

**Additional Applied Science A
Twenty First Century**

General Certificate of Secondary Education **J632**

Mark Schemes for the Units

June 2007

J632/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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CONTENTS

GCSE Additional Applied Science A 21st Century (J632)

MARK SCHEMES FOR THE UNITS

Unit	Content	Page
A324/01	Foundation	1
A324/02	Higher	5
A325/01	Foundation	9
A325/02	Higher	13
A336/01	Foundation	17
A336/02	Higher	21
*	Grade Thresholds	24

Mark Scheme A324/01
June 2007

Question	Expected answers	Mark	Additional guidance
1 a i	B (given) A somewhere before D; C somewhere before E;	2	
ii	Too many clothes / unwell / eaten / drunk / crowded / other sensible suggestion	1	Ignore room temperature
b i	Correct labels, trachea; bronchial tubes; alveoli; diaphragm	4	
ii	Simple answer eg will cause death/ suffocation, 1 mark; Supported answer, 2 marks	2	Ignore ref to choking eg prevents air getting into the lungs/ stops breathing; prevents gas exchange; prevents oxygen getting to the cells; stops respiration
Total		9	

Question	Expected answers	Mark	Additional guidance
2 a	Alcohol consumption; current medication; tobacco consumption;	3	
b i	hCG to pregnancy (given) Glucose to diabetes; nitrite to bacteria; protein to kidney disease	3	
ii	Any three of: Apply tourniquet/ belt/ band; identify suitable area to take sample from (owtte); insert needle into vein; sterilise area sample taken from; pull on plunger/allow syringe to fill; remove and place plaster over/ cover wound	3 max	
iii	1 mark for correctly labelled white and red blood cell	1	
Total		10	

Question	Expected answers	Mark	Additional guidance
3 a	Any 2 of: Injured; therefore reduce training; Actually ill; readjust training to overcome period of inactivity; Progressing faster than expected; increase training load	4	Look for something that will interrupt the programme and allow a valid explanation of it A vague answer can be credited with one mark but really looking for a possible reason and the outcome.
b i	13	1	
ii	26%	2	Allow 1 mark for correct method ecf
iii	74%	1	ecf
iv	100m sprinter	1	ecf
Total		9	

Question	Expected answers	Mark	Additional guidance
4 a	A B D F H	4	5 correct = 4 marks 4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark If more than 5 listed, mark first 5 only
b	1 mark for the title; 1 mark for a valid description of their role	2	Do not accept nurse Any sensible suggestion such as physiotherapist; dietician; pharmacist; GP; health visitor; midwife etc.
c	1 mark for an example; 1 mark for how that change will effect the health / well being of the individual	2	Balanced diet owtte / reduces risk of coronary heart disease; regular exercise; Low alcohol intake / reduced risk of liver failure / liver cancer / heart failure etc.
Total		8	

Mark Scheme A324/02
June 2007

Question	Expected answers	Mark	Additional guidance
1 a	Any 2 of: Injured; therefore reduce training; Actually ill; readjust training to overcome period of inactivity; Progressing faster than expected; increase training load	4	Looking for something that will interrupt the programme and allow a valid explanation of it. A vague answer can be credited with one mark but really looking for a possible reason and the outcome.
b i	26%	2	Allow 1 mark for correct method
ii	74%	1	Allow ecf
iii	100m sprinter;	1	Allow ecf
	Total	8	

Question	Expected answers	Mark	Additional guidance
2 a i	hCG to pregnancy (given) Glucose to diabetes; nitrite to bacteria; protein to kidney disease	3	
ii	Any three of: Apply tourniquet/ belt/ band; identify area from which blood sample is taken (owtte); insert needle into vein; sterilise area sample taken from; pull on plunger/allow syringe to fill; remove and place plaster/ cover over wound	3 max	
iii	1 mark for both cells correctly labelled	1	
b	ECG;	1	Accept heart monitor
	Total	8	

Question	Expected answers	Mark	Additional guidance
3 a i	Two of: to be able to listen; to explain; to seek clarification	2 max	
ii	Any two from: Empathetic; patient; tactful; trustworthy	2 max	Allow other suitable qualities.
b i	1 mark for the title and valid description of their role; second mark for second title and role	2	Any sensible suggestion such as physiotherapist; dietician; pharmacist; GP; health visitor; midwife etc. and role linked to title
ii	One mark for the example; two marks for the description.	3	Importance of regular exercise; reduces obesity; less people with coronary problems; more beds available for other people; less people go on to develop diabetes; more health service money/resources available for other needs.
Total		9	

