

# Commentary on candidate 2 evidence

The evidence for this candidate has achieved the following marks for each question of this course assessment component.

## Question 1(a)(i)(A)

The candidate was awarded **1 mark** because the horizontal component of the initial velocity of the sponge has been correctly calculated. The candidate has written a truncated version of the final answer, as indicated by the attempted ellipsis (...). This is acceptable.

## Question 1(a)(i)(B)

The candidate was awarded **1 mark** because the vertical component of the initial velocity of the sponge has been correctly calculated.

## Question 1(a)(ii)

The candidate was awarded **3 marks** because they have selected an appropriate relationship, substituted data correctly, and given the correct final answer. In the penultimate line, the candidate has again written a truncated version of the final answer, as indicated by the ellipsis (...). This is acceptable.

## Question 1(a)(iii)

The candidate was awarded **0 marks** because they have not selected an appropriate relationship ( $s = u + \frac{1}{2} at^2$ ). The remaining marks cannot be accessed.

## Question 1(b)

The candidate was awarded **1 mark** because they have made a correct statement about the increase in vertical component (of velocity), but has not commented on any change in the horizontal distance.

## Question 2(a)(i)

The candidate was awarded **3 marks** because a correct relationship has been selected, correct substitution of data has been made, and an acceptable final answer stated.

## Question 2(a)(ii)

The candidate was awarded **3 marks** because a correct relationship has been selected, correct substitution of data has been made, and a correct final answer stated.

### Question 2(a)(iii)

The candidate was awarded **2 marks** because their description of the subsequent motion of the drone and the justification are acceptable.

### Question 2(b)

The candidate was awarded **0 marks**. The calculated value of weight (16600 N) is incorrect, and so the remaining marks cannot be accessed.

### Question 3(a)

The candidate was awarded **2 marks** because they have explicitly stated the appropriate selected relationship, substituted the data correctly, and stated the given final answer.

### Question 3(b)

The candidate was awarded **0 marks** because they have not selected an appropriate relationship. The mark for substitution and the mark for final answer cannot be accessed.

### Question 3(c)

The candidate was awarded **2 marks** because they have clearly implied the calculation of *total* kinetic energy and stated the conditions for inelastic collisions.

### Question 4

The candidate was awarded **1 mark** because they have shown a limited understanding of the physics involved. A number of statements are made, which are relevant to the context.

### Question 5(a)

The candidate was awarded **0 marks** because their statement '... in the atmosphere' is incorrect.

### Question 5(b)(i)

The candidate was awarded **1 mark** because they have substituted data correctly into the given relationship, but have not given an acceptable final answer in years.

### Question 5(b)(ii)(A)

The candidate was awarded **0 marks** because their response is not sufficiently detailed.

### Question 5(b)(ii)(B)

The candidate was awarded **1 mark** because their suggestion is valid.

**Question 5(c)**

The candidate was awarded **1 mark** because their response is correct.

**Question 6(a)(i)**

The candidate was awarded **2 marks** because they have explicitly stated the appropriate selected relationship, substituted the data correctly, and stated the given final answer.

**Question 6(a)(ii)**

The candidate was awarded **2 marks** because they have selected an appropriate relationship and substituted data correctly, but have made an arithmetic slip in their statement of the value of  $v^2$  (power of ten missing). The mark for the final answer is not awarded.

**Question 6(b)**

The candidate was awarded **0 marks** because their suggestion is incorrect.

**Question 6(c)**

The candidate was awarded **0 marks** because they have not shown a limited understanding of the physics involved.

**Question 7(a)**

The candidate was awarded **0 marks** because the suggestion implies that photons are ejected from the surface of the metal.

**Question 7(b)(i)**

The candidate was awarded **0 marks** because, again, their statement implies that photons are ejected from the surface of the metal.

**Question 7(b)(ii)**

The candidate was awarded **1 mark** because their statement on the effect on the maximum kinetic energy is correct. The justification, however, is incorrect.

