



**General Certificate of Secondary Education
June 2011**

Human Health and Physiology 44151F

(Specification 4415)

**Unit 1: Topics in Human Health and Physiology
(Foundation)**

Final

Mark Scheme

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process 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 standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

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Question	Answers	Extra information	Mark										
1(a)	A Heart B Intestine C Testis D Brain	Ignore small / large Allow ileum	1 1 1 1										
1(b)	<table border="0"> <thead> <tr> <th>Organ</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Brain</td> <td>Digests food</td> </tr> <tr> <td>Intestine</td> <td>Co-ordinates the body's activities</td> </tr> <tr> <td>Testis</td> <td>Absorbs oxygen from the air</td> </tr> <tr> <td></td> <td>Produces sperm</td> </tr> </tbody> </table>	Organ	Function	Brain	Digests food	Intestine	Co-ordinates the body's activities	Testis	Absorbs oxygen from the air		Produces sperm	1 mark for each correct line Do not allow if two lines from left hand box Crossing out must be clear – if not mark not awarded for each unclear line	3
Organ	Function												
Brain	Digests food												
Intestine	Co-ordinates the body's activities												
Testis	Absorbs oxygen from the air												
	Produces sperm												
Total			7										

Question	Answers	Extra information	Mark
2		<p>1 mark for each correct line</p> <p>Do not allow if two lines from left hand box</p> <p>Crossing out must be clear – if not mark not awarded for each unclear line</p>	4
Total			4

Question	Answers	Extra information	Mark
3(a)(i)	Foods & drinks high in fat and / or sugar		1
3(a)(ii)	Bread, rice, potatoes and pasta		1
3(b)(i)	Bread, rice, potatoes and pasta		1
3(b)(ii)	Meat, fish, eggs and beans		1
Total			4

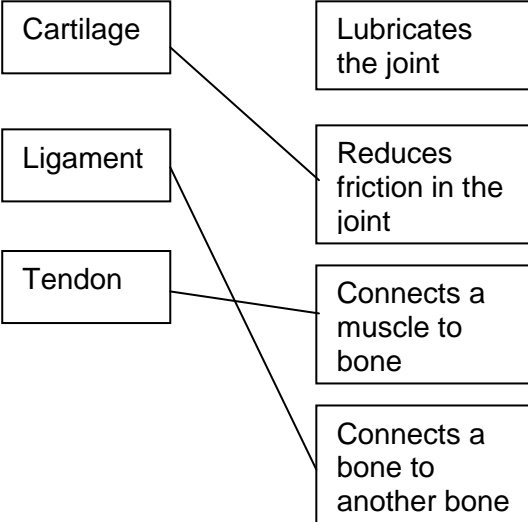
Question	Answers	Extra information	Mark
4(a)(i)	A Enamel		1
	B Dentine		1
	C Cement		1
4(a)(ii)	Molar		1
4(b)	R Q P	All 3 correct gains 2 marks 2 or 1 correct gains 1 mark If lines drawn trace back to check	2 max
4(c)(i)	Lower (class)	Ignore reference to age	1
4(c)(ii)	1.8 gains 2 marks	If answer incorrect allow 1 mark for evidence of 2.8 – 1 Allow 3 (rounded figure) – 1 (1 mark)	2
4(c)(iii)	Any two from eg <ul style="list-style-type: none"> • better diet • better dental hygiene / brushing teeth / mouthwash • more visits to the dentist • sugar-free chewing gum 	Quality must be qualified	2
Total			11

Question	Answers	Extra information	Mark
5(a)(i)	A		1
5(a)(ii)	D		1
5(b)	Unable to get air to lungs	Accept so air can get to lungs Ignore reference to breathing Ignore oxygen and carbon dioxide	1
5(c)(i)	X Nucleus Y Cytoplasm		1 1
5(c)(ii)	Traps / collects / catches microbes / dust		1
5(c)(iii)	Moves mucus (out of lungs)	Ignore reference to trap microbes	1
Total			7