Question	Expected answers	Mark	Additional guidance
4 a i	To check on the development of the baby owtte	1	
ii	X-rays can harm a developing baby / ultra sound does not; ultrasound uses sound waves to image the baby / uses lower energy waves	2	treat all reference to radioactivity as neutral
b i	To ensure the needle does not damage the baby owtte	1	
ii	Any procedure carries with it a risk; might damage the baby; might cause miscarriage; could harm Shivani psychologically/ physiologically owtte	2 max	
c i	axes and scale = 1 plot = 1 suitable line = 1	3	
ii	She was younger; therefore at less risk of having a child with Down's Syndrome: owtte	2	Accept reverse argument
Total		11	

**Mark Scheme A325/01
June 2007**

Question	Expected Answers	Mark	Additional guidance
1 a	forensic sci	1	
	environment ag	1	
	foods standard	1	
	Thatcham		
b	Any good example eg collect evidence;	1	Must be linked to forensics
Total		4	

Question	Expected answers	Mark	Additional guidance
2 a i	Holds (slide in place);	1	
ii	Provides light (to see specimen);	1	
iii	Allows light through (specimen);	1	
iv	Magnifies;	1	
b	2 different types of grains;	1	Allow: Large pieces same size Small pieces same size
	Found in both A and B;	1	
Total		6	

Question	Expected answers	Mark	Additional guidance
3 a i	Ring around electron;	1	
ii	Electron;	1	
b i	25mm;	1	
ii	Correct working shown / $25/0.05$; X 500	1	500 = 2 use ecf
		1	
c	Uses light : electrons; Less : more magnification; Cheap : expensive; Does not need : does need vacuum;	2 max	Must make comparison
Total		7	

Question	Expected answers	Mark	Additional guidance
4 a	i Litmus / universal;	1	Accept other correct indicators but colours must be correct Right colours but wrong way round = 1 mark Use ecf if not indicator given ie red; blue;
	ii Red acid / yellow or orange;	1	
	iii Blue / purple;	1	
b i	Rye;	1	
ii	wheat;	1	
iii	chickpeas;	1	
iv	5 / all of them;	1	
v	Rye;	1	
Total		8	

Question	Expected answers	Mark	Additional guidance
5 a	Food colourings only separate when dissolved;	1	
b	To see what food colourings were in the sweets;	1	
c	So the food colourings did not go into solvent;	1	
d	To stop the solvent evaporating off the paper;	1	
e	To get maximum separation of the food colourings;	1	
Total		5	

Question	Expected answers	Mark	Additional guidance
6 a	Idea of easy to use / colour / living specimens; Limited magnification / specimen must be thin;	1 1	
b	Great magnification; hard to use / specimen must be dead / black and white;	1 1	
c	Quick / easy; Limited to colour / not quantitative	1 1	
Total		6	

Mark Scheme A325/02
June 2007

Question	Expected Answers	Mark	Additional Guidance
1 a	2 nd box.. used to accredit a laboratory ; 5 th box.. are analysed by the agency;	1 1	
b	2 from: Health & safety; Checking equipment; Training;	2 max	Allow specific examples
Total		4	

Question	Expected answers	Mark	Additional guidance
2 a i	B; Shows most detail OWTTE;	1 1	eg biggest clear picture
ii	A; In focus from front to back OWTTE;	1 1	
iii	D; Largest size of image;	1 1	
b	Only original image was x45000; Photo may be larger or smaller;	1 1	
c	X1000;	1	
Total		9	

Question	Expected answers	Mark	Additional guidance
3 a i	Ring around electron;	1	
ii	Electron;	1	
b i	25;	1	
ii	Correct working shown / 25/0.05; X 500	1 1	500 =2 allow ecf
c	Uses light : electrons; Less : more magnification; Cheap : expensive; Does not need : does need vacuum:	2 max	Must make comparison
Total		7	

Question	Expected answers	Mark	Additional guidance
4 a	Calibrate / Set to zero;	1	
b i	Axes correct with labels; All plots correct; Straight line of best fit <u>through origin</u> ;	1 1 1	
ii	0.35 \pm 0.1;	1	Use ecf
Total		5	

Question	Expected answers	Mark	Additional guidance
5 a	Food colourings only separate when dissolved;	1	
b	To see what food colourings were in the sweets;	1	
c	So food colourings did not go into solvent;	1	
d	To stop the solvent evaporating (off the paper);	1	
e	To get maximum separation of the food colourings;	1	
Total		5	

Question	Expected answers	Mark	Additional guidance
6 a	Idea of easy to use / colour / living specimens; Limited magnification / specimen must be thin;	1 1	
b	Great magnification; hard to use / specimen must be dead / black and white;	1 1	
c	Quick / easy; Limited to colour / not quantitative;	1 1	
Total		6	

Mark Scheme A336/01
June 2007

Question	Expected Answers	Mark	Additional Guidance
1 a	thermal insulator; cheap; tough; attractive;	4	
b	C; C; I; I;	3	Four correct scores 3 Three correct scores 2 Two correct scores 1
c	copper-metal; glass-ceramic; pine-wood; rubber-polymer;	4	
Total		11	

