



General Certificate of Secondary Education

Human Physiology & Health 3417/H

Mark Scheme

2006 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.

Human Physiology & Health

Higher Tier 3417/H

3417/H Q1

question	answers	extra information	mark
(a)(i)	- (<u>minus</u>) 76%		1
(ii)	1991 and 1993		1
(iii)	no data for some years / limited time range / no data for intermediate years		1
	no data for other substances / named substance		1
(iv)	any two from: <ul style="list-style-type: none"> • increased demand by industry / more factories / machinery • increase in population / more homes built • increased use in heating / lighting / cooking / domestic use • <u>increase</u> in car / transport <u>use</u> 		2
(b)	methane		1
	carbon dioxide		1
(c)	reduction of / damage to ozone layer OWTTE		1
	exposed to <u>UV</u> radiation		1
total			10

3417/H Q2

question	answers	extra information	mark
(a)(i)	sterilisation kills <u>all</u> bacteria / spores		1
	pasteurisation kills most bacteria / some remain / some spores remain		1
	these grow / reproduce / multiply (and sour milk)		1
(ii)	Quality of written communication	any 2 points in correct sequence	
	(idea of) raw meat contains bacteria / bacteria falls on meat	annotate as Q ✓ or Q ✗	1
	not killed in freezer		1
	reproduce during defrosting		1
	cooking kills bacteria		1
	prevents food poisoning		1
(b)	bacteria left on / transferred to work surface (from raw chicken)	accept converse argument	1
	bacteria picked up / transferred to cooked chicken		1
	bacteria reproduce		1
	(cooked chicken) eaten without cooking / has already been cooked		1
total			12

3417/H Q3

question	answers	extra information	mark
(a)	abnormal / uncontrolled growth (of cells)	ignore 'rapid'	1
(b)	any two from: <ul style="list-style-type: none"> • asbestos • distillation products of fossil fuels • UV • X-rays • gamma rays / ionising • mutation • lack of fibre 	accept radiation for 1 mark accept any other valid carcinogen	2
(c)(i)	34 439		1
(ii)	died (on average about) 10 years younger	accept converse argument	1
(ii)	(30) 10 years		1
	(50) 6 years		1
(iv)	42%		1
(d)(i)	35 or 36		1
(ii)	50		1
total			10

3417/H Q4

question	answers	extra information	mark
(a)	stomach		1
	ileum / small intestine	accept duodenum do not accept 'intestine' unqualified	1
(b)(i)	30 to 40°C	ignore refs to body / optimum temperature do not accept warm	1
(ii)	(pH) 4		1
(iii)	protease / enzyme digests / breaks down (protein)		1
	to amino acids		1
total			6

3417/H Q5

question	answers	extra information	mark
(a)	any two from: <ul style="list-style-type: none"> • growth / repair / cell division • maintenance of body temperature / keeping warm • movement / muscle contraction • reproduction 	accept 'active transport'	2
(b) (i)	glucose	ignore 'sugar'	1
	water		1
(ii)	in plasma		1
(c)(i)	2500 (cm ³)		1
(ii)	0 – 1 (seconds)		1
(iii)	30		1
total			8

3417/H Q6

question	answers	extra information	mark
(a)(i)	A – cerebrum / cerebral hemisphere / cerebral cortex		1
	B – cerebellum		1
	D – pituitary (gland)		1
(ii)	controls heart rate / breathing rate / involuntary actions / choking / swallowing etc		1
(b)	any two from: <ul style="list-style-type: none">• rapid• automatic / involuntary / without thought• response (to a stimulus)		2
(c)(i)	sensory / afferent		1
(ii)	synapse		1
(iii)	muscle or gland		1
total			9

