

**Additional Applied Science A
Twenty First Century**

General Certificate of Secondary Education J632

Mark Scheme for the Components

June 2008

J632/MS/R/08

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

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 Additional Applied Science A Twenty First Century (J632)

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Guidance for Examiners

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Each separate marking point is indicated by a (1) at the end of that marking point.
4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:

ORA = or reverse argument

NOT = point that is not given credit

AW/owtte = alternative wording/or words to that effect: allow any expression that is clearly equivalent

/ = Alternative and acceptable answers for the same marking point

point = point must be present to gain the mark

(description) = description which need not be present to gain the mark

E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy'

work done = 0 marks

work done lifting = 1 mark

change in potential energy = 0 marks

gravitational potential energy = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.
6. The list principle: if a list of responses greater than the number requested is given, you work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, i.e. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.
7. Marking method for tick boxes:
If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out). For a two-mark question, the rationale would be:

All boxes are indicated scores 0 marks.

All boxes blank scores 0 marks.

All four boxes correct scores 2 marks.

Three boxes correct scores 1 mark.

Two boxes correct scores 1 mark.

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

A324/01 Life Care - Foundation

Question	Gd	Expected Answers	Marks	Rationale													
1	a	<table border="0"> <tr> <td>temperature</td> <td rowspan="4"> </td> <td>stopwatch</td> </tr> <tr> <td>blood pressure</td> <td>sphygmomanometer</td> </tr> <tr> <td>pulse rates</td> <td>clinical thermometer</td> </tr> <tr> <td></td> <td>meter rule</td> </tr> </table>	temperature		stopwatch	blood pressure	sphygmomanometer	pulse rates	clinical thermometer		meter rule	3	One mark for each line. Disregard any two lines from one box on left				
temperature		stopwatch															
blood pressure		sphygmomanometer															
pulse rates		clinical thermometer															
		meter rule															
	b	i	height (1)	1													
		ii	overweight (1)	1													
	c	i	<table border="0"> <tr> <td>amount of alcohol</td> <td><input checked="" type="checkbox"/></td> <td>(1)</td> </tr> <tr> <td>family medical history</td> <td><input checked="" type="checkbox"/></td> <td>(1)</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>tobacco consumption</td> <td><input checked="" type="checkbox"/></td> <td>(1)</td> </tr> </table>	amount of alcohol	<input checked="" type="checkbox"/>	(1)	family medical history	<input checked="" type="checkbox"/>	(1)		<input type="checkbox"/>		tobacco consumption	<input checked="" type="checkbox"/>	(1)	3	One mark per correct tick (up to maximum three ticks) Then list principle.(one mark lost for every wrong answer in excess of three)
amount of alcohol	<input checked="" type="checkbox"/>	(1)															
family medical history	<input checked="" type="checkbox"/>	(1)															
	<input type="checkbox"/>																
tobacco consumption	<input checked="" type="checkbox"/>	(1)															
		ii	(named) aerobic test/brief description (1) method of monitoring/assessment (1)	2	e.g. Running/steps/swimming not weights/stretches bleep, step, VO ₂ or Cooper test; e.g. measuring speed/distance run/pulse rate/heart rate/recovery time etc												
	d		Any two from: Future reference (by doctor/other people); Monitoring fitness/progress (in training); Legal need for records.	2	Allow: to help him remember. Ignore: diagnosis/prescriptions/treatment												
			Total	12													

Question	Gd	Expected Answers	Marks	Rationale						
2	a	To communicate/tell about/for Marcus (1) Useful medical information (1)	2	Allow: Marcus cannot answer for himself Allow: Friend can give consent for Marcus Ignore: "Comfort when he wakes up" e.g. Medical history/medication/allergies/food taken/country visited. Ignore: providing name, address etc. Information must be about Marcus and not what happened to him						
	b	he is unconscious / condition could be life threatening (1)	1	Ignore: "more serious", "an emergency" Allow: "more urgent", "brain injury"						
	c	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>B</td> <td>E</td> <td>C</td> <td>D</td> <td>F</td> <td>A</td> </tr> </table>	B	E	C	D	F	A	4	E & C together in either order D after either E or C F after D A after F For example: DECFA = 3; EDCFA=3; AFECDF=2; AFDCE=1
B	E	C	D	F	A					
	d	Urine/faeces/pus/tissue e.g. skin/saliva (1)	1	Reject: BP/temperature/etc. (things that are measured not sampled) – Ignore: DNA sample						
		Total	8							
3	a	Bending and stretching of muscles; increasing activity (to take more weight)	2	Allow: swimming/walking/etc for 1 st mark Ignore: jogging/running/etc progression e.g. swimming then jogging =2 swimming and jogging = 1						
	b	any two from: to see if he is recovering (or not); to advise on (suitability of) programme/activity; to advise on return to play;	2	Ignore "monitors/checks recovery" (stem) "how he is doing" is not enough; Ignore reference to further injury						
		Total	4							

Question	Gd	Expected Answers	Marks	Rationale
4	a	1 uterus (1) 2 umbilical cord (1) 3 amniotic fluid (1) 4 placenta (1)	4	Placenta Uterus Amniotic fluid Umbilical Cord
	b	any three from: placenta developed / umbilical cord developed / amniotic fluid present / ovaries stopped producing ova / breasts enlarged or breasts with milk/stopped periods	3	Look for specific physical changes e.g. belly or tummy or uterus or womb enlarges/periods stop/ hormone levels change/cervix enlarges or softens/uterus lining thickens/nipples darken ignore cervix dilates ignore results of physical changes e.g. hips widen/gain weight/ankles swell/stomach grows/more urination ignore numbering of answers i.e. can have 2 correct answers in response1
	c	any two from progress/state of baby (1) progress/state of mother (1) build trust/provide information (1)	2	
	d	38 (1)	1	
	e	any two from: consent/legal responsibility (1) risks involved/side effects/possible complications (1) to know what is going to happen/raise awareness of procedure(1)	2	allow the idea that it will be a comfort to Fiona if she knows what to expect knows what is happening to her and knows the risks = 2
		Total	12	
		Section total	36	

