(a) Figure 1 shows a solar-powered charger for a mobile phone.

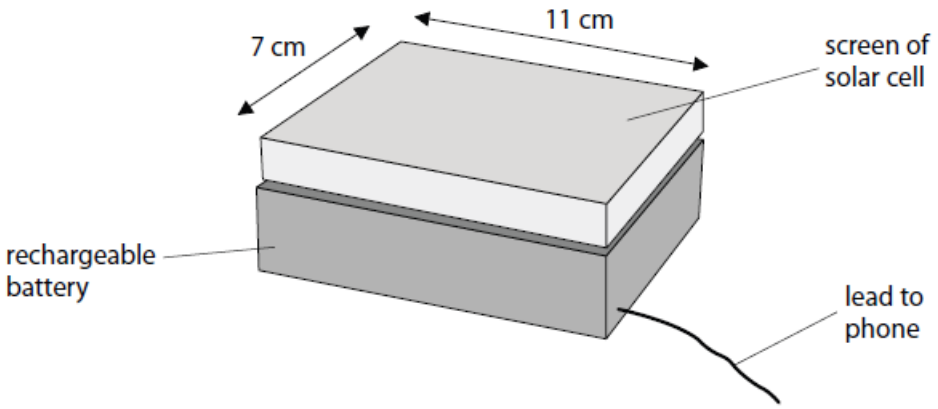

Figure 1

The screen of the solar cell takes in energy from the Sun.

(i) State how energy gets from the Sun to the screen.

(1)

.....

.....

(ii) State how energy is stored in the charger.

(1)

.....

.....

(iii) Each second, 0.12 J of energy from the Sun reaches 1 cm^2 of the screen.

Calculate the total amount of energy reaching the whole screen in 1 second.

(3)

energy = ... J

(b) Mobile phones emit microwaves.

Microwave ovens emit microwaves.

Explain why a mobile phone does not have the same heating effect as a microwave oven.

(2)

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(Total for Question 1 = 7 marks)

Question number	Answer	Mark
1(a)(i)	(Carried by) electromagnetic wave	(1)

Question number	Answer	Mark
1(a)(ii)	As chemical energy in the battery	(1)

Question number	Answer	Additional guidance	Mark
1(a)(iii)	Calculation of area (1) 7 × 11 Substitution (1) 77 × 0.12 Answer (1) 9.2 (J)	77 ecf area award full marks for correct numerical answer without working	(3)

Question number	Answer	Additional guidance	Mark
1(b)	An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (1 mark): • the heating effect for the oven and the phone depends on their power (1) • and since the power of an oven is much greater than the power of a phone, the oven produces a greater heating effect (1)	allow not the same wavelength/microwaves cover a range in wavelengths	(2)