

Answers to examination-style questions

Answers	Marks	Examiner's tips
<p>1 a) kinesis: random movements = 1 mark, e.g. degree of turning / number of turns depends on strength of stimulus / on temperature / allow specific reference to more turning at 35° than at 30° / non-directional stimulus / response</p> <p>b) stays longer in warmer area / at 35° / tends to leave cooler area / to leave 30° / stays in favourable conditions; remains near food source / on host;</p>	2	Thermokinesis, orthokinesis or klinokinesis are acceptable answers but photokinesis or chemokinesis are not. Remember, kinesis involves a non-directional stimulus and response.
<p>2 a) i) arc shows 3 neurones</p> <p>ii) neurones labelled sensory, relay / intermediate, motor;</p> <p>iii) muscle labelled as effector;</p> <p>b) i) rapid response to stimulus; which is automatic / involuntary / not under conscious control;</p> <p>ii) avoids damage to tissues; role in learning / homeostasis; posture / balance; escape from predators; finding food / mate;</p>	1 1 1 2 2 max.	<p>You must show 3 distinct neurones (the middle one in the grey matter) with correct route through dorsal and ventral roots and indication of synapses.</p> <p>It is important that you refer to stimulus and response for the first marking point.</p> <p>Avoid responses such as 'it prevents you getting hurt'. Reflexes help an organism survive by responding to changes in their environment.</p>
<p>3 a) heart rate controlled by both (divisions); parasympathetic reduces heart rate / sympathetic increases heart rate; parasympathetic is most active / larger change in heart rate when parasympathetic is cut;</p> <p>b) rate increased by sympathetic / decreased by parasympathetic / change in activity of both</p>	3 1	<p>You could obtain all these marks from analysing the changes shown on the graph. However, you should know the effects of these two systems on the heart rate.</p>

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<p>4 a) pressure deforms / stretches membrane sodium channels; sodium ion channels / gates open; sodium ions enter causing depolarisation / change in membrane potential;</p> <p>b) increase in carbon dioxide from respiration; decrease in blood pH / increase in hydrogen ions detected by chemoreceptors; in carotid / aortic bodies / medulla; (more) impulses to cardiac centre / medulla; (more) impulses (from medulla) along sympathetic nerve; to SAN increasing heart rate.</p>	3	It is important to refer to the entry of <i>sodium ions</i> . Pressure causes sodium ion channels to stretch and change shape which allows the sodium ions to enter.
<p>5 a) i) no photoreceptors / no rods and / or cones at P</p> <p>ii) maximum number of cones at Q; each cone has connection with one neurone / bipolar cell;</p> <p>b) several rods have connections with one neurone / bipolar cell; idea of summation (of generator potentials); exceed threshold; individual (generator potentials) do not exceed threshold;</p>	1 2 3 max.	<p>This is known as the blind spot.</p> <p>The brain will receive separate sets of impulses from each stimulated cone.</p> <p>Summation literally means 'addition'. Here the additional effect of several stimulated rods exceeds the threshold required to generate an impulse in a bipolar neurone.</p>