A324/02 Life Care - Higher

Question		Gd	Expected Answers	Marks	Rationale
1	a		1 uterus (1) 2 umbilical cord (1) 3 amniotic fluid (1) 4 placenta (1)	4	Placenta Uterus Amniotic fluid Umbilical Cord
	b		any three from: placenta developed / umbilical cord developed / amniotic fluid present / ovaries stopped producing ova / breasts enlarged or breasts with milk/stopped periods	3	Look for specific physical changes e.g. belly or tummy or uterus or womb enlarges/periods stop/ hormone levels change/cervix enlarges or softens/uterus lining thickens/nipples darken ignore cervix dilates ignore results of physical changes e.g. hips widen/gain weight/ankles swell/stomach grows/more urination ignore numbering of answers i.e. can have 2 correct answers in response1
	c		any two from progress/state of baby (1) progress/state of mother (1) build trust/provide information (1)	2	
	d		38 (1)	1	
	e		any two from: consent/legal responsibility (1) risks involved/side effects/possible complications (1) to know what is going to happen/raise awareness of procedure(1)	2	allow the idea that it will be a comfort to Fiona if she knows what to expect knows what is happening to her and knows the risks = 2
			Total	12	

Question			Gd	Expected Answers	Marks	Rationale
2	a	i		any two types of baseline assessment: pulse rate / temperature / blood pressure / aerobic fitness	1	ignore height or mass / BMI allow bleep/step test
		ii		substitution (1) 19 (1)	2	allow two marks for correct answer / one mark for correct method with incorrect maths
		iii		correct position of X (1)	1	If more than one X then no mark
	b	i		CT scan (1)	1	allow MRI or PET ignore X-ray/ultrasound
		ii		none invasive (1)	1	ignore harmless/quicker allow less harmful/safer/quicker recovery/reduces risk of infection/does not require surgery/cutting open/no open wound/painless
	c			any two from: not as fit as before / muscles lost tone whilst injured (1) so build up training programme (1) so as not to aggravate injury or cause new injury(1)	2	Look for an appreciation that resting will have weakened Imran and the trainer will need to take account of this and modify the programme accordingly to prevent further injury.
				Total	8	

Question		Gd	Expected Answers	Marks	Rationale
3	a		faeces / pus / tissue sections / saliva	2	allow alternatives only if linked to food poisoning e.g. vomit allow alternative wording for faeces allow food sample (from restaurant) ignore waste
	b	i	any two from: removes waste from the body / regulates the amount of water in the body / reabsorbs useful chemicals (sugar)	2	allow produces urine/filters blood ignore cleans the blood (ensure function relates to kidney e.g. reject removes alcohol)
		ii	any three from: balancing budget / more economical to have centres of expertise which specialise in one particular area / attracts specialists in that area to one centre, so improving excellence / most effective use of limited funds	3	Simple reference to cost issue = 1 mark allow reverse argument allow not enough specialists to go into every hospital
			Total	7	

Question	Gd	Expected Answers	Marks	Rationale
4	a	He/she wants to work out what her chances of survival are / whether it is worth the risk of carrying out the operation / owtte (1)	1	
	b	named drug therapy encountered on the course e.g. chemotherapy (1) description of what it does e.g which kills cancer/dividing cells (1)	2	look for any example for one mark and a description of what it does for the second mark allow antibiotics If painkiller used must be named reject radiotherapy ignore marijuana/herbal remedies
	c	raise awareness (1) reducing the number of people who go on to require treatment (1) therefore more funds available to treat other conditions, pay doctors or purchase drugs (1)	3	
Total			6	

5		limited budget /OWTTE(1) drug very expensive (1) money saved used to target resources where going to have the most effect/ the money saved by not prescribing the drugs during the early stages can be spent on caring for people with the advanced cases where they may need full time supervision/Alzheimer's is a prolonged disease so would be too expensive over many years but can afford later treatment (1)	3	allow personalised argument but looking for the link between limited funds and balancing decisions based on the best solution for all rather for the individual. allow limited budget being clearly implied
Total			3	

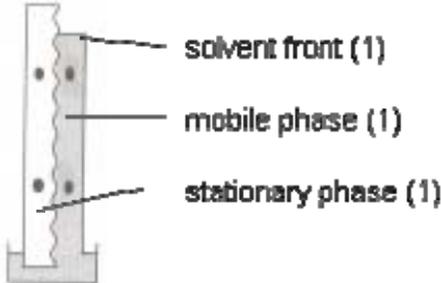
Section total			36	
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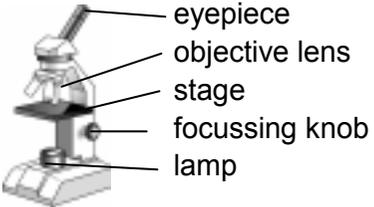
A325/01 Scientific Detection - Foundation

Question		Gd	Expected Answers	Marks	Rationale
1	a		any three reasonable differences e.g.: A has 6 legs – B has 8 legs / A has wings – B has no wings / A has antennae – B has no antennae / A has one pair of legs longer – B has legs all same / A is segmented – B is not segmented / A larger – B smaller	3	<p>Must correctly refer to A or B either by letter or name.</p> <p>Accept one half of the argument if the difference is clear e.g. A is larger. If quantified then it must be accurate ie A is more than twice the size of B. Reject A is twice the size OR A is 1cm and B is 0.5 cm</p> <p>Accept B has more legs OR A has wings or has antennae</p> <p>Reject if difference is not clear e.g. A is large.</p> <p>Reject if it is not clear which is being referred to.</p> <p>Ignore reference to eyes or pincers or flying</p> <p>Reject B has longer legs</p> <p>A good way of marking this to accept correct answers that could be used in a dichotomous key</p>
	b		2.2 - 3 (1) 1 (1)	2	
	c		any two from: written or chart or table or tape recording / photograph or scan / video or film	2	
			Total	7	

Question	Gd	Expected Answers	Marks	Rationale
2		across: 1 proficiency (1) 3 accreditation (1) 4 reliable (1) down: 1 procedures (1) 2 safety (1)	5	Ignore spelling Care with 2 down – do not accept danger
		Total	5	

3	a	i		to get a closer match (1)	1	Candidates can answer by either choosing from the list or writing in their own words for each item in part (a). Ignore to make more accurate / fair test Ignore bigger range
		ii		to mix the solution (1)	1	Ignore cleaning or to get it all out the pipette
		iii		might not be an exact match (1)	1	Accept may be between two colours. Ignore need more concentrations OR difficult to judge colours.
		iv		same every time / can be replicated (1)	1	Accept makes it more reliable
	b	i		accurate - used correctly in the answer (1)	1	e.g so the result was more accurate. Accept accurate Reject if the science is wrong If two or more of the words used then score is zero.
		ii		quantitative (1)	1	
				Total	6	