Question	Expected answers	Mark	Additional guidance
2 a i	reflective;	1	
ii	valid example of use in buildings or amusements, eg security mirror / checking appearance when buying clothes / Hall of mirrors / kaleidoscope	1	Allow use in toys NOT use for makeup
b	transparent; translucent; opaque;	3	
c i	heat energy does not move away from Dan's hand;	1	
ii	heat energy moves away from Dan's hand;	1	
Total		7	

Question	Expected answers	Mark	Additional guidance
3 a	louder;	1	
b	lion growling before child singing, child singing before mouse squeaking;	1	all correct scores 1
c i	X between 2kHz and 4kHz and below 15 dB;	1	
ii	his ear is more sensitive at 500Hz;	1	
iii	the intensity of a sound;	1	
Total		5	

Question	Expected answers	Mark	Additional guidance
4 a	beam positioned diagonally across gate and overlapping both uprights;	1	
b i	arrows point away from each other;	1	
ii	arrows point towards each other;	1	
c i	in line with each other;	1	
ii	easy to separate fibres / splits along lines of [fibres / structure];	1	
iii	it does not [crack/shatter] easily / not brittle / deforms before breaking;	1	NOT other mechanical property
d i	3 or 4 points plotted correctly score 2 marks; 1 or 2 points plotted correctly score 1 mark;	2	
ii	smooth line through points;	1	
iii	stiffness increases with density;	1	
e	mark up to 3 points either from text or diagram: end(s) of sample fastened to firm clamp(s); apply known load appropriately; measure extension / deflection; repeat for second sample; same sample dimensions;	3	
Total		13	

Mark Scheme A336/02
June 2007

1 a	beam positioned diagonally across gate and overlapping both uprights;	1	
b i	arrows point away from each other;	1	
ii	arrows point towards each other;	1	
c i	in line with each other;	1	
ii	easy to separate fibres / splits along lines of [fibres / structure];	1	
iii	it does not [crack/shatter] easily / not brittle / deforms before breaking;	1	NOT other mechanical property
d i	3 or 4 points plotted correctly score 2 marks; 1 or 2 points plotted correctly score 1 mark;	2	
ii	smooth line through points;	1	
iii	stiffness increases with density;	1	
e	mark up to 3 points either from text or diagram: end(s) of sample fastened to firm clamp(s); apply known load appropriately; measure extension / deflection; repeat for second sample; same sample dimensions;	3	
Total		13	

Question	Expected answers	Mark	Additional guidance
2 a	glass; glass that darkens in bright light; tinted; plastic;	2	3, 4 correct scores 2 1, 2 correct scores 1
b i	converges;	1	
ii	retina;	1	
iii	focal length;	1	
c	up to 4 marks: 1 mark for each advantage backed up by the relevant property	4	each advantage must be clearly described
Total		9	

Question	Expected answers	Marks	Additional guidance
3 a i	2 out of: better thermal conductivity; so better heat transfer; expansivities must match; so piston doesn't stick /wobble AW; less dense; so less force needed for movement AW;	4	NOT less weight unless qualified
ii	(more) expensive, less stiff;	1	both points required for 1 mark
b i	sample B (no mark); smallest range of data;	1	must include comparison of ranges
ii	A and D; mean = 0.42 for both A and D;	2	
Total		8	

Question	Expected answers	Mark	Additional guidance
4 a	In diagram or text: voltmeter in parallel with bulb / same voltage across both bulbs; ammeter in series with bulb / measure current through each bulb; correct formula in symbols or words;	3	If voltage controlled / measured and current measured, then allow 'larger current indicates higher conductance'
b i	ratio of speeds / how much light slows down / changes direction (at a [surface / change of medium] /as it enters the plastic);	1	
ii	(acrylic / Perspex) reason = lower value of refractive index;	1	
c	to reduce absorption / scattering AW / (optical fibres) require good transmission AW;	1	
Total		6	

**General Certificate of Secondary Education
Twenty First Century Additional Applied Science A (J632)
June 2007 Assessment Series**

Unit Threshold Marks

<i>Unit</i>		Maximum Mark	a*	a	b	c	d	e	f	g	u
A324/1	Raw	36	n/a	n/a	n/a	26	22	18	15	12	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A324/2	Raw	36	31	26	21	17	13	11	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	20	n/a	n/a	n/a
A325/1	Raw	36	n/a	n/a	n/a	20	15	11	7	3	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A325/2	Raw	36	28	22	16	11	8	6	n/a	n/a	n/a
	UMS	50	31	26	21	17	13	11	n/a	n/a	n/a
A336/1	Raw	36	n/a	n/a	n/a	28	24	20	16	12	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A336/2	Raw	36	29	24	19	15	12	10	n/a	n/a	n/a
	UMS	50	31	26	21	17	13	11	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

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