

Question Number	Answer	Mark
1 (a) (i)	100 (mV) ;	(1)

Question Number	Answer	Mark																												
1 (a) (ii)	<table border="1"> <thead> <tr> <th>Description</th> <th></th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Stage when the concentration of positive ions is greatest inside the axon</td> <td></td> <td></td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Stage when hyperpolarisation first occurs</td> <td></td> <td></td> <td></td> <td></td> <td><input checked="" type="checkbox"/></td> <td></td> </tr> <tr> <td>Site showing the resting potential</td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Description		B	C	D	E	F	Stage when the concentration of positive ions is greatest inside the axon			<input checked="" type="checkbox"/>				Stage when hyperpolarisation first occurs					<input checked="" type="checkbox"/>		Site showing the resting potential	<input checked="" type="checkbox"/>						(3)
Description		B	C	D	E	F																								
Stage when the concentration of positive ions is greatest inside the axon			<input checked="" type="checkbox"/>																											
Stage when hyperpolarisation first occurs					<input checked="" type="checkbox"/>																									
Site showing the resting potential	<input checked="" type="checkbox"/>																													

Question Number	Answer	Mark
1 * (b)	<p>QWC – Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence</p> <ol style="list-style-type: none"> diffuses across {gap /eq} ; binds to (receptors on) post-synaptic membrane / eq ; idea of gated-channels opening or Na⁺ travels through post-synaptic membrane ; causing a depolarisation / eq ; (if sufficient present) an action potential is set up in {post-synaptic membrane/adjacent cell / eq} ; details such as temporal or spatial summation ; idea that allows coordination / one way flow of information ; idea that it allows integration in post-synaptic cell ; neurotransmitter broken down (by enzyme) / eq ; so that do not get {prolonged /eq} action potential in post-synaptic membrane / make receptors available again ; credit reference to fate of products e.g. reabsorbed through pre-synaptic membrane OR to be re-synthesised into neurotransmitter substance ; 	(5)

Question Number	Answer	Mark
2(a)	<ol style="list-style-type: none"> 1. (L-Dopa) can reach brain / unlike dopamine treatment / eq ; 2. converted to dopamine (in brain) / eq ; 3. increases dopamine levels in the brain / eq ; 4. Parkinson's disease has low dopamine levels / reduces symptoms of Parkinson's disease / eq ; 	max (2)

Question Number	Answer	Mark
2(b)	<ol style="list-style-type: none"> 1. reference to {higher levels of / more} serotonin / eq ; 2. reference to synapse / eq ; 3. {inhibits / eq} reabsorption (into neurone) / eq ; 4. may reverse pumps to release more serotonin / eq ; 	max (3)

Question Number	Answer	Mark
2(c)(i)	to mimic Parkinson's disease / Parkinson's disease has low dopamine levels / eq ;	(1)

Question Number	Answer	Mark
2(c)(ii)	<ol style="list-style-type: none"> 1. (rationalist view) overall good should outweigh harm (to animals) ; 2. (absolutist view) all use (of animals) unacceptable ; 3. idea of as few animals as possible used in the trial ; 4. welfare of animals should be important / eq ; 	max (3)

Question Number	Answer	Mark
2(d)	<ol style="list-style-type: none"> 1. test {small sample / eq} {for safety / of healthy individuals} / eq ; 2. large sample of {patients / tested for effectiveness} / eq ; 3. reference to clinical trials on {1000s / larger sample} ; 4. reference to double blind {trials / tests} ; 5. reference to placebo ; 6. idea of representative sample e.g. take into account sex, age ; 	<p style="text-align: center;">max (3)</p>

Question Number	Answer	Mark
3(a)(i)	D ;	(1)

Question Number	Answer	Mark
3(a)(ii)	B ;	(1)

Question Number	Answer	Mark
3(a)(iii)	C ;	(1)

Question Number	Answer	Mark
3(a)(iv)	A ;	(1)

Question Number	Answer	Mark
3(b)	<ol style="list-style-type: none"> 1. reference to (electrical) insulation / eq ; 2. reference to depolarisation at nodes ; 3. impulse jumps from node to node / eq ; 4. saltatory conduction ; 5. reference to faster conduction ; 	(4)

Question Number	Answer	Mark
3(c)	<ol style="list-style-type: none">1. idea that phospholipid restricts ion movement / eq ;2. proteins span the membrane / eq ;3. idea that sodium potassium pump moves ions / eq ;4. (protein) {gates / channels} allow {diffusion / movement} of ions / eq ;	(3)

Question Number	Answer	Mark
4(a)	C ; A ; D ;	(3)

Question Number	Answer	Mark
4(b)(i)	<ol style="list-style-type: none"> 1. high frequency of impulses / eq ; 2. {depletes /eq} neurotransmitter / eq ; 3. calcium ion channels do not open / are less responsive / eq ; 4. reference to synapse / synaptic {membrane / knob / eq } ; 5. (post synaptic) membrane not depolarised / eq ; 6. impulses do not reach gill / eq ; 	(3)

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"> 1. avoids wasted {effort / time / resources / eq} / eq ; 2. to {non-threatening / unimportant / eq} stimulus / eq ; 3. reference to natural frequent stimuli e.g. wave action ; 	(2)

Question Number	Correct Answer	Mark
5(a)	<ol style="list-style-type: none"> 1. depolarisation of adjacent {membrane / eq} / eq ; 2. changes PD across membrane / eq ; 3. opens sodium {gates / eq} ; 4. sodium ions move into (the neurone) ; 	max (2)

Question Number	Correct Answer	Mark												
5(b)	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Position on diagram</th> <th style="width: 30%;">Permeable to sodium ions</th> <th style="width: 30%;">Permeable to potassium ions</th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td></td> <td style="text-align: right;">;</td> </tr> <tr> <td style="text-align: center;">D</td> <td></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: right;">;</td> </tr> </tbody> </table>	Position on diagram	Permeable to sodium ions	Permeable to potassium ions		A	<input checked="" type="checkbox"/>		;	D		<input checked="" type="checkbox"/>	;	(2)
Position on diagram	Permeable to sodium ions	Permeable to potassium ions												
A	<input checked="" type="checkbox"/>		;											
D		<input checked="" type="checkbox"/>	;											

Question Number	Correct Answer	Mark
5(c)	<ol style="list-style-type: none"> 1. correct {reference to / description of} diffusion gradient (of potassium ions) ; 2. correct {reference to / description of} electrochemical gradient ; 3. increased permeability (of membrane) to potassium ions / eq ; 4. reference to potassium {gates / eq} open / eq ; 5. reference to sodium {gates / eq} closed / eq ; 	max (3)

Question Number	Correct Answer	Mark
5(d)	<ol style="list-style-type: none"> 1. PD less negative / eq 2. idea that the membrane remains permeable to potassium ions ; 3. potassium ions {move because of charge difference / eq} ; 4. into {nerve cell / neurone / axon / eq} ; 5. idea that potassium ion is removing a positive charge (from the outside) ; 6. idea that equilibrium is established e.g. diffusion gradient balanced by potential difference ; 	<p>max (3)</p>