.

Question 6(a)

The candidate was awarded **0 marks** because the response is incorrect.

Question 6(b)(i)

The candidate was awarded **1 mark** because the response is correct, including a correct unit.

Question 6(b)(ii)

The candidate was awarded **0 marks** because there is no indication of the number of half-value thicknesses (0) and the final answer is incorrect (0).

Question 6(b)(iii)

The candidate was awarded **1 mark** because 'increase' is an acceptable equivalent statement.

Question 6(c)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, in hours, has been stated (1).

Question 7(a)

The candidate was awarded **0 marks** because there is no indication of the number of decays per second in the candidate's response.

Question 7(b)(i)

The candidate was awarded **0 marks** because there is no indication that the neutrons produced in the initial reaction go on to cause further reactions (0), or that the process then repeats or causes a 'chain reaction' (0).

Question 7(b)(ii)

The candidate was awarded **4 marks** because the total energy produced in a minute has been calculated (1), a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, including unit, has been stated (1).

Question 7(c)

The candidate was awarded **1 mark** because 'sterilisation of medical equipment' is a suitable use of nuclear radiation.

Question 8(a)

The candidate was awarded **1 mark** because '0 m' is a correct response.

Question 8(b)(i)

The candidate was awarded **1 mark** because a correct relationship has been stated (1), but the substitution stage is incomplete, as one of the areas has been omitted (0) and no further marks are therefore accessible.

Question 8(b)(ii)

The candidate was awarded **1 mark** because a correct relationship has been selected (1), but an incorrect substitution has been made (0) and no further marks are therefore accessible.

Question 8(c)

The candidate was awarded **2 marks** because a correct relationship has been selected (1), correct substitutions have been made (1), but an incorrect final answer has been stated (0).

Question 9(a)

The candidate was awarded **1 mark** because 'balanced' is a correct response.

Question 9(b)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have been made (1) and a correct final answer, including unit, has been stated (1).

Question 9(c)

The candidate was awarded **1 mark** because a correct relationship has been selected (1), but an incorrect substitution for the calculation of the unbalanced force has been made (0) and no further marks are therefore accessible.

Question 10

The candidate was awarded **1 mark** because they have demonstrated a limited understanding of the physics involved.

Question 11(a)

The candidate was awarded **0 marks** because the response is incorrect.

Question 11(b)

The candidate was awarded **2 marks** because 'the same' is a correct response (1) and 'as the acceleration (9.8 m s^{-2}) doesn't change' is an acceptable implication of acceleration due to gravity being the same (1).

Question 11(c)

The candidate was awarded **1 mark** because a correct relationship has been selected (1), but an incorrect substitution has been made (0) and no further marks are therefore accessible.

Question 12(a)(i)

The candidate was awarded **1 mark** because the response is correct and an appropriate unit has been included.

Question 12(a)(ii)

The candidate was awarded **3 marks** because a correct relationship has been selected (1), correct substitutions have all been made (1) and an acceptable final answer has been stated (1). Given that the candidate has used 365 as a value for the number of days in a year, the final answer, when quoted to four significant figures, is acceptable. Also, although a unit is not required in the final answer the candidate has not stated an incorrect unit.

Question 12(b)(i)

The candidate was awarded **0 marks** because 'naked human eye' is not a suitable detector of visible light in this instance.

Question 12(b)(ii)

The candidate was awarded **1 mark** because 'same' is an acceptable equivalent statement.