



General Certificate of Secondary Education

Applied Science (Double Award) 3861

3860/2F Science for the Needs of Society

Mark Scheme

2005 examination – June 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.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

3860/2F

question	answers	extra information	marks
1(a)(i)	sterilisation	do not need to use a ring e.g. accept all the incorrect answers crossed out two answers = 0 marks	1
(ii)	disinfectants		1
(iii)	antiseptics		1
(b)	low temperature		1
	prevents growth of microorganisms / slows spreading / no new growth / stops reproducing / stops multiplying	(do not accept kills them)	1
(c)(i)	any sensible method e.g. wash hands or food / wear gloves / wash food / change knife / cover food / clean the surface / suitable clothing, but not mask	(accept method mark written in (c)(ii))	1
(ii)	a specific reason – linked to method given in (c)(i) e.g. remove bacteria from skin / germs are washed away / to stop insects landing on food etc		1
(d)	athlete's foot		1
	measles		1
	tuberculosis		1
Total			10

question	answers	extra information	marks
2(a)	polyethene	4 marks for all 5 correct	4
	glass reinforced plastic	3 marks for 4 correct	
	lead	2 marks for 3 correct	
	phosphorus	1 mark for 2 correct	
	iron oxide	accept single headed arrows ignore double headed arrows	
(b)(i)	flexible		1
(ii)	high melting point		1
(c)(i)	magnesium		1
(ii)	S		1
(iii)	put metal (non-metal) in circuit		1
	bulb will light (not light) circuit is complete (incomplete) / circuit will (will not) conduct electricity / circuit will work		1
(d)	carbon		1
	reduction		1
Total			12

question	answers	extra information	marks
3(a)	toothpaste water-based paint deodorant spray shaving cream lemonade	4 marks for all 5 correct 3 marks for 4 correct 2 marks for 3 correct 1 mark for 2 correct accept single headed arrows	4
(b)	gel	accept jelly do not accept brand names	1
Total			5
4(a)(i)	carry oxygen	ignore CO ₂	1
(ii)	help form a clot at the site of a wound	accept clot the blood / heal wound / seal wound / produce scab / stop bleeding	1
(iii)	any one from: <ul style="list-style-type: none"> • fight disease / prevent illness / fight bacteria • produce antibodies / protect against infection / immune system • remove microbes / dead tissue / toxins 		1
(b)(i)	plasma		1

question	answers	extra information	marks
(ii)	any two from: <ul style="list-style-type: none"> • food / sugar / amino acids / vitamins / nutrients / minerals • salt • carbon dioxide • hormones • waste / urea 	ignore nitrogen / oxygen / alcohol etc accept protein / carbohydrate	2
(c)(i)	heart	accept hart	1
(ii)	any two from: <ul style="list-style-type: none"> • thickness (of wall) / muscle • direction of blood flow (to or from heart) • pressure / speed of blood flow • valves • vessel nearer skin surface 	ignore bigger / larger accept reference to muscle ignore oxygenated / deoxygenated accept reference to pulse	2
(iii)	diffusion		1
(iv)	50,000 for 1 mark 50000 million scores 2 marks		1 1
Total			12

question	answers	extra information	marks
5(a)(i)	convection radiation conduction		1 1 1
(ii)	any two from: <ul style="list-style-type: none"> • loft insulation • cavity wall insulation / thick walls • double glazing / smaller windows • draught proofing • curtains • carpets / underlay • silver foil behind radiator 	} insulation = 1 mark ignore close windows	2
(b)(i)	any two from: <ul style="list-style-type: none"> • lid on beaker • bulb under / closer to / in beaker • reflective surface behind bulb • metal beaker • remove gauze • insulation on sides / shielding • stir the water • digital thermometer 	ignore time / volume measurements or repeat experiment	2

question	answers	extra information	marks
(ii)	any four from: <ul style="list-style-type: none"> temperature at start temperature at end fix any other variable repeat with second bulb / comparison of results 	any temperature measurement = 1 mark temperature rise = 2 marks compare temperature rise = 3 marks compare time taken for fixed temperature rise = 4 marks	4
(c)	2/20 = 0.1 = 100 (watts)	apply ecf for conversion of kW to W	1 1 1
Total			14

question	answers	extra information	marks
6(a)	energy / respiration / movement		1
(b)(i)	pesticides / insecticide		1
	kills / poisons aphids		1
(ii)	predator / ladybirds	accept definition of predator	1
	eat aphids	second mark must be linked to method	1
	or		
	attraction crops / marigolds		
(ii)	attract aphids		
	or		
	insect trap / pheromones		
	traps aphids		
(c)(i)	cell wall	ignore cellulose	1
	chloroplast	ignore chlorophyll	1
(ii)	any two from: <ul style="list-style-type: none"> • (cell) membrane • nucleus • cytoplasm 		2
Total			9

question	answers	extra information	marks
7(a)(i)	any one from: <ul style="list-style-type: none"> no new oil being formed / takes a long time to be formed supplies being used up 	do not accept cannot be reused / replaced (need to explain)	1
(ii)	any two from <ul style="list-style-type: none"> (natural) gas coal nuclear / uranium / radioactive material 	do not accept fossil fuel	2
(b)(i)	5 + 20 + 35 + 10 = 70 100 – 70 = 30	allow ecf	1 1
(ii)	scale labelled with names of fractions percentage scale labelled (% and values) all bars same width (\pm one square) heights of bars correct (\pm half a square)	accept abbreviations max 3 marks if kerosene is missing	1 1 1 1
(iii)	fractional distillation	fractionation = 2 marks	1 1

question	answers	extra information	marks
(iv)	any one from: <ul style="list-style-type: none"> • boiling point • size of molecules 		1
(c)(i)	carbon		1
	hydrogen		1
(ii)	carbon dioxide		1
	water	accept hydrogen oxide do not accept hydroxide	1
(iii)	any two from: <ul style="list-style-type: none"> • carbon dioxide released • global warming / greenhouse effect • flooding / changes to climate / damage to coral 	ignore acid rain and other gaseous pollutants for ozone layer damage apply list principle	2
Total			18
Overall marks = 80			