Question	Gd	Expected Answers	Marks	Rationale
4 a		 <p>solvent front (1) mobile phase (1) stationary phase (1)</p>	3	<p>Reject if label lines from mobile phase or stationary phase touch black dots Reject if stationary phase label line stops at interface. Reject if continuation of label lines for mobile and stationary phase would hit a black dot.</p> <p>Mobile phase label must be above water level</p>
b		arrow crossing boundary between stationary and mobile phase (1)	1	<p>Arrow must go through boundary between the two phases BUT not out into the air Allow arrow pointing to left or right across interface or vertical with repeated crossings</p>
c		<p>are different (substances) (1)</p> <p>(X and Y) have different (Rf) / one is high / one moves faster / different levels (1)</p>	2	<p>First mark for saying they are different. Second mark for how you can tell they are different substances</p> <p>Accept reverse argument Ignore they do not match Ignore reference to colour or darkness If named X or Y they must be the correct way round</p>
		Total	6	

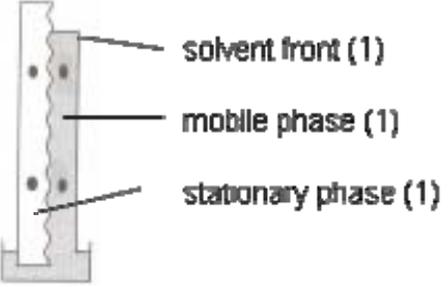
Question		Gd	Expected Answers	Marks	Rationale
5	a		 <p>eyepiece objective lens stage focussing knob lamp</p>	3	5 correct (3) 4 correct (2) 3 correct (1) Reject stage label if line goes to clip
	b		Any 3 from... eye piece - the part you look through (1) focussing - adjust the image... (1) lamp – lights up... (1) objective lens – selected to change the mag (1) stage – supports the slide (1)	3	5 correct (3) 4 correct (2) 3 correct (1) If two or more lines from 'part' box then that line does not score
			Total	6	

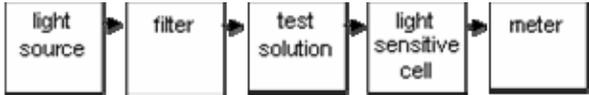
Question		Gd	Expected Answers	Marks	Rationale
6	a		paper – uses a liquid solvent (1) electrophoresis – can be used on small biological samples (1) gas – the sample is heated (1)	3	
	b		paternity testing / identifies or finds out who father is (1) – saliva or blood (1) crime scene / identify or find out who victim or criminal is (1) – blood / saliva / semen / hair / skin (1) pedigree testing / identifies variety (1) – blood / semen (1) food testing / identifies unwanted products (1) – test ingredients or sample (1) screening for genetic disorders (1) – blood / cvs / amniocentesis (1)	3	Max of two marks per category Ignore to see what blood group they are OR to catch / find criminals. It must be a specific example Ignore fingerprints Accept just blood or saliva or skin etc for 1 mark
			Total	6	
			Section total	36	

A325/02 Scientific Detection - Higher

Question	Gd	Expected Answers	Marks	Rationale							
1	a	i		90.3 (1)	1	Accept 90					
		ii		any error in measurement (1) is multiplied calculating area (1)	2						
	b	i		0.8 (1) (0.8) <u>g</u> (1)	2	Ignore 2 nd d.p. for first mark Second mark is for 2 nd d.p. only					
		ii		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>D</td> <td>B</td> <td>C</td> <td>E</td> <td>A</td> </tr> </table> B before C (1) C before E (1) E before A (1)	D	B	C	E	A	3	
D	B	C	E	A							
			Total		8						

2	a	i		to get a closer match (1)	1	Candidates can answer by either choosing from the list or writing in their own words for each item in part (a). Ignore to make more accurate / fair test Ignore bigger range
		ii		to mix the solution (1)	1	Ignore cleaning or to get it all out the pipette
		iii		might not be an exact match (1)	1	Accept may be between two colours. Ignore need more concentrations OR difficult to judge colours.
		iv		same every time / can be replicated (1)	1	Accept makes it more reliable
	b	i		accurate - used correctly in the answer (1)	1	e.g so the result was more accurate. Accept accurate Reject if the science is wrong If two or more of the words used then score is zero.
		ii		quantitative (1)	1	
			Total		6	

Question	Gd	Expected Answers	Marks	Rationale
3		across: 1 proficiency 3 accreditation 4 reliable down: 1 procedures 2 safety	3	5 correct = 3 marks 4 or 3 correct = 2 marks 1 or 2 correct = 1 mark Accept wrong spellings if clearly identifies correct word Accept words written outside grid provided they are clearly linked to appropriate clue e.g. in spaces in clues below
		Total	3	
4	a		3	Reject if label lines from mobile phase or stationary phase touch black dots Reject if stationary phase label line stops at interface. Reject if continuation of label lines for mobile and stationary phase would hit a black dot. Mobile phase label must be above water level
	b	arrow crossing boundary between stationary and mobile phase (1)	1	Arrow must go through boundary between the two phases BUT not out into the air Allow arrow pointing to left or right across interface or vertical with repeated crossings
	c	are different (substances) (1) X and Y have different (Rf) / X moves slower / different levels (1)	2	First mark for saying they are different. Second mark for how you can tell they are different substances Accept reverse argument Ignore they do not match Ignore reference to colour or darkness If named X or Y they must be the correct way round
		Total	6	

