Question number	Answer	Notes	Marks
5 (a) (i)	voltage = current × resistance;	allow in standard symbols and rearrangements e.g. V = I × R reject C, A for current	1
(ii)	substitution; rearrangement; evaluation; unit; e.g. 4.80 = 0.42 × R (R =) 4.8 / 0.42 (R =) 11 ohms / Ω	 -1 if rounding error e.g. 11.42 allow 11.4, 11.43, 11.42857…	4
(b) (i)	charge = current × time;	allow in standard symbols and rearrangements e.g. Q = I × t reject C for current and charge	1
(ii)	dimensionally correct substitution; evaluation; e.g. (Q =) 0.42 × 45 (× 60) (Q =) 1100 (C)	can be scored even if time not converted to seconds allow 1130, 1134 (C) 18.9, 19 (C) gets 1 mark only	2
(iii)	time (to charge fully) increases; current reduces; (because) resistance of cable has increased;	 allow longer {wire / lead} has greater resistance	3

Total for question 5 = 11 marks

Question number	Answer	Notes	Marks
11 (a)	A; A is the only correct answer B is incorrect because the amplitude of the alpha wave should be smaller than the amplitude of the delta wave C is incorrect because the frequency of the alpha wave should be higher than the amplitude of the delta wave D is incorrect because the amplitude of the alpha wave should be shorter than the amplitude of the delta wave and the frequency should be higher		1
(b)	B; B is the only correct answer A is incorrect because the motion arrows do not show vibrations C is incorrect because the motion arrows do not show vibrations D is incorrect because the motion arrows show vibrations, but in the wrong orientations compared to the direction of wave travel		1
(c)	any four from: MP1. rays A, B and C are refracted (at the boundary); MP2. A is un-deviated; MP3. C is more deviated than B; MP4. angles of incidence increase from A to B to C to D; MP5. ray D undergoes (total internal) reflection; MP6. ray D angle of incidence > critical angle;	 allow rays B and C refracted allow correct description of refraction e.g. 'rays B and C bend away from the normal' allow A does not change direction ignore A does not refract allow C bends more than B allow ray D undergoes TIR	4

Total for question 11 = 6 marks