MARK SCHEME for the October/November 2015 series

0610 BIOLOGY

0610/22	Paper 2 (Core Theory), maximum raw mark 80

Abbreviations used in the Mark Scheme

- **;**   separates marking points
- **/**   separates alternatives within a marking point
- **R**   reject
- **ignore**   mark as if this material was not present
- **A**   accept (a less than ideal answer which should be marked correct)
- AW   alternative wording (accept other ways of expressing the same idea)
- <u>underline</u>   words underlined (or grammatical variants of them) must be present
- max   indicates the maximum number of marks that can be awarded
- mark independently   the second mark may be given even if the first mark is wrong
- ecf   credit a correct statement that follows a previous wrong response
- ( )   the word / phrase in brackets is not required, but sets the context
- **ora**   or reverse argument
- AVP   any valid point

Question number	Mark Scheme	Mark	Guidance
1	**A** – hoverfly ; **B** – (clouded yellow) butterfly ; **E** – (large yellow) moth ; **F** – springtail ;	[4]	
		[Total: 4]	
2 (a) (i)	body temperature high / above normal AW ;	[1]	
(ii)	sweat secreted AW / sweat glands active ; (sweat / water) evaporates (from skin surface) ; heat / energy for evaporation provided by body ; body cools down ;	max [2]	**A** ecf if 2(a)(i) answered incorrectly
(iii)	blood carries heat AW ; body temperature needs to be maintained AW at 37 °C / reference to homeostasis ; idea of enzyme activity affected adversely by higher temperature ; (more blood flow to the surface) means more heat lost ; by evaporation of sweat / conduction / convection / radiation ;	max [2]	
(b)	33 (°C) ;	[1]	

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Question number	Mark Scheme	Mark	Guidance
(c)	(in exercise) muscles contract / work AW ; muscles respire ; (so) release energy (for contraction); energy is "lost" as heat ; idea of (body temperature slightly raised) as blood takes time to transport the heat to the body surface / skin ;	max [2]	"more" (or equivalent) must be used at least once in the explanation otherwise max 1 **ignore** body more active / respires more
		[Total: 8]	
3 (a) (i)	arrow to point from heart to lungs ;	[1]	
(ii)	**A** – <u>renal artery</u> ; **B** – <u>hepatic vein</u> ; **C** – <u>pulmonary artery</u> ;	[3]	
(iii)	line joining alimentary canal to liver ; <u>hepatic portal vein</u> ;	[2]	

Question number	Mark Scheme	Mark	Guidance
(b)	<table><tr><td rowspan="2">characteristic</td><td colspan="3">blood vessel</td></tr><tr><td>aorta</td><td>vena cava</td><td>capillary</td></tr><tr><td>thick, elastic wall</td><td>yes</td><td>no</td><td>no ;</td></tr><tr><td>valves present along length</td><td>no</td><td>yes</td><td>no ;</td></tr><tr><td>transports oxygenated blood</td><td>yes</td><td>no ;</td><td>no</td></tr><tr><td>amino acids pass through walls</td><td>no</td><td>no</td><td>yes ;</td></tr></table> [4]		one mark for each correct row
(c) (i)	<u>coronary</u> artery ;	[1]	
(ii)	cholesterol / fat / lipid ;	[1]	**A** thrombus / clot; **ignore** fatty acids / fatty foods / blood
(iii)	blockage stops blood flow AW ; oxygen / glucose / nutrients would not reach muscle ; muscle cannot respire ; runs out of energy ; muscle cells die ; more muscle dies than in previous attack ; heart / ventricle cannot contract effectively / cannot pump blood ;	max [3]	**A** heart tissue / heart muscle throughout but **ignore** heart unqualified
		[Total: 15]	

Question number	Mark Scheme	Mark	Guidance
4 (a)	term — definition genotype — the genetic make-up of an organism dominant — an allele that is expressed in a heterozygote heterozygous — having two different alleles of the same gene phenotype — the physical features of an organism haploid — containing a single set of unpaired chromosomes gene — a length of DNA which codes for a specific protein [5]		R if more than one line from each LH box 5 or 6 correct = 5 4 correct = 4 3 correct = 3 2 correct = 2 1 correct = 1

Question number	Mark Scheme	Mark	Guidance
(b) (i)	cell division to give (two / identical) cells;	[1]	
(ii)	asexual reproduction; growth of tissues AW; development of new structures; replacement of cells; example of mitosis occurring (e.g. in embryo / skin cells) ;	max [2]	**A** cancer
(c) (i)	*(XX and XY)* **X X X Y** ; **XX XX XY XY** ;	[2]	both pairs needed in correct sequence for 1 mark four needed in any order for 1 mark, but must be correct sequence if lines drawn
(ii)	50% / 0.5 / ½ / 2 in 4 / 1 in 2 / 1:1;	[1]	
(iii)	**M** placed between line drawn above mother and father and line above gamete circles ;	[1]	
		[Total: 12]	
5 (a) (i)	incisor ;	[1]	