Question	Gd	Expected Answers	Marks	Rationale		
5	a	 <p>Filter before test solution (1) Test solution before light sensitive cell (1) Light sensitive cell before meter (1)</p>	3			
	b	sets to zero (1) idea of accurate reading (1)	2	Mark the 2 reasons independently Ignore 'standard) reference' Do not allow first mark if response states 'clear substances do not absorb light'		
	c	i		<p>scales correct on both axes (1)</p> <p>plots correct (1)</p> <p>line of best fit correct (1)</p>	3	<p>Scales must be linear and match labels on axes Allow scales that do not start at 0 on either axis provided student indicates this Values on axes must match those in the table e.g. '10, 20 30 etc' is not acceptable for absorbance axis</p> <p>Points should be correct to within half a square. Do not award mark for plotting if non-linear scale used.</p> <p>Line does not need to pass through the origin Mark consequentially to points plotted e.g. allow line from points plotted on non-linear scales Line must be straight unless mis-plotted point(s) give a smooth curve. Multiple lines do not score.</p>
		ii		<p>Horizontal line at 0.24 (1) reading correct (1)</p>	2	<p>Mark consequentially to any graph drawn. Second mark – value given (to 2 d.p.) should correspond to where their horizontal line (or to horizontal value of 0.24 if no horizontal line drawn) meets the graph. Allow 0.3 for 0.30 only. Tolerance of half a square.</p>

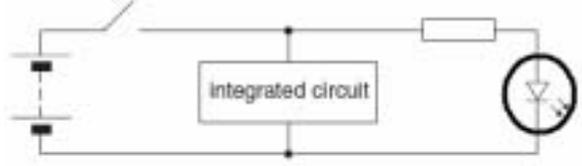
Question	Gd	Expected Answers	Marks	Rationale
d			3	One mark for each correct link More than one link from the same description scores 0 for that description Allow correct missing words written in spaces in the description boxes
Total			13	
Section total			36	

A326/01 Communications - Foundation

Question	Gd	Expected Answers	Marks	Rationale
1	a		4	5 correct lines (4) 3 or 4 correct lines (3) 2 correct lines (2) 1 correct lines (1) lines do not have to be straight
	b	800 kHz (1)	1	
	c	i	1	allow sparks / electrocution / electric(icity) reject hazard / danger
		ii	1	allow turn off the device / turn off the power / don't touch / get a qualified professional to do it ... reject safety spectacles
	d	i	1	
		ii	2	C anywhere before A (1) A anywhere before B (1) remember C apacitors A lways B low
Total			10	

Question			Gd	Expected Answers	Marks	Rationale
2	a	i		infrared light (1)	1	
		ii		any two from: high data rates or speed / low noise or interference / light or small / cheap / long distance	2	reject all references to security of data accept clearer / better quality / less distortion (signal)
	b	i		any system which transmits information from one device to another along wires e.g. intercom / baby alarm / railway signal / morse (telegraph) / telephone / intranet / ethernet (1)	1	reject computer / walkie-talkies / internet / power supply
		ii		any two reasons from: cheap / secure / easy to connect / easy to repair / easy (technology)	2	allow two reasons for [1] each allow one reason [1] with a justification [1]
				Total	6	

3	a				3	first block scanner (1) encoder anywhere before decoder (1) last block printer (1) accept any clear and unambiguous response
	b	i		any of the following: (1) online shopping / police communications / cash machine / internet banking / armed forces radio / mobile phone	1	allow named example of internet commerce e.g. eBay allow internet / email
		ii		anything which shows understanding of the term security: (1) e.g. identity theft / theft / eavesdropping	1	reject responses which appear to be about compression
	c			any device whose sole function is to store digital data (1) e.g. USB stick / floppy disk / CD / flash card / memory stick / minidisc / DVD / pen drive / memory card (1)	1	allow ipod / mp3 player / mobile phone / digital camera / USB reject hard drive / USB cable / camera / telephone / playstation / computer
				Total	6	

Question	Gd	Expected Answers	Marks	Rationale
4	a		1	reject any ring which goes through more components than LED accept any clear and unambiguous response
	b	any of the following, [1] each: <ul style="list-style-type: none"> • cheaper - no need to buy batteries • doesn't run out of power / more reliable • no need to recharge batteries 	2	reject more power / amps / volts
Total			3	

5	a	i	A (1)	1	accept any clear and unambiguous response
		ii	less noise / better quality / clearer / no hiss / no interference (1)	1	reject sounds better allow no distortion
		ii	can be encrypted / can be edited / can be compressed / easy to store / easy to copy / easy to transmit / takes up less room / easy to access / easy to organise (1)	1	allow clearer signal etc. if not already given in 5aii allow can be downloaded / shared easily reject unqualified easy
	b	i	12 x 42 000 (1)	1	accept 504 000 divided by 12 = 42 000 accept 504 000 divided by 42 000 = 12 accept digital sample × sample rate = ...
		ii	(504 000 x 15 =) 7 560 000 (1)	1	
		iii	divide by 8 (1)	1	accept 945 000 bytes
Total			6		

Question	Gd	Expected Answers	Marks	Rationale
6	a	microphones, cameras as inputs, any order (1) transmitters anywhere before satellite (1) 	2	accept any clear and unambiguous response
	b	any two from: control or select sound / control or select pictures / instruct cameramen / instruct commentators / add (sub)titles / censor content / control or select final output signal.	2	accept actions by human beings reject automated functions
	c	dish (1)	1	accept any clear and unambiguous response
		Total	5	
		Section total	36	

A326/02 Communications - Higher

Question			Gd	Expected Answers	Marks	Rationale
1	a	i		A (1)	1	accept any clear and unambiguous response
		ii		less noise / better quality / clearer / no hiss / no interference (1)	1	reject sounds better allow no distortion
		ii		can be encrypted / can be edited / can be compressed / easy to store / easy to copy / easy to transmit / takes up less room / easy to access / easy to organise (1)	1	allow clearer signal etc. if not already given in 5aii allow can be downloaded / shared easily reject unqualified easy
	b	i		12 x 42 000 (1)	1	accept 504 000 divided by 12 = 42 000 accept 504 000 divided by 42 000 = 12 accept digital sample × sample rate = ...
		ii		(504 000 x 15 =) 7 560 000 (1)	1	
		iii		divide by 8 (1)	1	accept 945 000 bytes
				Total	6	

2	a	i		4 V (1)	1	
		ii		period = $8 \times 0.005 = 0.04$ s ecf period: frequency = $1/0.04 = 25$ Hz	2	25 Hz worth (2) 200 Hz / 50 Hz worth (1)
	b	i		increase amplitude / voltage / power / current (1) of modulated carrier / signal at input (1)	2	allow boosts signal for [1] reject amplifies signal
		ii		use voltage / current (1) to make (radio) waves (1)	2	allow "signal from amplifier" instead of voltage / current
				Total	7	

