Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

BIOLOGY **5090/21**

Paper 2 Theory **October/November 2017**

MARK SCHEME

Maximum Mark: 80

Published

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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)
Ig	ignore (for incorrect but irrelevant responses)
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
+	statements on both sides of the + are needed for that mark

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Question	Answer	Marks	Guidance
1(a)	**B** ; incisor ; biting / cutting / tearing / gripping ; **C** ; molar ; chewing / crushing / grinding ;	**6**	 **R** pre-molar
1(b)(i)	sugar ; bacteria ; respiration ; acid ; plaque ;	**2**	**A** named sugar, **Ig** sweets
1(b)(ii)	reference to brushing ; flossing ; fluoride ; reference to dental check-ups ;	**2**	 **A** fluorine

Question	Answer	Marks	Guidance
2(a)(i)	**P** renal artery ; **Q** renal vein ;	**2**	
2(a)(ii)	urine ; ureter ; bladder ; urethra ;	**4**	**R** urea
2(b)(i)	reference to artery **+** vein ;	**1**	
2(b)(ii)	lower pressure ; less / no urea ; reference to increase / decrease **+** concentration of ions **AW** ;	**1**	
2(c)	(*artificial membrane*) partially permeable **AW** ; small molecules or named **+** pass through (membrane) ; correct reference to diffusion / osmosis ; proteins do not pass through (membrane) ; *(dialysis fluid)* no / low urea **OR** removes urea ; reference to concentration gradient ; same glucose concentration **+** as normal blood ; same ion **AW** concentration **+** as normal blood ;	**5**	

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Question	Answer	Marks	Guidance
3(a)(i)	food chain ;	**1**	
3(a)(ii)	tree ; songbird / hawk ;	**2**	**A** named tree
3(b)(i)	doesn't hit leaves / tree **OR** intercepted by other objects ; reflected (off leaves) ; not used in photosynthesis ;	**2**	
3(b)(ii)	movement / flight ; excretion ; egestion / faeces ; sound / singing ; heat / maintaining body temp / warm blooded ; respiration ; hawk doesn't eat / digest all of songbird(s) **OR** songbird(s) decay(s) ;	**3**	
3(c)	more food produced ; comparative data manipulation ; fewer levels in food chain **AW** ; correct reference to herbivore / carnivore **+** human ; correct reference to primary / secondary **+** consumer ; less energy lost / more efficient ; example of energy not lost (e.g. through movement) **ORA** ;	**5**	**A** quote from Fig. 3.2 (e.g. 12 000 loaves vs. 1200 portions of meat) **A** 25× more mass / 10× more food products (for wheat)

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Question	Answer	Marks	Guidance
4(a)	red blood (cell) / erythrocyte ; oxygen **+** carriage / transport / absorption **AW** ;	**2**	
4(b)	tiredness / fatigue / weak / dizzy / faint ; inability to exercise / exert / inactive ; breathing problems ; reduced oxygen transport ; reduced respiration ; reduced energy (release) ; irregular menstruation **AW** ;	**4**	
4(c)	low <u>water</u> potential / concentration inside cell ; water enters ; by osmosis / diffusion ; cell expands ; cell bursts ; reference to no cell wall ;	**3**	

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Question	Answer	Marks	Guidance
5	(*fruit A*) hooks / spikes **AW ;** on animal / fur **;** falls off / rubbed off / leaves animal **AW ;** (*fruit B*) edible / eaten / food **;** colour / taste / juicy / sweet **;** thrown away / discarded / faeces / egested **AW ;** (*for A or B*) new location / away from parent plant **;**	**5**	**R** feathers / hairs

Question	Answer	Marks	Guidance
6(a)(i)	shaded circle drawn in iris **+** smaller than in 6.1(a) **;**	**1**	
6(a)(ii)	iris **+** muscle **;** circular **+** contract **;** radial **+** relax **;** pupil **;** constricts **AW ;**	**5**	
6(b)	*(type of action)* reflex / involuntary **;** *(why the changes take place)* protection / prevent damage **;** reduces light (entering) **;** retina / rods / cones / photoreceptors **;**	**4**	

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Question	Answer	Marks	Guidance
7(a)(i)	***(W)*** fungus / microorganism / bacteria / nutrient / yeast / water ; ***(X)*** carbon dioxide ; ***(Y)*** oxygen ; ***(Z)*** antibiotic / named antibiotic ;	**4**	
7(a)(ii)	respiration ; aerobic ; reference to increased yield ; sparger / bubbles / more surface area ; growth ;	**2**	
7(b)	detect changes ; enzymes ; denature ; reduce rate of reaction / product formed ; kill microorganisms or named ; maintain optimum / best conditions ;	**3**	
7(c)	heat production / temperature ; ease of maintenance ; prevents water damage to motor ; doesn't take up space (in fermentation vessel) **AW** ;	**1**	

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Question	Answer	Marks	Guidance
8(a)	active **+** more energy **;** reference to carbohydrates / fats **;** child **AW +** growth **;** reference to protein / calcium / vitamin D **;** (post-pubertal **AW**) female **+** iron **;** reference to menstrual loss of blood **;** old person **+** less growth / less active / no menstruation **;** reference to reduced need for correct named nutrient **;**	**4**	marks are linked in pairs
8(b)	muscle **+** wall **;** contracts / churn / mechanical digestion **;** acid **;** optimum **AW** pH **;** enzyme **;** protease / pepsin **;** protein(s) **;** to amino acids / (poly)peptides **;**	**6**	answer must refer to the stomach and not other parts of the alimentary canal

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Question	Answer	Marks	Guidance
9(a)	hypothalamus ; reference to detecting blood temperature ; receptors ; in skin ; detect temperature **+** of surroundings **AW** ; impulse ; sensory neurone ; to central nervous system / brain / spinal cord ; motor neurone ; effector ; named effector ; shiver / vasoconstriction or vasodilation / sweat increase or decrease ; reference to negative feedback ;	**6**	**A** muscle or named effector / sweat gland
9(b)	correct named situation ; target organ / named ; *(any two effects from)* glycogen to glucose / sugar ; increased (heart) rate ; pupils dilate ; dry mouth ; breathing rate change ; diversion of blood to muscle / from gut ;	**4**	increased heart rate = 2 marks (named target organ **+** effect)

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