

Applied Science Double Award

General Certificate of Secondary Education **J649**

Mark Schemes for the Units

June 2007

J649/MS/R/07

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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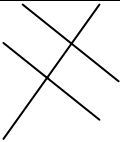
GCSE Applied Science Double Award (J649)

MARK SCHEMES FOR THE UNITS

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Mark Scheme B482/01
June 2007

Question	Expected Answers	Mks	Additional Guidance
1 a	convection; radiation; conduction;	1 1 1	
b	any three from (cavity) wall insulation; double glazing / curtains; loft / roof insulation; draft excluders / close doors / close windows; carpets (on floor) / underlay;	3 max	IGNORE tiles
c	less energy needed / less heat used / heating can be turned off; need less fuel; cost of fuel less/reduced;	2 max	NOT fuel price drop
d	does not add to global warming; renewable;	1 1	
Total		10	

Question	Expected Answers	Mks	Additional Guidance
2 a i		2	all 3 correct = 2 1/2 correct = 1
a ii	(glazed floor) tiles;	1	IGNORE ceramic
b	lighter; easier to fit; doesn't need varnishing; glazed	any 2	
Total		5	

Question	Expected Answers	Mks	Additional Guidance
3 a i	continents	1	
a ii	any 2 from tsunami; earthquakes; volcanoes	2 max	NOT meteorological
b i	N ₂ / N 78 O ₂ / O	1 1 1	
b ii	carbon dioxide / CO ₂	1	
b iii	any 2 correctly named example climate changes eg global warming; rising sea / tide levels; melting (polar) ice caps; increased rainfall / risk of flooding / greater risk of hurricanes / tornadoes / (extreme) storms / changing weather patterns; desertification	2 max	ACCEPT climate change for 1 mark 'hotter' must be qualified ie average global temperature
Total		9	

Question	Expected Answers	Mks	Additional Guidance
4 a	gives out energy / heat;	1	ACCEPT raises temp / gets hot
b	TFT	2	all 3 correct= 2 2/1 correct = 1
c	electrons; nucleus; protons; in either neutrons; order	3	all 4 correct = 3 2/3 correct =2 1 correct =1
Total		6	

Question	Expected Answers	Mks	Additional Guidance
5 a i	① lower wattage / lower power; ② costs less for electricity / uses less electricity / energy / more efficient; ③ uses solar energy; ④ solar energy is free;	2	
a ii	longer life bulbs / LED / quotes numbers; so need replacing less often; i identifies labour cost; cost of bulbs; maintenance of electricity supply mentioned;	any 2	NEUTRAL 'they' or 'the signs last longer'
b i	electrical / electricity	1	
b ii	diagram with labels heat, light; light MUCH BIGGER than heat output;	2max	
c	solar is renewable; electricity is generated from fossil fuels / named fuel; which is non-renewable / finite supply; (burning fossil fuels) causes global warming / acid rain / named environment effect; electricity produces carbon dioxide / sulfur dioxide / SO _x / nitrogen oxides / NO _x ; stay on in power cuts;	any 3	
Total		10	

Question	Expected Answers	Mks	Additional Guidance
6 a	lower; 60 (per minute);	1 1	
b	to body; to lungs; from lungs;	1 2	
c i	red blood cell labelled;	1	
c ii	fights infection / disease / infection / microorganism / engulfs bacteria / creates antibodies; carries oxygen; clots blood;	1 1 1	
Total		9	

Question	Expected Answers	Mks	Additional Guidance
7 a i	nucleus;	1	
a ii	body cell / DNA;	1	
a iii	DNA (from champion);	1	
a iv	2 years;	1	
a v	both the same;	1	
b	C; S; C; S; S;	3 max	5 correct = 3 3/4 correct = 2 2 correct = 1 1 correct = 0
c	balanced argument / at least one for, one against valid argument for: eg choose desired characteristics; eliminate certain diseases / provide parts for transplants valid argument against; eg religious / moral objections; only available to the wealthy; threat to / depletion of the gene pool / less variation;	3 max	
Total		11	

Paper total = 60

Mark Scheme B482/02
June 2007

Question	Expected Answers	Mks	Additional Guidance
1 a	60; (ALLOW 58-62) per minute; OR 1; per second	2	'slower' = 1 mark
b	blood to body; blood to lungs; blood from lungs	1 2	
c i	red (blood) cell labelled	1	
c ii	fights infection / disease / infection / microorganism / engulfs bacteria / creates antibodies; carries oxygen; clots blood	1 1 1	IGNORE 'protect / prevent' IGNORE 'germs'
Total		9	