Question			Gd	Expected Answers	Marks	Rationale
3	a	i		voltages add in a series circuit (1)	1	allow $6 - 2 = 4$
		ii		$I = 4 / 80$ $I = 0.05 \text{ A}$	2	0.05 A for (2) 0.025 / 0.03 A for (1) 0.075 / 0.08 A for (1)
	b			integrated circuit needs power / current (1) this current will also go through switch (1)	2	
Total					5	

4	a			scanner / reader / owtte (1) (optical) fibre (1) printer / owtte (1)	3	reject first fax machine reject second fax machine
	b			any three from: convert information on document into electronic (or electrical) form / compress information / output as pulses / of infrared or light / as a digital signal	3	allow wtte
	c			any two from: higher data transmission rate / less interference / less noise / less space / lighter	2	allow either two reasons OR one reason plus justification reject cheaper / safer / long distance allow faster / quicker
Total					8	

Question	Gd	Expected Answers	Marks	Rationale		
5	a	i		idea of encryption (1) consequence of no encryption (1) e.g. information can't be read by third party who might get money out of Matt's account	2	
		ii		compression reduces size of file / removes redundant information (1) less storage required / faster transmission (1)	2	
	b			economies of scale (1)	1	look for reason why electronic components are cheaper. allow can update program without changing machine (owtte)
				Total	5	

6	a			microphones, cameras as inputs, any order (1) transmitters anywhere before satellite (1) <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px;">microphones</div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; padding: 2px;">transmitter</div> <div style="border: 1px solid black; padding: 2px;">satellite</div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> <div style="margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px;">cameras</div> </div>	2	accept any clear and unambiguous response
	b			any two from: control or select sound / control or select pictures / instruct cameramen / instruct commentators / add (sub)titles / censor content / control or select final output signal.	2	accept actions by human beings reject automated functions
	c			dish (1)	1	accept any clear and unambiguous response
				Total	5	

				Paper total	36	
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A334/01 Agriculture and Food - Foundation

Question	Gd	Expected Answers	Marks	Rationale															
1	a	<table border="1"> <tr> <td></td> <td>gathered</td> <td>organism</td> </tr> <tr> <td>cheese</td> <td>✓</td> <td></td> </tr> <tr> <td>handbag</td> <td></td> <td>✓</td> </tr> <tr> <td>milk</td> <td>✓</td> <td></td> </tr> <tr> <td>shoes</td> <td></td> <td>✓</td> </tr> </table>		gathered	organism	cheese	✓		handbag		✓	milk	✓		shoes		✓	2	Ignore tick in butter line 3,4 correct (2) 1,2 correct (1)
	gathered	organism																	
cheese	✓																		
handbag		✓																	
milk	✓																		
shoes		✓																	
	b	yoghurt / cream / beef / offal / tripe / glue / manure / gelatine (1)	1	allow leather/meat reject coats/clothes/shoes															
Total			3																

2	a	i	high milk yield / reference to quantity of milk (1)	1	allow any useful characteristic e.g. fast growth reject good milk/ healthy
		ii	from cow with high milk yield (1)	1	allow any useful characteristic e.g. fast growing/ high sperm count
	b	i	use selected bull; sperm/semen (in pipette) ; if sperm mark correct continue to award inserted or put ; into cervix or uterus	3	
		ii	can select bull / timing correct for cow to conceive / timing correct for birth time / select characteristic / no need to keep a bull / allows a single bull to fertilise more cows / greater chance of success/ bull will not harm cow / can store semen for later use(1)	1	reject its quick/ easy
Total				6	

Question	Gd	Expected Answers	Marks	Rationale	
3	a	20 (1)	1		
	b	weight / mass / volume (1)	1	reject number/count them	
	c	i	humidity (1) temperature (1)	2	allow light / (soil) water / wind/ carbon dioxide
		ii	glucose (1) oxygen (1)	2	in any order allow sugar for glucose
		iii	light/ sun (1) minerals / named minerals/fertilisers/ nutrients/ manure (1)	2	
	d	any two from: unsightly / initial cost of tunnels / limited life / problems with disposal or recycling/ hard to clean/ plants need watering	2	Reject diseases easily spread / gets too hot / damaged easily/ organic	
		Total	10		

4	a	bacteria / fungi / viruses (1)	1	Accept mould/ yeast/ named example								
	b	carbon dioxide (1) aerobic (1) oxygen (1)	3									
	c	reduces synthetic fertilisers <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1) improves water quality <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr></table> (1) reduces use of pesticides <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr></table> (1)	✓				✓		✓		3	All ticked = 0 For every extra box ticked deduct one mark from total, no minus marks
✓												
✓												
✓												
		Total	7									

Question		Gd	Expected Answers	Marks	Rationale
	ii		greater demand than supply = 2 marks or any two from: fewer eggs produced / because small scale egg collection / greater demand/ higher quality/ can charge more/ more expensive to produce/ because more land needed	2	Accept reverse argument , Sami has more chickens in a small space so more eggs are produced cheaply Accept tastier as higher quality Reject organic / healthier
	c		eggs are of a certain standard / quality owtte (1)	1	Reject safe to eat/suitable for sale/organic/ fresh/ good/approved
	d		any two from: advertising / research / finding new markets / promoting egg eating/ gives advice or technical support to farmers	2	
			Total	10	
			Section total	36	

Question	Gd	Expected Answers	Marks	Rationale
	ii	greater demand than supply = 2 marks or any two from: fewer eggs produced / because small scale egg collection / greater demand/ higher quality/ can charge more/ more expensive to produce/ because more land required	2	Accept tastier for higher quality
	c	eggs are of a certain standard / quality owtte (1)	1	Reject safe to eat suitable for sale/ organic quality/ fresh/ good/approved
	d	any two from: advertising / research / finding new markets / promoting egg eating/ gives advice or technical support to farmers	2	
		Total	10	

2	a	i	prevent contamination / stop other microorganisms growing /no bacteria present/ ensure cheese is made (1)	1	reject reference to germs/ to kill bacteria
		ii	decrease / become less than 7 / become acidic (1)	1	
		iii	other microorganisms / bacteria / fungi / cannot grow / reproduce / prevent cheese production (1)	1	
	b		any four from: DNA or piece of chromosome or gene is the genetic material / DNA cut out of calf cell chromosomes / DNA inserted into <u>genetic material</u> of yeast cell / transferred DNA functions and produces appropriate protein / which is the enzyme chymosin / grow cells in fermenter	4	allow specific references to enzymes cutting and rejoining genetic material
	c		yeast not eaten/ not in product/ enzyme not genetically modified (1)	1	

