TRANSFORMER 2 MARK SCHEMES

QUESTION 1			
question	**answers**	**extra information**	**mark**
(a)	step-down (transformer)		1
(b)	alternating current	accept minor misspellings but do **not** credit alternative current	1
(c)(i) & (ii)	magnet attracts upwards	 correct order essential accept up	3
Total			5
QUESTION 2			
(a)(i)	secondary(coil) / output (coil)	do **not** accept just coil	1
(a)(ii)	<u>core</u> (laminated soft) <u>iron</u>	do **not** accept for either mark it is made out of iron ore allow **1** mark for 'it is made out of iron core'	1 1
(a)(iii)	magnetic field (which is) changing / alternating	accept magnetism / magnetic force direction (of field) changes / strength (of field) varies scoring second mark is dependent on first mark	1 1
(b)	...step-up .... step-down ...	both in the correct order	1

(c)	Do not build new houses .... Build new power lines away	deduct **1** mark for any other(s) to a minimum total of (0)	1 1
Total			**8**
Question 3			
4(a)(i)	iron		1
4(a)(ii)	step-down (transformer)		1
4(b)	any **one** from: • after the power station • after the generator • before the power lines • before the pylons		1
4(c)	each correct (1) current coil field core ends	in its correct place	5
Total			**8**
Question 4			
(a)	iron primary	correct positions only	1 1

	secondary		1
(b)	(it) decreases the p.d.	accept it would increase current accept voltage for p.d. the voltage goes from 230(V) to 20(V) is insufficient do **not** accept decreases current / energy / power do **not** accept decreases p.d. / voltage and current	1
(c)	any **one** from: • lighter • smaller • use (very) little power / current / energy when switched on and no load / phone not connected • more efficient	 accept it is easier to carry around accept no power / current / energy is drawn do **not** accept electricity for power / current / energy accept does not get as hot **or** less heat produced	1
(d)	an environmental		1
Total			**6**
Question 5			
(a)	(the alternating current creates) a <u>changing / alternating magnetic</u> field (magnetic field) in the (iron) core (causing a) potential difference (to be) <u>induced</u> in / across secondary coil	 accept that links with the secondary coil current in the core negates this mark accept voltage for p.d.	1 1 1

(b)(i)	20	allow **1** mark for correct substitution, ie $\frac{230}{V_s} = \frac{575}{50}$ **or** $\frac{V_s}{230} = \frac{50}{575}$	2
(b)(ii)	0.3 **or** correct calculation using 230 $\times I_p$ = their (b)(i) × 3.45	allow **1** mark for correct substitution, ie $230 \times I_p = 20 \times 3.45$ allow ecf from (b)(i) for 20 **OR** substitution into this equation $\frac{I_p}{I_s} = \frac{N_s}{N_p}$	2
(c)	(switch mode transformers) use (very) little power / current / energy when switched on but no load is applied **or** it is more efficient	accept no for little ignore it is more portable do **not** accept electricity for power / current / energy accept does not get as hot **or** less heat produced	1
(d)	any one from: fewer (waste) batteries have to be sent to / buried in land-fill the soil is polluted less by batteries in land-fill		1

	fewer (waste) batteries have to be recycled fewer batteries have to be made less raw materials are used in making batteries customers have to replace their batteries less often customers have to buy fewer (replacement) batteries	longer lifetime is insufficient it costs less is insufficient	
Total			**9**

Question 6

	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.		

0 marks	**Level 1 (1–2 marks)**	**Level 2 (3–4 marks)**	**Level 3 (5–6 marks)**
No relevant / correct content.	**Either** there is an attempt at a description of the construction of a transformer **or** a correct statement of the effect of one type of transformer on the input p.d.	There is a description of the construction of a transformer **and** a correct statement of the effect of one type of transformer on the input p.d.	There is a clear description of the construction of a transformer **and** there is a correct description of how transformers affect the input p.d.

details of construction:	extra information
a (laminated) core core is made from a magnetic material / iron 2 coils the coils are made from an electrical conductor / copper the coils are covered in plastic / insulation the coils are (usually) on opposite sides step-up transformer has more turns on secondary coil than (its) primary (or vice versa) step-down transformer has less turns on secondary coil than (its) primary (or vice versa)	

effect on input p.d. : step-up transformer, the output p.d. is greater (than the input p.d.) step-down transformer, the output p.d. is lower (than the input p.d.)		accept voltage for p.d.	
9(b)	switch mode (transformer)		1
Total			**7**