Question	Expected Answers	Mks	Additional Guidance
2 a i	① lower wattage / lower power; ② costs less for electricity / uses less electricity / energy / more efficient; ③ uses solar energy / solar panel; ④ solar energy is free	2	'saves energy' is too vague
a ii	longer life bulbs / LED / quotes numbers; so need replacing less often; identifies labour cost; cost of bulbs; maintenance of electricity supply mentioned	any 2	NEUTRAL 'they' or 'the signs last longer'
b i	electrical / electricity	1	
b ii	diagram with labels heat, light; light MUCH BIGGER than heat output	2	
c	solar is renewable/ does not run out; electricity is generated from fossil fuels / named fuel; which is non-renewable / finite supply; (burning fossil fuels) causes global warming / acid rain / named environment effect; (burning fossil fuels) produces carbon dioxide / sulfur dioxide / SO _x / nitrogen oxides / NO _x ; stay on in power cuts	any 3	
Total		10	

Question	Expected Answers	Mks	Additional Guidance
3 a	39 %	1	
b i	carbon dioxide decreases / falls; gas X increases / rises; quotes numbers from table	any 2	
b ii	nitrogen; 78 % in atmosphere / other main gas in atmosphere	2	
c i	increases it / give out oxygen	1	NOT 'breathes out oxygen'
c ii	photosynthesis	1	
d i	animals need food (from plants); and oxygen	2	
d ii	CO ₂ made by animals / respiration; used by plants / photosynthesis	2	NOT 'breathes in /out carbon dioxide'
Total		11	

Question	Expected Answers	Mks	Additional Guidance
4 a	<i>mitosis</i>	1	
b	chromosome / DNA; spindle / fibre	2	
c	✓ x ✓ ✓ x	3	All correct =3 4 correct = 2 2/3 correct = 1
d	contents of injection: weakened virus / related virus; vaccines contain antigens; body produces antibodies; prevents future occurrence of illness; recognition / memory idea; antibodies produced (quickly) on reinfection; role of white blood cells	3	IGNORE 'small amount'
Total		9	

Question	Expected Answers	Mks	Additional Guidance
5 a i	more than one material <u>joined</u> / <u>combined</u> <u>together</u>	1	NOT just 'mixture'
a ii	can choose properties; bigger range of properties; properties improvement over natural materials; idea of recycling unusable waste (eg wood chip); Up to 2 marks for specific properties eg stronger / harder / more durable / more flexible etc.	any 2	
b i	both polymers / long chain molecules; laminated has cross links / polyprop does not / <u>molecules</u> in laminated closer together / laminated has a more regular structure	2	
b ii	chains can move (over each other) in polyprop / cannot move in laminated; cross links hold chains in place / molecules held together	2	ACCEPT 'fibres' for 'molecules'
c i	cross links; no water; layers closer together	any 2	ACCEPT 3 or fewer water molecules
c ii	waterproof; stronger / harder; cannot be made soft again; lighter; cannot change shape / not malleable	any 2	
Total		11	

Question	Expected Answers	Mks	Additional Guidance
6 a i	X directly above engine	1	
a ii	idea of coolant flowing through exchanger / in and out; heat transfer to coolant; by conduction; coolant heats up in engine block; hot coolant flows to car heater; air removes heat from coolant; hot air enters car; by convection	any 3	
b	conduction, convection and radiation (all three needed)	1	
c i	2400 x 200 (1) ÷ 1000 = 480 (kJ)	2	
c ii	max 2 from water: corrodes engine; freezes more easily; idea of winter temperatures very low max 2 from antifreeze: low specific heat capacity / heats up quickly; explained eg does not cool engine as efficiently / engine may overheat; has a lower boiling point OWTTE	max 3	
Total		10	

**General Certificate of Secondary Education
Applied Science Double Award (J649)
June 2007 Assessment Series**

Unit Threshold Marks

<i>Unit</i>		Maximum Mark	a*	a	b	c	d	e	f	g	u
B482/1	Raw	60	n/a	n/a	n/a	36	30	34	18	12	0
	UMS	69	n/a	n/a	n/a	60	50	40	30	20	0
B482/2	Raw	60	44	37	30	23	15	11	n/a	n/a	n/a
	UMS	100	90	80	70	60	50	40	n/a	n/a	n/a

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication

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