Question	Gd	Expected Answers	Marks	Rationale
	d	a greater demand can charge more / a low demand will cause price cut owtte (1)	1	
Total			9	

3	a	1350 (1)	1	
	b	faster rate of photosynthesis makes more food (1) so faster growth/and more fruit production (1)	2	Accept reverse argument
	c	i	rate of photosynthesis increases as light intensity increases (1) then rate levels out (1)	2
		ii	Similar graph drawn starting at origin then continuing to the left of original or continuing and extending above original (1) Graph levels off above original (1)	2
	d	carbon dioxide / light intensity /water(1)	1	
Total			8	

Question		Gd	Expected Answers	Marks	Rationale
4	a		Chemicals used... hormones/oestrogen; Organs affected....ovaries; Body cycle... oestrous or menstrual cycle	3	Accept timing of egg release
	b		any two from: to ensure fertile time not missed / control time of birth / to prepare shelter or book vet/ to avoid bad weather/ meet contract to supply	2	allow two reasons or one reason plus explanation reject successful
	c	i	from selected bull; sperm or semen (in pipette) ; continue to award if sperm / semen mentioned, inserted or put ; into cervix or uterus	3	If IVF described award maximum of two correct points
		ii	can select bull / timing correct for cow to conceive / timing correct for birth time /can select characteristics/no need to keep a bull / greater chance of success/ allows a single bulls to fertilise more cows/ can store semen for later use (1)	1	
			Total	9	
			Section total	36	

A335/01 Harnessing Chemicals - Foundation

Question	Gd	Expected Answers	Marks	Rationale
1	a	E (1)	1	
	b	D (1)	1	allow 'burette'
	c	C (1)	1	allow 'funnel'
		Total	3	

2	a		3	6 correct (3) 4 or 5 correct (2) 2 or 3 correct (1) Note two lines are already drawn for the candidates
	b	e = milk / salad dressing / oil and water / foundation (1) s = milk of magnesia / paint / tippex (1)	2	allow any correct answer eg for emulsions body lotion, cream, butter, margarine, ice cream, salad cream, moisturising cream, sun cream eg for suspensions tomato puree, hot chocolate, toothpaste, sun screen
		Total	5	

3	a	catalyst (1)	1		
	b	i	(sodium) carbonate (+ acid) → salt + water + carbon dioxide in any order	2	LHSide (1) RHSide (1) If formulae used they must be correct
		ii	the fizzing stops (1)	1	
	c	A (1)	1		

Question	Gd	Expected Answers	Marks	Rationale
d		fine (1)	1	allow 'speciality'
e		consumer protection / safety comment owtte (1) to check that it is effective owtte /make sure that it works/ make sure that composition is correct owtte/ (1)	2	allow 'pen may be chewed or put in mouth' / to check it is not poisonous or harmful ignore reference to smell
Total			8	

4	a	hydrogen (1) nitrogen (1)	2	allow in either order allow 'H', 'H ₂ ', 'N' or 'N ₂ ' correct symbols only
	b	i	recycled / fed back into the reactor (1)	1 must imply that they go back into the reactor eg back to the beginning, back to the start reject reused
		ii	idea of operates 24 hours a day/ non stop/ keeps on going (1) idea of reactants constantly fed in and products constantly taken out owtte/ don't have to stop for cleaning owtte (1)	2
	c		a lower temperature <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> a high pressure <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	2
	d	i	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1

Question	Gd	Expected Answers	Marks	Rationale
	ii	HSE / Health and Safety Executive (1)	1	
e		5 (1)	1	
		Total	10	

5	a	<table border="1"> <tr> <td>(E)</td> <td>A</td> <td>D</td> <td>B</td> <td>F</td> <td>C</td> </tr> </table> <p>A anywhere before D (1) D anywhere before B (1) B anywhere before F (1) F anywhere before C (1)</p>	(E)	A	D	B	F	C	4	
(E)	A	D	B	F	C					
	b	use funnel (1) pour solution down a glass rod (1)	2	ignore use a pipette ignore filter reject burette accept correct diagram						
	c	potassium chloride	1	allow KCl – must be capital K and C and lowercase l						
	d	idea of contains / dissolved in water	1	allow water based/ contains water/water is the solvent/has water in it / water solution ignore liquid reject water on its own reject water substance						
	e	$1000 \text{ cm}^3 = 1 \text{ litre}/100 \text{ cm}^3 = 0.1 \text{ litre}/1.5 \times 10(1)$ $= 15 \text{ (g/l) (1)}$	2	correct answer scores two marks						
		Total	10							

		Section total	36	
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A335/02 Harnessing Chemicals - Higher

Question		Gd	Expected Answers	Marks	Rationale
1	a		catalyst	1	
	b		carbon dioxide	1	allow CO ₂ symbols must be in capital letters reject CO ₂ , CO ² , carbon oxide and carbon monoxide
	c	i	pentanol + <u>pentanoic acid</u> → (1) <u>pentyl pentanoate</u> + water (1)	2	allow <u>pentanoic acid</u> + pentanol allow water + <u>pentyl pentanoate</u>
		ii	OH / COH / ROH	1	reject C accept OH group circled on the diagram of C
		iii	(5 x 12) + (10 x 1) + (2 x 16) (1) = 102 (1)	2	2 marks for correct answer award 1 mark if they make an error in their counting of Hs but know to multiply number of atoms by the A _r and then correctly sum up the values
	d	i	<u>made / manufactured / produced</u> in small amounts / on a small scale	1	
		ii	advantage: simpler equipment can be used / low capital cost / equipment can be used to make another chemical if demand is low (1) disadvantage: high labour cost / lower productivity (1)	2	allow contamination will affect less of the chemical made (owtte) ignore cheaper (owtte) allow slower (owtte) ignore waste / pollution
			Total	10	