**Question 7(c)**

The candidate was awarded **2 marks** because they have shown a lower threshold frequency and drawn a line parallel to the given line.

**Question 7(d)**

The candidate was awarded **0 marks** because their explanation is incorrect.

**Question 8(a)(i)**

The candidate was awarded **1 mark** because their explanation is acceptable.

**Question 8(a)(ii)**

The candidate was awarded **3 marks** because a correct relationship has been selected, correct substitution of data has been made, and an acceptable final answer stated.

**Question 8(a)(iii)**

The candidate was awarded **2 marks** because their statement is correct and the justification is acceptable.

**Question 8(a)(iv)**

The candidate was awarded **0 marks** because their statement is insufficient (the phrase '*constant phase relationship*' is missing).

**Question 8(b)**

The candidate was awarded **0 marks** because their suggestion is incorrect.

**Question 9(a)**

The candidate was awarded **2 marks** because they have explicitly stated the appropriate selected relationship, substituted the data correctly, and stated the given final answer.

**Question 9(b)(i)**

The candidate was awarded **1 mark** because their statement is correct.

**Question 9(b)(ii)**

The candidate was awarded **2 marks** because they have selected an appropriate relationship and substituted data correctly, but the value stated in the penultimate line is rounded incorrectly (the ellipsis (...) indicating truncation is missing), and so the mark for the final answer is not awarded.

**Question 9(b)(iii)**

The candidate was awarded **1 mark** because they have shown total internal reflection, but not the angle of incidence on the right hand face of the prism as  $38^\circ$ , or the required details of the refraction at the bottom face of the prism.

**Question 9(c)**

The candidate was awarded **1 mark** because their statement implies less dispersion.

**Question 10(a)**

The candidate was awarded **1 mark** because their response covers one of the features of the Bohr model.

**Question 10(b)**

The candidate was awarded **3 marks** because they have selected an appropriate relationship, substituted data correctly and given an acceptable final answer.

**Question 10(c)**

The candidate was awarded **5 marks** because they have selected appropriate relationships, correctly substituted data into both relationships, and given an acceptable final answer.

**Question 11(a)**

The candidate was awarded **1 mark** because their statement is correct.

**Question 11(b)**

The candidate was awarded **0 marks** because one of the data points used in the substitution into the gradient relationship (70.6,400) does not lie on the line (even when the  $\pm \frac{1}{2}$  division tolerance is applied), and so the remaining marks cannot be accessed.

**Question 11(c)**

The candidate was awarded **0 marks** because their explanation is incorrect.

**Question 12(a)(i)**

The candidate was awarded **1 mark** because the peak voltage of the output of the signal generator has been correctly determined.

**Question 12(a)(ii)**

The candidate was awarded **3 marks** because they have selected an appropriate relationship, substituted data correctly, and given the correct final answer.

**Question 12(a)(iii)**

The candidate was awarded **1 mark** because their response covers part of the full explanation, corresponding to 'LEDs will conduct in only one direction'.

**Question 12(b)**

The candidate was awarded **5 marks** because they have selected appropriate relationships, correctly substituted data into both relationships, and given the correct final answer.

**Question 13(a)**

The candidate was awarded **1 mark** because they have substituted data correctly into the given relationship but have given an incorrect unit in the final answer.

**Question 13(b)(i)**

The candidate was awarded **3 marks** because they have appropriately scaled and labelled the axes with variables and units, plotted the data points accurately (within the  $\pm \frac{1}{2}$  division tolerance), and drawn an acceptable line of best fit.

**Question 13(b)(ii)**

The candidate was awarded **2 marks** because they substituted correct data into the gradient relationship and given an acceptable final answer. A unit is not required in this question. In the penultimate line, the candidate has written a truncated version of the final answer, as indicated by the attempted ellipsis (...). This is acceptable.

**Question 13(b)(iii)**

The candidate was awarded **0 marks** because they incorrectly transposed the given relationship, and so the remaining marks cannot be accessed.