Question	Answers	Extra information	Mark
6(a)	Lungs		1
	Liver		1
	Bladder		1
	Urethra		1
6(b)(i)	Protein	If more than one answer mark as incorrect	1
6(b)(ii)	Glucose	Allow sugar	1
6(b)(iii)	70 (times)	If answer incorrect, evidence of $2.1 \div 0.03$ gains 1 mark	2 max
6(b)(iv)	Poisonous / harmful		1
6(c)	<p>Any three from (Peritoneal)</p> <ul style="list-style-type: none"> • treatment takes place at home • treatment carried out by patient • patient can have normal diet • more freedom of movement <p>Any three from (Dialysis machine)</p> <ul style="list-style-type: none"> • carried out by experts / nurse / technician • less risk of infection • no problem with storage • treatment less often / takes less time (overall) 		3 max
Total			12

Question	Answers	Extra information	Mark
7(a)	Fallopian tube		1
7(b)	Any four from eg <ul style="list-style-type: none"> • sperm from male • egg(s) from female • fertilisation / fusion of egg and sperm / gametes / male and female nuclei • in dish / tube etc • embryo develops / cells divide / mitosis • embryo / ball of cells inserted into womb 	Allow sperm injected into eggs Ignore zygote	4 max
7(c)	<ul style="list-style-type: none"> • decreased • until age 43 / to 3% / then constant 		1 1
7(d)	(Clinic A) no marks <ul style="list-style-type: none"> • has fewer multiple births • A has higher success rate (for age 39) 	No marks if clinic B chosen	1 1
Total			9

Question	Answers	Extra information	Mark
8(a)	To prevent giving a disease (to recipient)	Allow prevent infection	1
8(b)	(Blood loss due to) injury / operation / accident	Allow anaemia Allow reference to blood loss during birth Ignore reference to infection	1
8(c)	Needs to give blood compatible with patient's blood owtte	Allow so that blood does not clump / clot Ignore reference to poisoning / infection	1
8(d)	Group O		1
8(e)(i)	Plasma		1
8(e)(ii)	40:1		1
8(f)(i)	Tiredness		1
8(f)(ii)	Iron		1
8(f)(iii)	Oxygen		1
8(f)(iv)	Red blood cells		1
Total			10

Question	Answers	Extra information	Mark										
<p>9(a)</p>	<table border="0"> <thead> <tr> <th>Part of joint</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Cartilage</td> <td>Lubricates the joint</td> </tr> <tr> <td>Ligament</td> <td>Reduces friction in the joint</td> </tr> <tr> <td>Tendon</td> <td>Connects a muscle to bone</td> </tr> <tr> <td></td> <td>Connects a bone to another bone</td> </tr> </tbody> </table> 	Part of joint	Function	Cartilage	Lubricates the joint	Ligament	Reduces friction in the joint	Tendon	Connects a muscle to bone		Connects a bone to another bone	<p>1 mark for each correct line.</p> <p>Do not allow if two lines from left hand box</p> <p>Crossing out must be clear – if not mark not awarded for each unclear line</p>	<p>3</p>
Part of joint	Function												
Cartilage	Lubricates the joint												
Ligament	Reduces friction in the joint												
Tendon	Connects a muscle to bone												
	Connects a bone to another bone												
<p>9(b)(i)</p>	<p>Sports injury</p>		<p>1</p>										
<p>9(b)(ii)</p>	<p>Osteoporosis</p>		<p>1</p>										
<p>9(c)(i)</p>	<p>Any two from</p> <ul style="list-style-type: none"> • the operation leaves very small scars • recovery time is very short • the operation can be done under local anaesthetic 		<p>2 max</p>										
<p>9(c)(ii)</p>	<p>Surgeons need extra training</p> <p>The equipment is very expensive</p>		<p>1</p> <p>1</p>										
<p>9(d)</p>	<p>Smooth</p> <p>Hard</p>	<p>In any order</p>	<p>1</p> <p>1</p>										
<p>Total</p>			<p>11</p>										

