

GCSE 2004
June Series



Mark Scheme

Human Physiology and Health *(3417/H)*

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Dr. Michael Cresswell Director General

Question 1

question	answers	extra information	mark
(a)	teeth	accept muscles or muscle action in stomach / stomach	1
(b)	peristalsis or description		1
(c)	large / insoluble molecules		1
	broken down to small / soluble molecules		1
	by enzymes	accept named example of enzyme	1
(d)(i)	ileum / small intestine / villi		1
(ii)	any two from small molecules diffuse (from intestine) to blood / into blood	accept named examples	2
(e)	(hepatic) portal vein		1
(f)(i)	as energy source / respiration		1
(ii)	to make protein / enzymes / named example	do not accept growth and repair	1
total			11

Question 2

question	answers	extra information	mark
(a)	mass of abnormally (arranged) / mutated cells		1
	which multiply at random / uncontrolled division		1
(b)	any two from UV radiation X-rays / gamma rays carcinogens / example asbestos	allow radiation if no other named example accept smoking / tar do not accept nicotine	2
(c)	cancerous cells break off		1
	carried in blood (to other organs)		1
(d)(i)	lung cancer		1
(ii)	stomach		1
(iii)	78 (%)		1
(iv)	any two from better self awareness earlier diagnosis / screening better treatment / easier to treat		2
(v)	high-fibre diet		1
total			12

Question 3

question	answers	extra information	mark
(a)(i)	B		1
(ii)	D		1
(b)	Graph 1 (no mark) no intermediate values /only 2 separate values		1
(c)(i)	a form of a gene		1
(ii)	parents Ff and Ff	accept ecf for maximum 2 marks	1
	gametes F f F f		1
	F1 genotype FF fF fF ff		1
	child ff identified		1
total			8

Question 4

question	answers	extra information	mark
(a)(i)	fungus		1
	bacterium		1
	virus		1
	protozoan / protoctistan		1
(ii)	malaria		1
(b)	(stomach) produces acid		1
	acid kills pathogens		1
	(respiratory passages) mucus traps pathogens		1
	cilia 'sweep' mucus / pathogens (up to throat or out of lungs)	ignore nasal hair	1
total			9

Question 5

question	answers	extra information	mark
(a)	A – cartilage B – synovial fluid		1 1
(b)	(strong) prevents dislocation (slightly elastic) (stretches) to allow movement		1 1
(c)(i)	less bone / bone is thinner more cavities in bone / number of cavities increased		1 1
(ii)	bones more brittle / weaker / more easily broken	do not accept references to effects on the spine or height	1
(d)(i)	allow surgeon to explore joint / assess damage allow instruments to reach damaged part of joint		1
(ii)	to prevent infection		1
(iii)	any two from faster recovery time less scar tissue / less tissue damage shorter hospital stay other valid reasons local anaesthetic rather than general anaesthetic	ignore references to cost / stress	2
(e)	any three from non-allergenic / non-reactive strong / tough smooth / friction free long-lasting rustproof		3
total			14

Question 6

question	answers	extra information	mark
(a)	any two from to remove pathogens to remove toxic chemicals to make clear		2
(b)	<i>The answer to this question requires a minimum of two technical terms used in correct context for Quality of Written Communication mark.</i> any three from screened to remove debris / rubbish sedimentation / settling to remove (inorganic) particles filtered to remove microorganisms / organic matter chlorinated to kill pathogens / microorganisms storage in dark to prevent growth of algae		1 3
total			6

Question 7

question	answers	extra information	mark
(a)	antibiotics		1
(b)	causing changes not related to the treatment		1
(c)	brain	do not accept nervous system	1
(d)(i)	$\frac{80 - 64}{80} \times 100$		1
	20%		1
(ii)	any one from increasing alcohol reduces typing speed increasing alcohol increases typing errors / decreases accuracy		1
(e)	(drug) changes chemical reactions in body	allow description of tolerance	1
	(body) becomes dependant / unable to function without drug		1
	suffer withdrawal symptoms when drug removed		1
total			9

Question 8

question	answers	extra information	mark
(a)(i)	any two from (some) blood passes directly from right to left atrium / between atria (some) blood does not enter ventricle(s) (some) blood does not enter pulmonary artery	allow blood mixes if no other effects given	2
(ii)	any two from pressure reduced (some blood) bypasses lungs less oxygen picked up / less oxygen carried less oxygen to cells / tissues little / reduced respiration		2
(b)(i)	small arteries		1
(ii)	valves prevent blood flowing back	allow wider lumen flows faster / less resistance to flow	1 1
(iii)	less muscle tissue in right ventricle compared to left ventricle or less force exerted by right ventricle		1
(c)	<i>The answer to this question requires a minimum of two linked ideas in a sensible order.</i> any three from (fat / cholesterol) deposited on walls of blood vessels / atheroma lumen becomes smaller / blocked less space for blood / more resistance to blood flow leads to high blood pressure	do not allow veins or capillaries	1 3
total			12

Question 9

question	answers	extra information	mark
(a)(i)	(strain Y) had gene coding for production of protein A	do not allow chromosome allow allele / DNA	1
(ii)	any two from mutation natural transfer of genetic material / gene / chromosomes / DNA / sexual reproduction accept references to mutualism / symbiosis		2
(b)(i)	enzyme		1
(ii)	(large number) of genetically identical organisms / cells		1
(iii)	any two from suitable temperature suitable pH food / nutrient supply oxygen supply sterile	ignore references to water or moisture allow warmth if suitable qualified	2
(c)	(advantages) any two from less use of insecticide less damage to useful organisms less build-up of insecticides in environment higher crop yields (disadvantages) any two from possible gene transfer to weeds / other plants weed plants grow out of control leading to reduced yields public opinion of GM crops / resistance to / lack of knowledge and long term effects	ignore disadvantages that are the reverse argument of advantages already given allow pollen transfer	2 2
total			11

Question 10

question	answers	extra information	mark
(a)	any three from damaged cells / platelets release enzyme fibrinogen to fibrin network of fibres formed trapping red blood cells		3
(b)(i)	any four from vaccine contains antigens vaccine dead / inactive pathogen these are proteins (antigens stimulate) production of antibodies by white cells / lymphocytes		4
(ii)	passive gives immunity faster active immunity is longer lasting		1 1
(iii)	24 weeks	± 0.5	1
(iv)	passive vaccine any two from (passive) injection of 'ready made' antibodies provide immediate protection (no need to wait) for antibody production time critical / disease could be fatal		1 2
(c)	any two from white cells destroyed no antibodies produced other diseases become fatal		2
total			15

Question 11

question	answers	extra information	mark
(a)	30 / 35 (units)		1
(b)	5 to 35 minutes heat production greater than heat loss		1 1
(c)	muscular activity generates heat requires energy from respiration / rate of respiration increases / more respiration		1 1
(d)	15 minutes		1
(e)	any six from core temperature rises detected by hypothalamus nerve impulses to sweat glands / arterioles increased sweat production sweat evaporates (heat lost) arterioles dilate or description more blood to skin surface / capillaries more heat lost by radiation		6
(f)	to reduce body temperature / to normal / 37°C to prevent denaturation of enzymes		1
total			13