

## Answers to examination-style questions

Answers	Marks	Examiner's tips
1 a) grows towards light for photosynthesis	1	This is an example of phototropism. Tropisms are responses to directional stimuli that can maintain flowering plants in favourable environments.
b) size/species/age of shoot / temperature / time / size of agar block	1	Light intensity is an incorrect answer; two of the experiments are carried out in total darkness.
c) i) against hypothesis 1: similar amounts of IAA in light and dark; ii) in support of hypothesis 2: C has more IAA on shaded side;	2	For the first mark you could use the appropriate letters, for example similar amounts of IAA in A and D. The difference in total amounts in the light and dark are insignificant.
d) diagram showing growth of shoot to right	1	The concentration of IAA will be greater on the left-hand side of the shoot, which stimulates these cells to elongate more.
2 a) action potential arrives / depolarisation occurs; calcium ions enter synaptic knob; vesicles fuse with membrane; acetylcholine diffuses (across synaptic cleft); binds to receptors (postsynaptic membrane);	4 max.	Don't waste time providing a description of how depolarisation of the postsynaptic membrane occurs. The question only requires details up to the binding of acetylcholine to the receptors.
b) inside becomes more negatively charged / hyperpolarised; stimulation does not reach threshold level / action potential not produced; depolarisation does not occur / reduces effect of sodium ion entering;	3	This is an example of how an inhibitory synapse works. The inside of the axon becomes more negative so that depolarisation is more difficult to achieve.
c) i) inhibits enzyme (which breaks down GABA); more GABA available (to inhibit neurone); <i>or</i> binds to (GABA) receptors; inhibits neuronal activity / chloride ions enter neurone;	2 max.	This is a suggest question and there are two probable explanations, either one of which is acceptable. As well as being able to explain transmission across a synapse, you will be expected to interpret effect of drugs on a synapse when provided with new information.
ii) receptors have different tertiary / 3D structure / shape not complementary; GABA cannot bind; inhibition of neuronal activity does not occur / chloride ions do not enter;	3	Receptors are proteins and have a tertiary structure, which is usually complementary to the binding molecule. A change in the structure of this receptor means that GABA is no longer complementary and cannot bind.

## Answers to examination-style questions

Answers	Marks	Examiner's tips
<p><b>3 a)</b> sodium gates or channels open / increase in permeability of axon membrane to sodium ion; sodium ions enter axon;</p> <p><b>b)</b> non-myelinated – depolarisation occurs along whole length of whole membrane; myelinated – depolarisation only occurs at nodes (of ranvier); 'impulse' jumps from node to node / salutatory conduction;</p>	<p>2</p> <p>3</p>	<p>Look carefully at the wording of the question. You don't need to provide a full description of what happens during an action potential, you only need to describe how depolarisation occurs.</p> <p>In the non-myelinated neurone, depolarisation of one section of the axon membrane causes depolarisation of the adjacent section of membrane. This results in slower transmission of impulses than when saltatory conduction occurs.</p>
<p><b>4 a)</b> nervous system electrical impulses, hormonal only chemicals; use neurones, use of blood; localised, widespread response; short-lived, long-lasting; rapid, slow response;</p> <p><b>b)</b> respiration stops / no ATP; active transport stops / pump stops; sodium ions no longer pumped out; sodium ions continue to diffuse / move in; accumulating sodium ions inside / becomes less negative inside; potassium ions equilibrium quickly established/ potassium ions no longer pumped in;</p>	<p>2 max.</p> <p>4 max.</p>	<p>You must have both sides of a comparison to gain a mark.</p> <p>The metabolic poison prevents the active transport of ions against their diffusion gradients. Eventually, the electrochemical gradients will no longer be maintained as the concentration of ions reaches equilibrium either side of the membrane.</p>
<p><b>5 a)</b> (rapid) response to stimulus / named example with stimulus and response; which is automatic / not under conscious control;</p> <p><b>b)</b> A – motor B – relay/inter (nuncial) C – sensory</p> <p><b>c)</b> reference to transmitters / principle of chemical rather than electrical; process of transmission takes time e.g. transmitter diffusion;</p> <p><b>d)</b> myelinated – impulse jumps from node to node / depolarisation or action potentials only occur at the nodes; non-myelinated – impulse travels whole length (of axon membrane);</p>	<p>2</p> <p>1</p> <p>2</p> <p>2</p>	