Question	Answers	Extra information	Mark
10	<i>Marks awarded for this answer will be influenced by the quality of written communication.</i>		
	The answer is coherent and in a logical sequence. It contains a range of appropriate or relevant specialist terms used accurately. There is a clear scientific description of several different ways in which infectious diseases are passed from one to another.		5-4
	The answer has some structure and use of specialist terms has been attempted, but not always accurately. There may be some errors in spelling, punctuation and grammar. There is a scientific description of at least two of the ways in which infectious diseases are passed from one to another.		2-3
	The answer is poorly constructed with an absence of specialist terms or their use demonstrates a lack of understanding of their meaning. The spelling, punctuation and grammar are weak. There is a brief description of at least one of the ways in which infectious diseases are passed from one to another.		1
	No relevant content.		0
	Examples of scientific ideas that may contribute to a candidate's response: <ul style="list-style-type: none"> • through the air • droplet infection • direct contact • sexual contact • food • water • vectors / named vector • faeces 		
Total			5

Question	Answers	Extra information	Mark
11(a)(i)	37.8 gains two marks	Accept 37.77 / 37.78 Ignore rounding error if correct answer shown in working Ignore units If incorrect answer allow 1 mark for $85/(1.5 \times 1.5)$ or $85 / 2.25$	2
11(a)(ii)	Obese	Accept ECF from part (i)	1
11(b)	Reduce calorie / joule / energy / food intake / fat / sugar / carbohydrate Increase fruit / vegetables / eat five portions of fruit or vegetables	Ignore references to protein / salt If neither mark gained allow one mark for balanced diet. Ignore healthy diet / eat less junk food Ignore references to change of lifestyle / exercise	1 1
11(c)	Anorexia	allow bulimia ignore kwashikor and vitamin / mineral deficiencies	1

11(d)(i)	<i>Marks awarded for this answer will be influenced by the quality of written communication.</i>	
	The answer is coherent and in a logical sequence. It contains a range of appropriate or relevant specialist terms used accurately. There is a clear scientific description of the link between diet and heart attacks including at least 4 points.	4
	The answer has some structure and use of specialist terms has been attempted, but not always accurately. There is a scientific description of the link between diet and heart attacks including at least 2 points.	2-3
	The answer is poorly constructed with an absence of specialist terms or their use demonstrates a lack of understanding of their meaning. There is a brief description of the link between diet and heart attacks, which has little clarity and detail.	1
	No relevant content.	0
	<p>Examples of scientific ideas that may contribute to a candidate's response:</p> <ul style="list-style-type: none"> • High level of fat / cholesterol in diet • Fat in diet saturated • Leads to high blood cholesterol / LDL • Fatty deposits on arteries / atheroma. • Narrowing of blood vessels restricts flow of blood • Blood clots may block blood supply • Heart (muscle) does not receive enough oxygen • Heart muscle dies • High salt intake • Increases blood pressure due to high salt / atheroma • Which damages blood vessels <p style="margin-left: 200px;">Do not accept HDL for this point</p> <p style="margin-left: 200px;">Allow blood vessels Ignore veins</p> <p style="margin-left: 200px;">Allow fat / cholesterol blocks blood vessels</p>	

11(d)(ii)	Any one of <ul style="list-style-type: none">• (Plan) exercises (for patient)• Advise lifestyle change• Advise relaxation technique / stress reduction	Ignore massage Ignore breathing exercises Ignore references to diet Ignore drugs	1
Total			11

