

Coordination and Response

Mark Scheme 3

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Coordination and Response
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 3

Time Allowed: 62 minutes

Score: /51

Percentage: /100

Question	E answers	Mark	Additional Guidance								
1 (a) (i)	<table><tr><td>stimulus</td><td>(blue) light / (change in) light intensity / dim to bright light ;</td></tr><tr><td>receptor cells</td><td>cones / rods ;</td></tr><tr><td>effector</td><td>(circular) muscle, of / in, iris ;</td></tr><tr><td>response</td><td>pupil, gets smaller / constricts / AW ;</td></tr></table>	stimulus	(blue) light / (change in) light intensity / dim to bright light ;	receptor cells	cones / rods ;	effector	(circular) muscle, of / in, iris ;	response	pupil, gets smaller / constricts / AW ;	[4]	<p>ignore retina (as it is a tissue)</p> <p>R ciliary muscle R radial muscle</p> <p>R muscle / pupil, contracts ignore muscle contraction</p>
stimulus	(blue) light / (change in) light intensity / dim to bright light ;										
receptor cells	cones / rods ;										
effector	(circular) muscle, of / in, iris ;										
response	pupil, gets smaller / constricts / AW ;										
(ii)	<p><i>if marked in the context of accommodation or a mixture of the two reflexes, then mark to max 3</i></p> <p>1 (nervous / electrical) <u>impulses</u> ;</p> <p>2 sent by / initiated by, (named) receptors / sensory cells / retina ; R if optic nerve, sends / initiates / AW, the impulse</p> <p>3 via / along / through, <u>sensory neurone(s)</u> / <u>optic nerve</u></p> <p>4 to, brain / CNS / grey matter ; ignore spinal cord</p> <p>5 (from the brain) via / along / through, <u>motor neurone</u> (to effector) ;</p>	[max 4]	<p>MP1 – M5 ignore 'signals' / 'messages' / AW</p> <p>ignore relay / connector / inter-, neurone ;</p> <p>ignore 'impulses to brain' after the response has happened</p>								

2 (a)	A <u>cell membrane</u> ; B cytoplasm ; C nucleus	[3]	
(b) (i)	retina ;	[1]	
(ii)	fovea / yellow spot ; blind spot / optic disc / end of optic nerve ;	[2]	
(c)	1 light absorbed (by a pigment) ; 2 rods detect low light (intensity) ; 3 give 'black and white' vision / do not detect colour ; 4 provide night vision / AW ; 5 cones detect high light (intensity) ; 6 cones detect colour ; 7 any detail, e.g. three different types of cone ; 8 convert light into (electrical) <u>impulses</u> ; 9 <u>impulses</u> sent to brain ; 10 via, neurones / sensory nerve / optic nerve ;	[max 4]	
		[Total: 10]	

Question		Answers	Marks	Additional Guidance
3	(a)	A – pancreas ; B – insulin ; C – <u>glucagon</u> ;	[3]	A Islet(s) of Langerhans <i>although not an organ</i>
	(b)	(i) liver ;	[1]	
	(ii)	glycogen less reactive than glucose ; <i>idea that</i> is not lost from cell by diffusion ; not used up in respiration ; decreases concentration of solute(s) ; <i>idea that</i> this prevents a decrease in water potential ; so reducing excess uptake of water ; by osmosis ; prevents cell bursting (as a result of osmosis) ;	[max 2]	
	(c)	<u>negative feedback</u> ;	[1]	
	(d) (i)	gene identified / location found ; cut from, DNA / chromosome ; inserted into, plasmid / vector ; plasmid inserted into bacterium ; AVP ;	[max 3]	restriction enzymes / ligases

	<p>(ii)</p> <p><i>advantages for max 2</i> increases, yield / production ; increases profits ; fewer animals need to be kept ; less waste / less pollution ;</p> <p><i>disadvantages to max 2</i> puts health of animals at risk ; consumers may not buy 'genetically modified food' ; ref to health scares with hormonally-treated animals ; ref to health scares with use of GM products ; AVP ; e.g. ref to milk surpluses</p>	<p>[max 3]</p>	<p>e.g. mastitis A GM</p>
		[Total: 13]	

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Question	E	Answers	Marks	Additional Guidance
4	(a)	detect / sense / feel, changes / stimuli ; make response(s) / react / AW ;	2	ignore specific example of response
	(b)	F to skin receptor ; G to sensory neurone ; H to biceps ;	3	Label line to actual part only. R lines to motor end plate or neurone
	(c)	automatic ; no thought required / not a conscious action ; stimulus always leads to the same response ;	max 2	ignore refs to speed of response A no (higher centres in) brain involved A fixed response
	(d)	1 rapid response ; 2 protective / AW ; 3 mechanical damage / injury ; 4 e.g. ; 5 already present immediately after birth ;	max 3	i.e. before learning can take pla
	(e)	1 heart beats faster ; 2 increased rate of breathing ; 3 trachea / bronchi / bronchioles / airways, dilate / widen 4 vasoconstriction / AW, in gut / skin; 5 vasodilation / AW, in muscles ; 6 stimulates breakdown of glycogen in the liver ; 7 increases blood glucose concentration ; 8 dilate pupils ; 9 heightened sensitivity / increased mental awareness / AW;	max 3	A increase pulse (rate) A more oxygen to muscles R 'adrenaline breaks down glycogen' A sharper senses / more alert / AW
			[Total: 13]	