

	Mark	Commentary
Q1(a)(ii)	1	
Response 1	0	The candidate does not make it clear that the current is being stopped.
Response 2	1	The candidate has implied that too large a current is prevented from flowing.
Response 3	1	The candidate's response is acceptable.
Response 4	0	The candidate does not specify which component is being protected. The answer does not explain the operation of a fuse in terms of preventing too large a current (the voltage is fixed at 230 V).
Q1(a)(iii)	4	
Response 1	2	The candidate has selected an appropriate relationship, substituted correctly, but has incorrectly calculated a value for I . In addition, the candidate has not related the value of current to a fuse rating. Superfluous working can be ignored.
Response 2	4	The candidate has implied an appropriate relationship by correct substitution and has correctly calculated a value for I . The candidate has also stated the rating of the fuse.
Response 3	4	The candidate has selected an appropriate relationship, substituted correctly and has correctly calculated a value for I , the line containing the ellipsis (...) is ignored. The candidate has also stated the rating of the fuse.
Response 4	3	The candidate has selected an appropriate relationship, substituted correctly and calculated a correct value for the current. The candidate has not, however, related the value of current to a fuse rating.
Q1(b)	1	
Response 1	0	The candidate does not specify that the 'two different directions' are opposite to each other, that the direction changes repeatedly and the explanation is not in terms of electron flow.
Response 2	0	The axes of the candidate's sketch graph are not labelled, and the two x-axes are confusing. The graph is ignored. The term 'back and forth' is acceptable, but again the explanation is not in terms of electron flow.
Response 3	0	The candidate states that the electron flow changes direction, but also that the electrons do not follow a fixed path, which is wrong physics. No mention that the electrons change direction repeatedly.
Response 4	1	The candidate implies that the electron flow changes direction repeatedly.
Response 5	0	The use of the phrase 'up and down' with reference to electrons does not make it clear that the electrons change direction repeatedly. The idea that electrons keep alternating between positive and negative, however, is wrong physics. The word 'alternating' is a repetition of the stem of the question.

Q2(a)(i)	4	
Response 1	4	In the third last line, the candidate has implied an appropriate relationship and substituted correctly to obtain a correct value for the current in the circuit, and subsequently used this value in another implied relationship to obtain an acceptable final answer. Working prior to the third last line is not wrong physics and is ignored.
Response 2	4	The candidate has identified the resistance of the parallel branch, selected an appropriate relationship, substituted correctly and obtained an acceptable final answer.
Response 3	2	The candidate has selected an appropriate relationship, but substituted incorrectly (the sum $15+25$ is awarded a mark but the substitution of 15 in the top line is incorrect).
Response 4	1	The selected relationship ' $V=IR$ ' is correct. The candidate's implied attempt to calculate the current in the $15\ \Omega$ resistor and in the motor is wrong physics.
Q2(b)(i)	3	
Response 1	3	The candidate has selected an appropriate relationship, substituted correctly and given a correct final answer. The inclusion of ' $\frac{1}{R_3}$ ' in the selected relationship is not wrong physics and is ignored.
Response 2	2	The candidate has selected an appropriate relationship, substituted correctly, but given an incorrect final answer.
Response 3	0	The candidate's selected relationship is wrong physics. The marks for substitution and final answer are not accessible.
Response 4	0	Again, the candidate's selected relationship is wrong physics. The marks for substitution and final answer are not accessible, despite a 'correct' final answer.
Q2(b)(ii)	3	
Response 1	2	The candidate has made a correct statement but their justification, while not incorrect, is incomplete. An additional statement that <i>V across the motor has increased</i> would have gained full credit.
Response 2	3	The candidate has made a correct statement and has stated a justification in terms of reduction in resistance and increase in current.
Response 3	0	The candidate has made an incorrect statement about the power in the first sentence. The marks for justification are not accessible.
Q3(a)	3	
Response 1	2	The candidate has selected an appropriate relationship, substituted correctly, but given an incorrect final answer by not including the unit.
Response 2	1	The candidate has selected an appropriate relationship, but substituted incorrectly. The mark for a correct final answer is not accessible.
Response 3	1	The candidate has selected an appropriate relationship, but substituted incorrectly. The mark for a correct final answer is not accessible.
Response 4	2	The candidate has selected an appropriate relationship, substituted correctly, but given an incorrect final answer.

Q 3(b)	3	
Response 1	2	The candidate has made a correct statement about the effect on pressure and has given a partial explanation in terms of more frequent collisions. However they have not described the overall force on the walls.
Response 2	1	The candidate has made a correct statement about the effect on pressure but has given an incorrect explanation.
Response 3	3	The candidate has made a correct statement about the effect on pressure and has given an acceptable explanation.
Response 4	1	The candidate has made a correct statement about the effect on pressure but their explanation implies an increase in the speed of the particles, which is wrong physics. The statement about the particles hitting the walls more often is ignored because it is preceded by a wrong explanation of the individual particle collisions.
Response 5	1	The candidate has made a correct statement about the effect on pressure but has not offered an explanation.
Q3(c)	2	
Response 1	0	The candidate's graph does not describe the variation of pressure with volume.
Response 2	1	A mark is awarded for the axes (labelled p and V) but the graph implies an increase in both pressure and volume, which is incorrect.
Response 3	1	The candidate has labelled the graph acceptably. The shape of the graph is incorrect as the line intercepts the X and Y axis (the candidate is implying that the pressure is 2.5×10^5 when the volume is zero).
Response 4	2	The candidate has labelled the graph acceptably and, since the origin is not labelled, the shape is also acceptable.
Response 5	1	The candidate has labelled the graph acceptably, but the line is not acceptably curved.
Q 4(a)(ii)	1	
Response 1	0	The candidate's response is not sufficiently detailed, no mention of averaging.
Response 2	1	The candidate has suggested more readings and averaging. The use of a timer is assumed and is superfluous.
Response 3	0	The candidate's suggestion implies the measurement of the period of a wave repeated for a number of waves, but no suggestion of averaging.
Response 4	1	The candidate's suggestion is acceptable.
Q4(b)	3	
Response 1	3	The candidate has selected an appropriate relationship, substituted correctly and given a correct final answer.
Response 2	3	The candidate has selected an appropriate relationship, substituted correctly and given a correct final answer.

Q4(c)	2	
Response 1	2	The candidate's diagram shows diffraction, with straight sections in the middle with consistent wavelengths. The variation of the wavelengths of waves in the diffracted sections is ignored. The degree of bending is acceptable.
Response 2	2	The candidate's diagram shows diffraction, with the wavelength consistent.
Response 3	0	The candidate's diagram does not show the 'bending' associated with diffraction.
Response 4	2	The candidate's diagram shows diffraction, with straight sections in the middle with consistent wavelengths. The extension of the 'straight' sections is ignored.
Response 5	0	The candidate's diagram attempts to show diffraction, but shows diffraction starting before the waves meet the gap, which is wrong physics.
Response 6	0	The candidate's diagram does not show the diffraction of the waves into the 'shadow' regions.
Q4(d)	1	
Response 1	1	The candidate's explanation is acceptable.
Response 2	0	The candidate's phrase ' <i>spread apart</i> ' does not sufficiently clarify whether the wavelength is increasing or the wavefront is lengthening.
Response 3	0	The candidate has not sufficiently explained the reduction in amplitude.