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Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

5090 BIOLOGY

5090/22 Paper 2 (Theory), maximum raw mark 80

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Mark schemes will use these abbreviations:

- **;** separates marking points
- **/** alternatives
- **()** contents of brackets are not required but should be implied
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point (where a greater than usual variety of responses is expected)
- **ORA** or reverse argument
- **underline** actual word underlined must be used by candidate (grammatical variants excepted)
- **max** indicates the maximum number of marks that can be given
- **+** statements on both sides of the + are needed for that mark

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Question	Expected Answer	Mark	Additional Guidance
1 (a) (i)	(dorsal) aorta ;	[1]	
(ii)	left ventricle ;	[1]	
(b)	(amino acids) 0.05 ; (glucose) 0.10 to 0.15 ; (mineral ions) 0.72 to 2.22 ; (proteins) 8.00 ; (urea) 0.03 to 2.03 ;	[5]	
(c)	B would contain some / more / high (glucose) / C would contain more / high (glucose) / D would contain more / high (glucose) ; lack of Insulin ; glucose would not be converted into glycogen ; kidney unable to/doesn't reabsorb all glucose ;	[max. 3]	
		[Total: 10]	

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Question	Expected Answer	Mark	Additional Guidance
2 (a) (i)	oesophagus / gullet ;	[1]	
(ii)	peristalsis ;	[1]	
(b)	ref. protection / barrier / prevents damage / breakdown / digestion ; of walls ; acid / HC*l* ; ref. protease ; walls are made of protein ; ref. lubrication ;	[max. 5]	
(c) (i)	heart not involved / no connection between E and the heart / AW ;	[1]	
(ii)	less mucus in E ; acid (from stomach) ; (acid) damages the cells / walls ; (acid) neutralised (by the medication) ;	[max. 2]	
		[Total: 10]	

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Question	Expected Answer	Mark	Additional Guidance
3 (a) (i)	photosynthesis ;	[1]	
(ii)	as sucrose / sugar ; in solution ; via the phloem ;	[max. 2]	
(b)	urine / nitrogenous waste / NH_3 / other named ; faeces / egested waste ; decomposition ; by bacteria ; enzymes ; release of nitrates / salts / ions / named ions ; absorbed by plant / pitcher ; used to make proteins / amino acids ; for growth / repair ; carbon dioxide ; from respiration ; for photosynthesis ; to make glucose / carbohydrate / starch ;	[max. 5]	
		[Total: 8]	

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Question	Expected Answer	Mark	Additional Guidance
4 (a)	glucose / $C_6H_{12}O_6$ (substrate) ; (yeast) alcohol / ethanol / C_2H_5OH ; (yeast) carbon dioxide / CO_2 ; (muscles) lactic acid / lactate / $C_3H_6O_3$;	[4]	
(b) (i)	food / glucose deficiency / AW ; (killed) by alcohol ; poisoned by competing organisms (e.g. bacteria) ;	[max. 2]	
(ii)	(killed) by heat / baking / high temperature ;	[1]	
(c)	lactic acid removed / broken down / converted ; by circulation / blood / AW ; lactic acid not toxic (at concentrations experienced) ;	[max. 2]	
(d)	substrate / glucose not completely broken down ; chemical energy ; still contained within product / lactic acid / alcohol ;	[max. 2]	
		[Total: 11]	

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Question	Expected Answer	Mark	Additional Guidance
5 (a) (i)	control ;	[1]	
(ii)	rate + drops / reduces / AW ; rapidly / AW / quoted figures (85 to 62 + bpm) ; during first 4 months ; remains (more or less) constant ; (constant at) 59 / 60 / 61 / 62 + bpm ;	[max. 3]	**A** stays low
(b)	line / curve starts at 36 months ; drops with similar gradient to line K ; to between 70 and 74 bpm ; levels to run parallel with the J and K ;	[max. 3]	
(c)	arteries / arterioles ; muscular wall ; relax / prevent constriction ; larger lumens / dilation / widens / AW ; ref. reduces + deposits / atheroma / AW ; less + resistance / friction / AW ;	[max. 4]	
		[Total: 11]	

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Question	Expected Answer	Mark	Additional Guidance
(a)	*ovule*: in ovary ; contains female gamete ; ref. to haploid ;	[max. 2]	
	seed: ovule after fertilisation ; ref. diploid (or with ref. fruit) ; (grows) larger than ovule ; stores food / ref. cotyledons ; contains (rest of) embryo / radicle **+** plumule ; (surrounded by) testa ; ref. dispersal ;	[max. 3]	
	fruit: seed(s) **+** ovary (wall) / pericarp ; ref. dispersal ;	[max. 1] [total: 6]	

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(b)	dry ; light ; (may be) winged / hairy / feathery / helicopter / parachute ; large surface area ; to allow wind to detach it from parent plant ; to delay its descent ; (allow it to be carried) long distance AW / away from parent plant ;	[max. 4]	
		[Total: 10]	

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Question	Expected Answer	Mark	Additional Guidance
7 (a)	fast / instant ; automatic / involuntary / spontaneous / unconscious / AW ; response / reaction ; to a stimulus ;	[max. 3]	**A** ref. to no decision involved
(b) (i)	named stimulus* ; correct receptor / named* ; impulse / electrical **+** pulse ; sensory / afferent / receptor + motor / efferent / effector neurones, in correct order ; CNS / spinal cord* ; correct or named effector* ; correct action (of effector)* ;	[max. 5]	***** description must match example*** **R** brain if it directs response
(ii)	automatic / innate / does not need to be learnt ; ref. protection / aids survival / damage limitation ;	[2]	**A** example, e.g. prevents too much light entering eye
		[Total: 10]	

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Question	Expected Answer	Mark	Additional Guidance
8 (a) (i)	starting with a producer ; plausible food chain with 3 consumers **+** arrows in correct direction ;		**I** ref to the Sun
(ii)	labelled pyramid with organisms named in food chain ; in correct order with named producer labelled at bottom ; pyramid of correct proportions for given food chain ;	[max. 4]	
(b)	some organisms / parts remain uneaten ; energy lost in faeces / undigested food ; urine / excretory products / excretion ; respiration ; energy lost as heat ; homeostasis / named example ; in movement / muscular contraction (or any e.g. of same) ; in nervous impulses ; catabolic reactions / named ; active transport ; ref. decomposition / decay	[max. 6]	
		[Total: 10]	

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Question	Expected Answer	Mark	Additional Guidance
9 (a)	blood goes through heart twice (in one complete circuit of the body) ; circulation to / from lungs / pulmonary ; circulation to / from (rest of) body / systemic ; lungs **+** low pressure ; body **+** high pressure ;	[max. 4]	
(b)	two sides to the heart / heart completely divided ; four chambers / two atria **+** two ventricles / all 4 named chambers ; beats continually ; right side / atrium **+** receives blood from body ; right side / ventricles **+** pumps blood to lungs ; left side / atrium receives blood from lungs ; left side / ventricle **+** pumps blood to (rest of) body ; left ventricle thicker-walled / more muscular **+** than right ventricle ; ventricles thicker-walled / more muscular **+** than atria ; further to pump blood / generate higher pressure ; ref. valves **+** one-way flow / prevent backflow ;	[max. 6]	
		[Total: 10]	

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