Version 4.0

General Certificate of Secondary Education

Additional Applied Science 4863

AASC/2H Science at Work

Mark Scheme

2009 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.

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Higher / 2H

question	answers	extra information	marks
1(a)(i) E	$\frac{540}{2000} \times 100 =$ or $\frac{2249}{8400} \times 100 =$ 27% *or* *26.7738*	 ***1*** *mark for working* ***2*** *marks for correct answer* *Accept 26.7 / 26.8*	2
1(a)(ii) E	*New rice crisps* (no mark) Only 24g fat present (compared with 36 g) *Or less / lower fat*	*Brand must be identified* *Do* ***not*** *accept just 24g* *Must make a comparison*	1
1(b)(i) E	*Any* ***two*** *from:* • Fat content *(still)* in high category / *more than 20g fat* • *Saturated fat (still) in high category / over 5g saturated fat* • Sodium content *(still)* in high category / *more than 0.6g sodium*	*Figures must be correct* *Do not accept reference to sugar*	*2*

question	answers	extra information	marks
1(b)(ii) E	Any **two** from: • Salt / *sodium* – high blood pressure / heart disease / *heart attack / stroke* • *Sugar / obesity / putting on weight / diabetes / tooth decay* • Fat – high cholesterol / heart disease / *blocks arteries / clogs arteries / heart attack / stroke / obesity / putting on weight*	*Must have name and explanation* *The nutrient and its health risk must be clearly paired up* *Allow kidney disease / heart failure* *Ignore high cholesterol / diabetes / cancer / heart problems*	2
1(b)(iii) E	Any **two** from • Fills you up and stops you snacking on sugar and fat / *feeling hungry* • Prevents colon disease / *bowel cancer* • Helps move food through the *(digestive)* system / *clears <u>digestive</u> system* • *Adds bulk to the food* • *prevents constipation / softer stools*	*Ignore clears waste / keeps you regular / breaks down food / aids digestion / makes it easier to excrete*	2
Total			**9**

question	answers	extra information	marks
2(a)(i) E	8.5 x 3 = 25.5 7	***2** marks for correct answer* **1** mark for correct working	1 1
2(a)(ii) E	Any **three** from: • Make *(cardboard)* support */ box / frame* • Mix plaster *(of Paris)* with *water* • Pour *(mix)* into mould / *shoeprint* • Allow to set / *leave to dry*	*Max **2** marks if a shoe is put into the plaster*	3
2(a)(iii) E	Any **two** from: • Tread pattern / sole marking / *design of sole / detail of sole* • Areas of wear / depth of edges • Logos / brand / *type* • Random damage / unique marks / nicks • Shape	*Must refer to sole / tread* *Ignore print* *Ignore width / design / detail of shoe* *Allow impression of sole*	2

question	answers	extra information	marks
2(b) E	Any **two** from: • Photograph / *scan* the print/cast • *Compare against shoeprints stored* • *Match with know makes / brands*	*Ignore adding or entering a database*	2
Total			**9**

question	answers	extra information	marks
3(a)(i) E	*Amount* / Volume of *air* per breath	*Or equivalent* *Ignore how much lungs can hold* *References to oxygen incorrect*	1
3(a)(ii) G	2 *(litres)*		1
3(a)(iii) G	38	*Allow 37* *Ignore units*	1
3(a)(iv) E	Any **three** from: (the faster the running machine is going) • *Increase in breathing rate* • *To get more / increase oxygen* • *To the muscles* • *More energy / glucose is being used* • *Faster respiration* • *Remove CO_2*	*Ignore references to heart or heart rate*	3

question	answers	extra information	marks
3(b) E	B Any **one** from: • Diaphragm flattened / *lowered / contracts* • Ribs raised */ move up / out* • Chest cavity / *rib cage* enlarges *or lungs expand*	*Independent marks*	1 1
3(c)(i) G	Pancreas		1
3(c)(ii) E	Any **three** from: • when glucose level is high *(insulin is produced)* • *Insulin / (it)* lowers blood glucose level • glucose turned to glycogen • insulin promotes glucose absorption by body cells • *Stored in liver / muscles*	Accept converse answers *Allow sugar (in the blood)*	3
Total			**12**

question	answers	extra information	marks
4(a) E	Any **two** pairs from: • Food trapped in sponge/brush • Food source for bacteria or • Always wet / *damp* • Bacteria need moisture for growth / *multiply* or • Left lying around *or not cleaned* • Time for bacteria to multiply / *grow* or • Used to wipe work surfaces / *picks up bacteria* • *spreads bacteria* *or* • *Kept in a warm place* • *Warmth needed to grow / multiply*	Look for reason and explanation. **1** mark for reason *up to max 2* **1** mark for explanation *up to max 2*	4

question	answers	extra information	marks
4(b) E	Any **three** from: • Take samples from brush / sponge with (*sterile)* swab / wash out brush / sponge with (*sterile)* water • Use dilution method to reduce numbers • *Wipe sample across agar plate* • *Incubate / wait for several days* • *Observe for growth on plate* • Identify the bacteria visually (microscope) / identify using antibody serum	Max **3** marks *Allow cotton bud / scalpel / tweezers or any reasonable answer* *Culture the sample = **2** marks (**1** mark for time; **1** mark for method)*	3
4(c) E	Any **two** from: • Disinfectant • Use disposable cloths / *replace cloths regularly* • *Detergent* • *Sterilise eg boiling / bleach* • *Personal hygiene* • *Disposal of waste* • *Control of pests eg insects / mice*		2
Total			**9**

question	answers	extra information	marks
5(a)(i) E	Any **two** from: • Location of the sample • Date / time • Instructions for forensic team • SOCO name / *signature* • Whose/which shoe / *what is in the bag*	*Ignore evidence number*	2
5(a)(ii) E	Collect *(soil / sample)* from crime scene Test / analyse *(both)* samples / *named suitable method* Compare the samples / see if there is a match	*Must be a reference to collecting*	1 1 1
5(b) E	Any **two** from: • *Physical / biological compositions eg seeds, pollen* • Chemical composition / *minerals / nutrients* • pH • particle size • texture • *colour* • *soil type*	*Ignore moisture content*	2

question	answers	extra information	marks
5(c) E	Any **three** from: • *Evidence (from tests) should be accurate / correct* • Keep to facts • Logical order • Facts stated clearly and concisely • Deductions based on fact • *Impartial*		3
Total			**10**

question	answers	extra information	marks
6(a)(i) E	Diet R most suitable 80kg x 0.8 = 64g / diet contains about 64g of protein / *or wtte eg closest amount of protein suitable for this person*	*linked marks*	1 1
6(a)(ii) E	Diet P Diet P has <u>*highest*</u> protein / weightlifter requires more protein	*linked marks*	1 1
6(b) E	*Mix food with water* Add few drops copper sulfate *(solution) and add a few drops sodium hydroxide (solution)* Turns purple *(= protein)*	*Biuret solution = **1** mark* *Any reference to solution = **1** mark* ***not** purple - black*	1 1 1
6(c)(i) E	$\frac{93}{1.7^2}$ = 32.17993 Accept 32.1 / 32.2 / 32.18	**1** mark for working **2** marks for correct answer *Allow 32* *Ignore units*	2
6(c)(ii) E	Any **two** from: • Have more muscle • Muscle weighs more than fat		2
Total			**11**
			Overall mark = 60