3417/H Q7

question	answers	extra information	mark
(a)	(eggs) ovaries		1
	(sperm) testes		1
(b)(i)	any two from: <ul style="list-style-type: none"> • suitable temperature / body temperature / warm • suitable pH (6-7) • oxygen • nutrients / energy from food • suitable concentrations of / right amount of nutrients • sterile 	accept one named example accept 'clean' if qualified	2
(ii)	some eggs may be damaged / some may die during process / increased chance of <u>fertilisation</u> or definition	do not accept 'more successful' unless qualified	1
total			5

3417/H Q8

question	answers	extra information	mark
(a)(i)	mitosis		1
(ii)	meiosis		1
(b)	reference to paired bases / named base pairs		1
	(attached to) 2 strands / sugar phosphate chains	accept 'hydrogen bonds hold to sides'	1
	reference to <u>double</u> helix		1
(c)(i)	change in a gene / <i>DNA sequence</i> or chromosome		1
(ii)	carcinogens	accept idea of spontaneous change	1
	radiation	accept example of radiation	1
(iii)	e.g. resistance to disease qualified sensible suggestions		1
total			9

3417/H Q9

question	answers	extra information	mark
(a)	red blood cells		1
(b)(i)	98 (%)		1
(ii)	14 (mm of mercury)		1
(iii)	oxygen used up by cells		1
(iv)	combines with / binds to / attaches to oxygen to form oxyhaemoglobin		1 1
(c)(i)	foreign protein	accept reference to cell surface protein	1
(ii)	(top line) AB (second line) A (bottom line) O		1 1 1
total			10

3417/H Q10

question	answers	extra information	mark
(a)	any three from: <ul style="list-style-type: none"> • urea • cholesterol • bile <u>pigments</u> • carbon dioxide 	do not accept water or minerals	3
(b)	Quality of written communication any five from: <ul style="list-style-type: none"> • too much water (in the blood) • kidneys reabsorb less water • produce dilute urine • too little water (in the blood) • kidneys reabsorb more water • produce concentrated urine • correct reference to ADH • correct ref. to hypothalamus 	use of at least 2 technical terms in correct context e.g. concentration, reabsorption, ADH, urine, filtration, pituitary gland, hypothalamus only allow ref. to 'water in the blood' if linked to suitable ref. to kidney	1 5
(c)(i)	partially permeable	accept semi / selectively permeable membrane	1
(ii)	less salts / ions	accept converse answers	1
	less water		1
	less urea		1
total			13

3417/H Q11

question	answers	extra information	mark
(a)(i)	0.5 a u per day		1
(ii)	some progesterone present before ovulation / 14 days		1
	progesterone level peaks after 14 days		1
	progesterone level then falls		1
(iii)	(0 – 5) <u>lining</u> breaks down		1
	(6 – 12) lining builds up / thicker / more vascular		1
(b)(i)	produced by placenta / developing embryo		1
	during pregnancy / after fertilisation / after implantation		1
(ii)	(causes ovaries) to continue production of oestrogen / progesterone		1
(c)	oestrogen and / or progesterone		1
	given to inhibit FSH production / no eggs mature	accept 'produced' do not accept 'release'	1
	FSH		1
	given to stimulate eggs to mature		1
total			13

3417/H Q12

question	answers	extra information	mark
(a)(i)	any four from: A – epidermis <ul style="list-style-type: none"> • protects from mechanical injury • prevents loss of too much water • protects from UV light • prevents entry of microorganisms B – sebaceous gland <ul style="list-style-type: none"> • releases sebum / oily liquid • keeps hair / skin supple • contains disinfectant • kills bacteria 	maximum 2 marks for A and B accept waterproof	4
(ii)	contains nerve endings / sense receptors sensitive to touch / temperature / pressure / pain		1 1
(b)(i)	3		1
(ii)	19 to 20		1
(iii)	(both) increase as air temperature increases when exercising faster / more than at rest		1 1

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3417/H Q12

question	answers	extra information	mark
(iv)	any five from: <ul style="list-style-type: none">• sweat released• evaporates and takes heat from skin• arterioles• vasodilation or description of• <u>more</u> heat lost by radiation• correct reference to hypothalamus	accept latent heat from the body	5
total			15