Question	Answers	Extra information	Mark
12(a)	Any 2 of <ul style="list-style-type: none"> • Higher number of cases in men • Cases rise to peak at 65 • Cases rise then fall with age • Cases very low / zero under 20 or up to 19 	Accept answers in range 65-74 for either men or women	2 max
12(b)	Any one from e.g. need to know about <ul style="list-style-type: none"> • budgeting • number of (cancer) doctors / nurses • beds / equipment / drugs / treatment / resources 	Ignore number of patients Ignore statistics Ignore research / prevention	1
12(c)(i)	e.g. X-ray / (body) scan / MRI / CAT / ultrasound / biopsy	Ignore breathing tests Ignore screening	1
12(c)(ii)	Radiographer (all techniques except biopsy) or <u>cytologist</u> / <u>oncologist</u> if biopsy given in (c)(i) or <u>ultrasound</u> technician if ultrasound given in (i)	Award mark only if linked to part (i) Allow radiologist Ignore cancer specialist Ignore doctor / nurse / surgeon / technician Ignore endoscopy	1
12(d)	Any 2 of <ul style="list-style-type: none"> • Surgery / remove lung or tumour • Radiotherapy / radiation • Chemo(therapy) / drugs • Cyberknife 	Ignore transplant Ignore radiology Ignore medicine / tablets	2 max
Total			7

Question	Answers	Extra Information	Mark
13(a)	Use of needles / pins	Answer must relate to 'how'	1
	At specific points in body / points related to disease / acupuncture sites	Allow in skin / at pressure points / nerves / receptors / painful area Ignore 'to restore harmony' Ignore to relieve pressure / stress/ symptoms	1
13(b)(i)	Any 2 of <ul style="list-style-type: none"> • gender • age • duration of treatment / for three weeks • treatment given daily • mean length of time patients had suffered from urticaria • all had urticaria which did not respond to treatment 	Ignore control group / two groups Ignore number of people Do not accept Y axis label (dependent variable) i.e. mean length of urticaria symptoms in hours	2 max
13(b)(ii)	Length of time of symptoms / duration of urticaria attacks		1
13(c)	Psychological / placebo effect owtte	Ignore control treatment successful	1
13(d)	Would show if some people did not respond to treatment	Accept might show up anomalies OWTTE Ignore more accurate / reliable / valid Ignore mean is just an average Ignore shows range	1

13(e)	<ul style="list-style-type: none">● worth trying● treatment effective / reduces symptoms / mean times decreases <p>OR significant difference between two groups</p> <p>OR length of attacks might continue to get shorter</p> <p>OR but probably only reduce duration of attacks / not certain to work / does not cure</p>		1 1
Total			9

Question	Answers	Extra information	Mark
14(a)	Acid conditions	Allow mucus	1
	In vagina / cervix	Allow uterus / womb Ignore references to white blood cells / antibodies	1
14(b)(i)	Division uncontrolled / divides rapidly / divides continuously	Accept reproduction or multiplication if qualified by rapid / uncontrolled / continuous Ignore growth	1
14(b)(ii)	May enter blood stream / lymph	Allow blood vessel formation within organ / angiogenesis	1
	(then) form cancers in other parts of the body / form secondary cancers	Ignore spread / invade within organ	1
14(c)(i)	Rises then falls	Allow answers within range 30-34 inclusive	1
	Peak at 290 / at age 30-34		1
14(c)(ii)	62.5 gains 2 marks	Allow 62 or 63 for 2 marks Ignore rounding if 62.5 shown in working. If answer incorrect allow one mark for (incorrect number of cases) X 5	2

14(c)(iii)	<p>Any 2 of</p> <ul style="list-style-type: none"> • (Most) unlikely to be sexually active / to have had intercourse • None / few of this age group with disease / infected / exposed to virus • <u>So</u> greatest chance of success / more effective / done before it is too late / won't get late in life 	Ignore won't get disease	2 max
14(d)	<p>Fear of side effects / new vaccine so not enough known about effects</p> <p>Fear it might encourage promiscuity / encourage girls to have sex / encourage girls to think sex is safe</p>	Ignore religion / ethics	<p>1</p> <p>1</p>
Total			13

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