Coordination and Response

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Coordination and Response
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 1

Time Allowed: **64 minutes**

Score: **/53**

Percentage: **/100**

1 **(a)**	central (nervous system) **;** peripheral (nervous system) **;** spinal cord **;**	[3]	**R** spine
(b) (i)	sensory neurone **;**	[1]	**A** afferent neurone **R** sensory nerve
(ii)	simple reflex / reflex **;**	[1]	**A** reflex arc
(iii)	slower / takes more time **;** needs thought / uses (higher centres of) the brain / conscious control **;** learnt / not inherited / not innate / needs training / AW **;** not automatic **;** response is not always the same to the stimulus **;**	[max 2]	

Question		**Mark**	**Guidance**
(c) (i)	*either* **pot P** – (uniform) light AND **pot Q** – no light / dark / covered (up) **;** *or* **pot P** – (uniform) with / plus, magnesium AND **pot Q** – no magnesium **;**	[1]	**A** pot P has all nutrients
(ii)	positive **;** (photo)tropism / (photo)tropic **;**	[2]	**R** (photo)trophic / geotropic / gravitropic
(iii)	*idea that* leaves / seedlings / plants / chloroplasts, get more light **;** more (light) energy, absorbed / trapped / AW **;** more photosynthesis **;** more, growth / biomass / glucose / starch / AW **;**	[max 2]	'more' is only required once
(iv)	(auxins) made / produced, in (shoot), tip / apex **;** pass / move / diffuse / spread (down the stem) **;** auxins collect in the side, in the dark / away from light **;** greater (cell) elongation on side in the dark **;** AVP **;** e.g. absorption of water (by osmosis) / stretching of cell walls / phototropin(s) / plants detect *or* sense light / ref to turgor pressure	[max 4]	**I** 'found, in / on' **A** 'dark / shaded, side' **I** comments about roots
		[Total: 16]	

<table>
<tr>
<td>2 (a)</td>
<td>
<table>
<tr><td>name of part</td><td>letter from Fig. 3.1</td></tr>
<tr><td>hair</td><td>R ;</td></tr>
<tr><td>blood vessel / arteriole / small artery</td><td>S ;</td></tr>
<tr><td>sweat gland</td><td>U ;</td></tr>
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</td>
<td>[3]</td>
<td>1 mark per correct row

R artery, capillary</td>
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<td>(b)</td>
<td>(involuntary responses are) automatic / no conscious decision / does not involve thought / decision making / innate / reflex ;
(higher centres of) brain not involved ;
faster / immediate / rapid ;
response always the same / response specific to stimulus ;
may involve glands ;
they are protective / linked to survival / AW ;
AVP ;</td>
<td>max [3]</td>
<td>A reverse argument written in favour of voluntary responses if this is clearly stated</td>
</tr>
<tr>
<td>(c)</td>
<td>(change in) temperature / hot / cold is stimulus ;
temperature receptors (in skin) / V ;
(electric) impulse ;
travels through sensory neurone ;
to brain ;
relay / connector / intermediate neurone ;
motor neurone ;
to effector ;
example of effector (arteriole / erector, muscle) ;</td>
<td>max [4]</td>
<td>R messages
points need to be in the correct sequence

A ‘muscle’ unqualified.</td>
</tr>
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<td>(d)</td>
<td>change in temperature, is detected / acts as a stimulus ;
to keep temperature, constant / at 37 °C / within limits / near set point / at the norm / AW ;
corrective / opposite, action by the body ;
return to normal temperature ;
correct ref to homeostasis ;</td>
<td>max [3]</td>
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<td>[Total: 13]</td>
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3 **(a)**	hepatic portal vein ;	[1]	
(b)	(semi lunar) valves ; prevent backflow ; large, lumen ; low, pressure / resistance to blood flow ; thin / less elastic / less muscular, walls (than arteries) ; low blood pressure ; allows vein to be squeezed by (surrounding skeletal) muscles ;	2 + 2 max [4]	in each case the explanation must be linked to a correct feature
(c)	= (181 – 135) ÷ 135 (× 100) ; = 34 (%) ;;	max [2]	
(d) (i)	(liver) responds to insulin (from pancreas) ; increased, uptake / respiration, of glucose ; glucose converted to glycogen ; by enzymes ; glycogen is, insoluble / stored ; negative feedback ;	max [2]	**A** glycogenesis **R** hormones carrying out conversions directly **ignore** homeostasis
(ii)	temperature ; water ; AVP ; e.g. pH / ions / urea / carbon dioxide	max [1]	

3 **(e)**	deamination ; (part of excess) amino acids converted to urea ; (part of) amino acid converted to ammonia ; ammonia converted to urea ; ammonia is harmful ; (rest of) amino acid molecule, releases energy / converted to glucose / glycogen / respired ; (some amino acids) used to make proteins e.g. fibrinogen ; AVP ; e.g. transamination	max [3]	**A** description of amino group removal **ignore** protein converted to urea
(f)	bile production / AW ; breakdown / remove, hormones / red blood cells / toxins / alcohol / drugs ; storage of, iron / vitamin A / vitamin D ; AVP ; e.g. cholesterol, synthesis / AW	m [1]	**R** homeostasis, deamination, protein synthesis, transamination
		[Total: 14]	

4	(a) (i)	eaten / absorbed, a (sugary / high carbohydrate) meal / AW ; (secretion / effect, of) adrenaline ; (secretion / effect, of) <u>glucagon</u> ; dehydration / loss of water ;		max [1]	
	(ii)	used in <u>respiration</u> ; (named) exercise / physical activity ; hungry / fasting / starvation ; (secretion / effect, of) insulin ;		max [1]	
	(iii)	liver ; muscle ; kidney ; testes ;		max [2]	
	(b)	**1**	pancreas / islets of Langerhans, detects increase in glucose concentration ;	max [3]	
		2	(pancreas / islets) secretes / produces, insulin ;		
		3	transported in, blood / plasma ;		
		4	liver / muscle / cells, convert glucose to <u>glycogen</u> ;		
		5	ref to, enzymes (converting glucose to <u>glycogen</u>) ;		
		6	<u>homeostasis</u> / <u>negative feedback</u> ;		
	(c)	water, diffuses out of (red blood cells) ; through, partially permeable membrane ; by osmosis ; down water potential gradient / from high water potential to low water potential ; (red cells) decrease in volume / shrink / crenated / AW ;		max [3]	