Question			Gd	Expected Answers	Marks	Rationale
2	a	i		suspension	1	
		ii		lo-salt / vitamin tablets / pain killer tablets / sherbet / <u>packet</u> cake mix (1)	1	allow any valid answer – must be <u>dry</u>
	b			to <u>stop</u> (owtte) separation (1) into two layers (1) or maintain emulsion of two chemicals which do not mix (2)	2	
				Total	4	

3	a			<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>(E)</td> <td>A</td> <td>D</td> <td>B</td> <td>F</td> <td>C</td> </tr> </table> A anywhere before D (1) D anywhere before B (1) B anywhere before F (1) F anywhere before C (1)	(E)	A	D	B	F	C	4	
(E)	A	D	B	F	C							
	b			use funnel (1) pour solution down a glass rod / stirring rod (1)	2	ignore use a pipette ignore filter reject burette accept correct diagram						
	c			potassium chloride	1	allow KCl – must be capital K and C and lowercase l						
	d			$1000 \text{ cm}^3 = 1 \text{ litre}/100 \text{ cm}^3 = 0.1 \text{ litre}/1.5 \times 10$ (1) $= 15 \text{ (g/l)}$ (1)	2	correct answer scores two marks						
				Total	9							

Question		Gd	Expected Answers	Marks	Rationale
4	a		$\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3 \text{ (1)}$ $\text{N}_2 + \underline{3}\text{H}_2 \rightarrow \underline{2}\text{NH}_3 \text{ (1)}$	2	formulae must be copied correctly allow = or \rightleftharpoons instead of \rightarrow ignore state symbols
	b	i	<u>natural gas</u> will run out / finite supply (1) <u>natural gas</u> is a non-renewable source (1)	2	reject any reference to 'cannot be used again' accept not replaceable
		ii	recycled / fed back into the reactor	1	must imply that they go back into the reactor reject reused
	c	i	high / higher / more pressure (1) low / lower temperatures (1)	2	accept 400 atmospheres accept 350 °C ignore 350°C and 450°C
		ii	$5000 \div 40 \text{ (x 100) (1)}$ $= 12\,500 \text{ (g) (1)}$	2	correct answer scores two marks
	d		HSE / Health and Safety Executive (1)	1	reject any alternative answers
	e	i	HNO ₃	1	all letters must be capitals reject HNO ³ , HNO3
		ii	Na ₂ CO ₃ (1) Pb(NO ₃) ₂ (1)	2	
			Total	13	
			Section total	36	

A336/01 Materials and Performance - Foundation

Question	Gd	Expected Answers	Marks	Rationale
1	a	transparent (1) malleable (1) ductile (1) stiff (1)	4	
	b	elastic (1) plastic (1)	2	
Total			6	

2	a	stamps will appear as the wrong colour / owtte (1)	1	allow stamps slightly green / things will look green/ only able to see green / colours hard to see / wants to see the different colours / changes the colour reject stamps not clear / blurred / shape altered / size altered / personal preference e.g. does not like green / it is green	
	b	enlarged (1)	1	Allow indication by circle or underline on list of words. Allow if correct word completing sentence but different word indicated on list. Reject if wrong word completing sentence but correct word indicated on list. Reject if no answer and more than one word indicated on list.	
	c	i	converging (1)	1	Allow underline or other unambiguous indication.
		ii	refraction (1) conduction evaluation expansion refraction ✓	1	Mark all four boxes. Any error scores zero. Allow cross or other unambiguous indication.
Total			4		

Question	Gd	Expected Answers	Marks	Rationale
3	a		4	<p>Reject two lines starting from same box in left column. Allow two lines arriving at same box in right column</p>
	b	i	1	<p>Allow titanium alloy is circled in the table. Allow titanium Reject value form table, e.g. 15000</p>
		ii	2	<p>Allow tougher, stronger, expands less Reject unqualified values e.g. because it is 15000; because it is 9. Reject answers which lack any comparison. Reject best or better unless qualified</p>

Question		Gd	Expected Answers	Marks	Rationale
	c	i	B (1)	1	Allow B indicated unambiguously on diagram.
		ii	strength / hardness / thermal expansion / corrosion resistance/ melting point improved (1)	1	Ignore cheaper, safer, lighter, rust Reject 'properties improved' without mention of specific property/ properties. Allow improvement in other relevant physical property. Reject answers which confuse an alloy with a composite
			Total	9	

4	a	i	(To ensure) any two from: safety quality / fit for purpose / standard if qualified consistency	2	Reject: ideas based only on specific properties of duvets e.g. to make sure the duvets are warm enough Allow ideas based on general properties of duvets, e.g. so the duvets are the right quality/ safe/ of the same standard Allow high standard Reject answers which suggest that every item sold is tested. Reject answers based on customer rather than product. Reject answers based on selling more
		ii	so tests are done in the same way (1)	1	Reject answers based on 'fair testing' Reject so the test is done properly Reject so same test on all products Reject to find fault on individual items Allow so the test is done safely Allow so it does not matter which person does the tests Allow so it does not matter where the tests are done
		iii	BS/ BSI / CE (1)	1	Allow National Tennis Federation, British kitemark, European Committee, FSA, British Standards Reject ISO
		iv	building control surveyor / named inspection responsibility e.g. hygiene inspector (1)	1	allow any government or any human performance assessor allow word officer instead of inspector reject builders/ tradesmen/ sales outlets / health and safety reject trading/products standards officer/inspector allow health and safety officer/inspector reject 'health and safety'

Question	Gd	Expected Answers	Marks	Rationale	
	b	i	11.4 (1)	1	
		ii	(average) value is less than 12 (1)	1	allow ecf from 4bi reject answers that lack comparison with <u>12</u> eg 'because it is 11.4' reject 'because it is less than 13' 'because it is less than it should be' 'because it is not 12'
Total			7		

5	a		decibels (1)	1	Allow decibels underlined or circled in list							
	b		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 2px;">threshold of pain</td> <td rowspan="3" style="padding: 0 10px;">}</td> <td style="padding: 2px;">60 dB</td> </tr> <tr> <td style="padding: 2px;">temp hearing loss</td> <td style="padding: 2px;">85 dB</td> </tr> <tr> <td style="padding: 2px;">normal conversation</td> <td style="padding: 2px;">130 dB</td> </tr> </table>	threshold of pain	}	60 dB	temp hearing loss	85 dB	normal conversation	130 dB	2	Reject two lines starting from same box in left column. Allow two lines arriving at same box in right column.
threshold of pain	}	60 dB										
temp hearing loss		85 dB										
normal conversation		130 dB										
	c		twice as loud (1)	1	Allow ten times as loud							
	d		material (1) reflects / absorbs as appropriate (1)	2	Allow building materials that we buy as individual objects eg acoustic tiles, soundproof tiles, breeze blocks, bricks, carpets, curtains, named type of insulation, concrete blocks Allow description of how a material absorbs sound e.g. reduces stops/ reduces vibrations/ sound waves Reject stops/ reduces sound/ noise Allow double glazing (1) absorbs sound in the gap (1) Reject 'soundproofing' for material							

