



General Certificate of Secondary Education

**Applied Science (Double Award)
4861**

APSC/2F Science for the Needs of Society

Mark Scheme

2010 examination - January series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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Foundation / 2F

question	answers	extra information	marks
1(a)(i) A	A, B or F		1
1(a)(ii) A	C, D or E		1
1(b)(i) G	Chloroplast	Allow E	1
1(b)(ii) G	Water		1
	Glucose + oxygen	Allow <u>correct</u> formula Allow either order	1
1(c) E	<ul style="list-style-type: none"> • Extended (cell) membrane / wall / hair / (root hair cell has a larger) surface area • (No) chloroplasts 	Allow any valid reference to chloroplasts	1
		Shape is insufficient	1
1(d)(i) A	Red blood cells		1
1(d)(ii) A	No nucleus		1
1(d)(iii) A	Nerve cell		1
1(d)(iv) A	Extended shape		1
Total			11

Foundation / 2F

question	answers	extra information	marks
2(a)(i) E	Nucleus correctly labelled		1
	Electron correctly labelled		1
	Neutron correctly labelled		1
2(a)(ii) A	7		1
2(b)(i) G	CO ₂	Allow O ₂ C	1
	Water	H ₄ C	1
	CH ₄		1
2(b)(ii) G	2		1
2(b)(iii) G	Hydrogen	Allow H ₂	1
2(b)(iv) G	Fuel / heating / energy resource	Ignore "gas" and "burning" Allow examples of uses of fuel eg cooking / Bunsen burners / gas fires	1
Total			10

Foundation / 2F

question	answers	extra information	marks
3(a) E	Less wasted energy	Allow converse	1
	As heat	Allow 'more light'	1
	or		
	More useful energy		1
	As light		1
3(b)(i) G	As light Electricity	Allow any reference to electricity	1
3(b)(ii) G	70		1
3(c) E	Bar for computer to 360	Allow $\pm\frac{1}{2}$ square	1
	Bar for microwave to 1200		1
3(d)(i) G	Camping stove – gas		1
	Mobile telephone – battery		1
	Microwave – mains electricity		1
3(d)(ii) E	(More) portable	Allow "don't need mains (supply)" Allow a description of portable	1
3(d)(iii) E	Too expensive / make appliance too heavy	Allow "batteries not powerful enough" or Kettle needs a high voltage / a lot of electricity Ignore References to "strength"	1
Total			11

Foundation / 2F

question	answers	extra information	marks
4(a)(i) G	Liver / brain		1
4(a)(ii) A	Depressant		1
4(a)(iii) G	Nicotine – causes addiction Carbon monoxide – reduces ability of blood to carry oxygen	Only one line to be drawn from nicotine Only one line to be drawn from carbon monoxide	1 1
4(b) E	More deaths		1
4(c)(i) A	B		1
4(c)(ii) A	A		1
4(c)(iii) E	(antibiotics) don't work against viruses / only work against bacteria		1
4(d) E	Advantages: Pain relief / it treats symptoms / help with disease Disadvantages: May go to jail / link with mental illness / reference to named / specific side-effects / addiction	“illegal” is insufficient Ignore references to respiratory system / hallucination	1 1
Total			10

Foundation / 2F

question	answers	extra information	marks
5(a)(i) G	Low		1
5(a)(ii) G	Liquid Gas		1 1
5(b)(i) A	Very small liquid particles mixed with a gas		1
5(b)(ii) E	eg deodorant, paint, hairspray, air freshener	Do not Allow "aftershave" Any reasonable answer Allow appropriate brand names	1
5(b)(iii) G	Solution / suspension / gel / emulsion / foam		1
5(c)(i) G	Carbon dioxide / CO ₂	Allow O ₂ C	1
5(c)(ii) E	Burning (fossil) fuels		1 1

Foundation / 2F

question	answers	extra information	marks
5(c)(iii) E	Any two from: <ul style="list-style-type: none">• Use alternative / renewable energy resources eg wind turbines• Remove gases eg by chemical reaction / filtration• Less combustion• Better insulation• Plant more trees• Use car less• Switch off appliances when not in use• use energy efficient devices	Ignore reference to “recycling”	2
Total			11

Foundation / 2F

question	answers	extra information	marks
6(a)(i) G	Conduction		1
6(a)(ii) G	Convection		1
6(b)(i) G	Less Rises		1 1
6(b)(ii) E	It is a conductor / it lets heat go through it	Not an electrical conductor	1
6(b)(iii) E	It is an insulator / it stops heat getting through / stops you from getting burnt/ waterproof/ lightweight	Ignore references to rust	1
6(c)(i) A	Solids		1
6(c)(ii) A	Close together		1
6(d)(i) E	<u>Absorbs</u>		1
6(d)(ii) E	Reflects	Allow reference to heating the whole pipe Ignore “bounce”	1
Total			10

Foundation / 2F

question	answers	extra information	marks
7(a)(i) A	Any one from Crisps / chocolate / sweets		1
7(a)(ii) E	fats / oils / sugar / salt	Answer must be linked to food Allow butter / sodium / harmful named additives	1
7(b)(i) A	Increases		1
7(b)(ii) A	Pancreas		1
7(b)(iii) G	Glycogen Liver		1 1
7(c) E	bloodstream / blood vessels (through the) blood / by the plasma	Not blood <u>cells</u>	1
7(d) E	<ul style="list-style-type: none"> • Sweat • Evaporation / removes heat or <ul style="list-style-type: none"> • Capillaries widen / vasodilation • More heat escapes or <ul style="list-style-type: none"> • Hairs lie flat • Warm air carried away 	Responses must be linked	2
Total			9

Foundation / 2F

question	answers	extra information	marks
8(a) G	Composite		1
	Ceramic		1
8(b)(i) G	Metal		1
	High melting point		1
8(b)(ii) G	Polymer		1
	Low density / light		1
8(c)(i) G	(U)PVC / aluminium	Allow plastic / polymer	1
8(c)(ii) E	Does not rot / does not need painting / low maintenance	Ignore waterproof / rust / cost Allow lasts longer	1
8(c)(iii) E	Renewable / biodegradable / colour can be changed	Ignore cost / lasts longer	1
Total			9

Foundation / 2F

question	answers	extra information	marks
9(a) G	Coal / oil / gas	Allow petrol, diesel, methane, natural gas	1
9(b)(i) E	Cancer / radiation sickness / cell damage/ death	Allow: Burns, mutation, damaged (named) organs	1
9(b)(ii) G	Lead	Allow Pb	1
9(b)(iii) E	Any two from: <ul style="list-style-type: none"> • tracers • radiotherapy / treatment for cancer • sterilising • medical imaging 		2
9(c)(i) E	Wave / tidal		1
9(c)(ii) E	Solar: not always sunny / needs a lot of cells Wind: not always windy / noisy / eyesore / needs a lot of wind turbines Hydroelectric: have to flood a big area of land / has to rain a lot / destruction of habitat / needs fast river or similar	Ignore Cost / "It's not reliable" Allow water has to be pumped back up	1 1 1
Total			9
Overall Mark			90