Question number	Mark Scheme	Mark	Guidance
(ii)	**K** – enamel; **L** – dentine; **M** – root; **N** – pulp (cavity);	[4]	
(b)	bacteria (in the mouth) ; respire or feed on sugar or food / form plaque ; anaerobic (respiration) ; produce AW acid ; acid destroys AW enamel ; (idea of) bacteria access internal structure via hole made ;	max [3]	**ignore** bacteria attacking AW the enamel acid production mark must follow from explanation
		[Total: 8]	
6 (a) (i)	10 (years);	[1]	
(ii)	0–4 years; 12–20 years;	[2]	either order **ignore** if years not given

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Question number	Mark Scheme	Mark	Guidance
(iii)	increase ; more rapid / faster AW ; calculation from figures from Fig. 6.1 in support ; (14–20 years is) time of adolescence / puberty / start of the menstrual cycle ; sex hormones stimulate development / growth or growth of named reproductive organ ; named sex hormone;	max [3]	**ignore** growing up / getting ready to have children testosterone / oestrogen / progesterone **A** growth hormone
(b) (i)	poor development of bones / teeth / weak or brittle bones / rickets or osteoporosis or osteopenia	[1]	**ignore** poor development in general **A** fetus takes calcium from maternal bones
(ii)	low birth weight ; poor brain development ; addicted to nicotine / withdrawal symptoms / irritable baby ; AVP ;	max [1]	**R** blood contains tar / lungs under-developed / respiratory conditions **ignore** poor development of baby e.g. low oxygen concentration in the blood at birth
		[Total: 8]	

Question number	Mark Scheme	Mark	Guidance
7 (a) (i)	*from left:* photosynthesis; respiration; feeding; decomposition / respiration;	[4]	
(ii)	glucose + oxygen ; ⟶ carbon dioxide + water ;	[2]	**R** if energy given on LHS **ignore** if energy given on RHS If chemical equation is given it must be correct and balanced = 2 mark / 1 mark per "side" **ignore** mixed chemical and word equation

Question number	Mark Scheme	Mark	Guidance
(iii)	eutrophication ; fertilisers dissolve in rain / water ; run-off / AW into streams / lakes / sea ; (fertilisers provide) nutrients / nitrates / phosphates ; (for) algae to grow rapidly / reproduce ; oxygen (in the water) depleted AW / algae use more oxygen ; aquatic plants die (as short of oxygen / light) ; dead plants decomposed / respired by bacteria ; (increased) oxygen shortage ; animals / named animals die ; aquatic food chains destroyed / affected ;	max [4]	first marking point is "stand alone" other mark points must be given in a logical sequence, but stages may be omitted **ignore** if animals die for wrong reason

Question number	Mark Scheme	Mark	Guidance
(b)	death of animals and plants / loss of medicinal chemicals ; migration of animals / spread of animal borne diseases ; species extinction / loss of habitat / loss of biodiversity ; disruption of food chains ; less photosynthesis ; increase in carbon dioxide concentration ; global warming / rising sea levels / ice caps melt ; loss of soil / soil erosion / landslides / soil not stabilised by roots ; flooding ; changes to water cycle / weather patterns / desertification ; AVP ;	max [3]	**ignore** reduction in oxygen concentration **ignore** reference to ozone layer / acid rain
(c) (i)	3 units + 2 units = 5 units 5 / 20 units ; 25(%) ;	[2]	correct answer with no working gets 2 marks

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Question number	Mark Scheme	Mark	Guidance
(ii)	contains sewage / chemical in sewage / minerals / harmful bacteria / parasites / pathogens ; contains (harmful cleaning) chemicals / named chemical / drugs / hormones ; pH of water is too low ;	max [1]	idea that these need to be removed / treated
(iii)	(vitamin) C;	[1]	**A** ascorbic acid
		[Total: 17]	
8 (a) (i)	villus ;	[1]	**A** villi
(ii)	absorption ;	[1]	**A** increase the surface area
(b)	<table><tr><td>food type</td><td>enzyme involved in digestion</td><td>products of digestion</td></tr><tr><td>starch</td><td>amylase / carbohydrase ;</td><td>simple sugar</td></tr><tr><td>fat</td><td>lipase ;</td><td>fatty acids and glycerol ;</td></tr><tr><td>protein</td><td>protease;</td><td>amino acids ;</td></tr></table>	[4]	

Question number	Mark Scheme	Mark	Guidance
(c)	synthesis of proteins / enzymes / other chemicals ;		
	breakdown / deamination (of amino acids) ;		
	(resulting in) urea formation ;		
	(residue of amino acid molecule) used for energy / respired ;		
	AVP ;	max [2]	
		[Total: 8]	