Coordination and Response

Mark Scheme 6

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Coordination and Response
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 6

Time Allowed: **65 minutes**

Score: **/54**

Percentage: **/100**

1 **(a)** **(A)** ciliary (muscle/body);
(B) pupil + becomes smaller/constricts; (R) narrower
(R) controls amount of light entering
(A) less light enters eye (A) makes iris larger/width increases **[2]**

(b)(i) **(voluntary)**
can be controlled (by will)/involves a decision or thought/not automatic;
(A) control by brain (R) conscious (R) knowingly

(antagonistic)
ref. to opposing/working against each other/one contracts while the other relaxes AW; **[2]**

(ii) CHECK FOR ARROWS OR ANNOTATIONS ON FIG. 2.1
ref. to eye ball pulled to the right AW; (A) clockwise (R) up
(A) outwards/towards muscle **C** **[1]**

(iii) ref. to contraction AW of muscle **D** + relaxation of muscle **C**;
D pulls on eyeball AW;
C is antagonistic to **D**; **[max. 2]**

(c) 2 MARKS FOR CORRECT ORDER
1 MARK FOR TWO INCORRECT

cornea aqueous humour pupil lens vitreous humour; ; **[2]**

(d)

	type of light detected	distribution in the retina
rods	ref. to shades of grey/ dim light/black and white/low light intensity; (A) night/dark/white	ref. to spread over (retina); (A) more concentrated on margins (R) on sides unqual.
cones	ref. to colour/bright light/ high light intensity/day(light); (A) single named colour	ref. to in fovea/yellow spot;

[4]

Total: 13]

2 **(a)** **(i)** pupil drawn in both diagrams + smaller in first diagram ;
iris in both diagrams the same diameter ; **[2]**

(ii) labels correct for:
iris ;
pupil ;
sclera ; **[3]**

(b) (pupils gets bigger)
ref. to contraction + of radial muscles ;
ref. to relaxation of circular muscles ; **[2]**

(c) ref. to role of rods in detecting black and white images AW ;
ref. to sensitivity even in low light intensities AW ;
ref. to role of cones in detecting colour AW ;
ref. to cones needing high light intensity to trigger them AW ; **[max. 3]**

[max. 10]

<table>
<tr><th>Question</th><th>Answer</th><th>Mark</th><th>Additional Guidance</th></tr>
<tr><td>3 (a) (i)</td><td>G oesophagus / esophagus / gullet ;
H diaphragm ;
M large intestine / large bowel / colon ;</td><td>[3]</td><td>R intestine unqualified / rectum</td></tr>
<tr><td>(ii)</td><td>
<table>
<tr><td>function</td><td>name</td><td>letter from Fig. 3.1</td></tr>
<tr><td>conversion of glucose to glycogen</td><td>liver</td><td>P ;</td></tr>
<tr><td>secretion of insulin and glucagon</td><td>pancreas</td><td>K</td></tr>
<tr><td>absorption of products of digestion</td><td>ileum / small intestine</td><td>L ;</td></tr>
<tr><td>storage of bile</td><td>gall bladder</td><td>O ;</td></tr>
<tr><td>chemical digestion of protein in an acidic pH</td><td>stomach</td><td>J ;</td></tr>
</table>
</td><td>[4]</td><td>ignore bile duct</td></tr>
</table>

<table>
<tr><th>Question</th><th></th><th>Mark</th><th>Additional Guidance</th></tr>
<tr><td>3 (b) (i)</td><td>emulsification / emulsifying (fat) / producing an emulsion ;</td><td>[1]</td><td>R ‘emulsion’ unqualified</td></tr>
<tr><td>(ii)</td><td>increases surface area ;
for action of, lipase / enzyme(s) ;</td><td>[2]</td><td>A speeds up, enzyme reaction / breakdown of fat / absorption of fat
A makes it easier to absorb</td></tr>
<tr><td>(c) (i)</td><td><table><tr><th>hormone</th><th>uptake by liver cells</th><th>concentration of glucose in the blood</th></tr><tr><td>insulin</td><td>inc</td><td>decreases ;</td></tr><tr><td>glucagon</td><td>de</td><td>increases / stays the same ;</td></tr></table></td><td>[2]</td><td>one mark per correct row</td></tr>
<tr><td>(ii)</td><td>adrenaline ;</td><td>[1]</td><td>A epinephrine, cortisol, ACTH, growth hormone, somatostatin, thyroxine, GLP–1, GIP</td></tr>
<tr><td>(d)</td><td>glucose concentration is kept, (near) constant / within narrow limits / AW ;
any change (in concentration), is detected / acts as a stimulus ;
correct ref to, glucose → glycogen / glycogen → glucose / increasing glucose concentration / decreasing glucose concentration ;
idea that it returns concentration to normal ;
idea that release of correctly named hormone, stops / switches off ;
ref to homeostasis ;</td><td>max [3]</td><td>R hormones carrying out conversions directly</td></tr>
<tr><td></td><td></td><td>[Total: 16]</td><td></td></tr>
</table>

Question		Answers		Marks	Additional Guidance
4	(a)	$C_6H_{12}O_6$; $2C_3H_6O_3$;		[2]	**I** word equation **I** energy / ATP **R** if 2 is not included for $C_3H_6O_3$ **R** glucose if oxygen included on left of arrow **R** if water given on either side
	(b)	2.0 / 2 ; 18 ; 36 ;		[3]	**A** *ecf* for volume of air per minute = multiple of first two figures in answer
	(c)	**1**	descriptive comment on difference between Fig. 3.1 and 3.2 ; **A** data quote for any one of the results shown in Table 3.1		breathing rate, volume of air, ventilation rate e.g. breathe, fast / faster, deeper **R** heavier
		2	<u>muscle</u> ;		
		3	respires faster ; **R** breathes faster (as this is for MP1)		**A** more respiration
		4	*idea that* more, energy / ATP, released / needed ;		**NOT** more glucose **R** 'energy produced'
		5	<u>aerobic</u> respiration ;		
		6	*idea that* requires more oxygen ; **A** ref to more <u>oxygenated</u> blood		
		7	*idea that* remove more carbon dioxide ;		
			change to breathing maintains		
		8	pH of blood ;		
		9	oxygen concentration ;		MP8 – MP10 must have idea of maintaining near constant
		10	carbon dioxide concentration ;		
		11	prevents (much) <u>anaerobic</u> respiration occurring ;		MP11–13 **R** refs. to there being an oxygen debt and paying off oxygen debt as question is about *during exercise* not afterwards, other points especially MP1 to 7 can still be awarded if answer contains refs to oxygen debt unless answer says 'after exercise'
		12	prevents build up of, lactic acid / lactate ; **R** removes		
		13	prevents oxygen debt ; **R** repays		
		14	AVP ; e.g. ref. to homeostasis, contraction of muscle	[max 5]	

Question		Answers	Marks	Additional Guidance
4 (d)		*mark both parts together to max 5 – some points may be awarded in either section*		
	1	more / faster , respiration in muscles ;		
		pulse rate		
	2	pulse rate increases ;		**A** heart pumps faster
	3	*idea that* more / faster, blood transport to, muscles / lungs ;		**R** 'to body'
	4	*idea that* muscle requires more oxygen ;		
	5	remove, carbon dioxide from muscles ;		
	6	remove, lactic acid / lactate, from muscles ;		
	7	remove heat from muscles ;		
		concentration of glucose		
	8	concentration of blood glucose, increases / stays the same ;		
	9	glucose required for, energy / respiration ;		
	10	for muscle, activity / contraction / to work ;	[max 5]	**I** – (strenuous) exercise
			[Total: 15]	