Question		Gd	Expected Answers	Marks	Rationale
	e	i	<p>bigger vibration produces louder sound (1)</p> <p>due to response of ear / perception depends on frequency (2)</p>	2	<p>Allow smaller vibration quieter sound</p> <p>Reject louder / more/ higher / stronger / a lot of vibrations</p> <p>allow two marks for one reason fully developed / resonant frequency of ear/ sight of 2000 Hz / sensitivity / how ear processes sound</p>
		ii	<p>material which absorbs mechanical vibrations / springs / dampers in gap (1)</p> <p>separation from material transmitting vibrations (1)</p>	2	<p>For example, machinery mounted on springs, floor supported with fluid-filled dampers</p> <p>reject put on a shelf</p> <p>reject wrap it up</p> <p>reject shielding</p>
			Total	10	
			Section total	36	

A336/02 Materials and Performance - Higher

Question	Gd	Expected Answers	Marks	Rationale
1	a	twice as loud (1)	1	Allow ten times as loud
	b	material (1) reflects / absorbs as appropriate (1)	2	Allow building materials that we buy as individual objects eg acoustic tiles, soundproof tiles, breeze blocks, bricks, carpets, curtains, named type of insulation, concrete blocks Allow description of how a material absorbs sound e.g. reduces stops/ reduces vibrations/ sound waves Reject stops/ reduces sound/ noise Allow double glazing (1) absorbs sound in the gap (1) Reject 'soundproofing' for material
	c	i	2	Allow smaller vibration quieter sound Reject louder / more/ higher / stronger / a lot of vibrations allow two marks for one reason fully developed / resonant frequency of ear/ sight of 2000 Hz / sensitivity / how ear processes sound
		ii	2	For example, machinery mounted on springs, floor supported with fluid-filled dampers reject put on a shelf reject wrap it up reject shielding
		Total	7	

Question			Gd	Expected Answers	Marks	Rationale
2	a	i		(To ensure) any two from: safety quality / fit for purpose / standard if qualified consistency	2	Reject: ideas based only on specific properties of duvets e.g. to make sure the duvets are warm enough Allow ideas based on general properties of duvets, e.g. so the duvets are the right quality/ safe/ of the same standard Allow high standard/right materials Reject answers which suggest that every item sold is tested. Reject answers based on customer rather than product. Reject answers based on selling more
		ii		so tests are done in the same way (1)	1	Reject answers based on 'fair testing' Reject so the test is done properly Reject so same test on all products Reject to find fault on individual items Allow so the test is done safely Allow so it does not matter which person does the tests Allow so it does not matter where the tests are done
		iii		BS/ BSI / CE (1)	1	Allow National Tennis Federation, British kitemark, European Committee, FSA, British Standards Reject ISO
		iv		building control surveyor / named inspection responsibility e.g. hygiene inspector (1)	1	allow any government or any human performance assessor allow word officer instead of inspector allow health and safety officer reject builders/ tradesmen/ sales outlets / health and safety reject trading/products standards officer/inspector
	b			substitution (9.0 x) 9.0/6.0 (1) evaluation to 13.5	2	13.5 alone gets 2 marks
				Total	7	

Question	Gd	Expected Answers	Marks	Rationale
3	a	substitution ($G=$) 0.6 / 12 (1) 0.05 (S) (1)	2	0.05 alone gets 2 marks
	b	Diagram to show: power supply/battery/power pack connected to cable (1) ammeter in series with full length of cable (1) voltmeter in parallel with full length of cable (1)	3	For the last two marks the position of the cable must be indicated either on the diagram or in the text. Accept sample/wire etc if clearly referring to cable. Use text to clarify any uncertainties in diagram. Allow non standard symbols if unambiguous. Allow correct symbol without label. Ignore descriptions of method of calculation
Total			5	

4	a	Decreased force clearly linked to increased time (1) because same change in momentum/speed (1)	2					
	b	i	direction (of movement) (1)	1	If list given score zero.			
		ii	1165 x 30 (1) 34 950 (1) ora	2	34 950 alone gets 2 marks Allow 34 900 allow 33 000 for one mark			
		iii	use momentum = force x time (in words, symbols or numbers) (1) rearrange (1) evaluate to 8737.5 (N) or ecf (1)	3	Correct answer alone gets 3 marks. allow 8750 for calculation from given approximation allow 8737/8738 or correct to 2 sig figs. ecf from 33 000 gives 8250			
		iv	same direction as braking force <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)	✓			1	
✓								
Total			9					

Grade Thresholds

General Certificate of Secondary Education
 Additional Applied Science (Specification Code J632)
 June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A324/01	Raw	36	n/a	n/a	n/a	27	24	21	18	15	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A324/02	Raw	36	30	26	22	18	14	12	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A325/01	Raw	36	n/a	n/a	n/a	23	20	17	14	11	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A325/02	Raw	36	31	26	21	16	11	8	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A326/01	Raw	36	n/a	n/a	n/a	21	18	15	13	11	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A326/02	Raw	36	27	22	17	12	9	7	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A334/01	Raw	36	n/a	n/a	n/a	23	19	15	12	9	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A334/02	Raw	36	29	24	19	15	11	9	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A335/01	Raw	36	n/a	n/a	n/a	21	18	16	14	12	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A335/02	Raw	36	30	24	18	13	10	8	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A336/01	Raw	36	n/a	n/a	n/a	22	19	16	14	12	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A336/02	Raw	36	27	21	15	10	7	5	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A337	Raw	96	88	80	71	62	51	40	30	20	0
	UMS	150	135	120	105	90	75	60	45	30	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J632	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J632	0.0	0.8	7.8	34.0	65.8	86.1	95.4	99.1	100	31405

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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