

5(a)	feature	ADH	glucagon	insulin	
	binds to receptors on cell surface membranes	✓	✓	✓	;
	results in molecules moving from cells into the blood	✓	✓	×	;
	is secreted as a result of detection by osmoreceptors	✓	×	×	;
5(b)	<i>any four from:</i> 1 impulses / action potentials / neurotransmitters, in nervous system <u>and</u> hormones in endocrine system ; 2 electrical in nervous system <u>and</u> chemical in endocrine system ; 3 neurones / nerve cells, in nervous system <u>and</u> blood in endocrine system ; 4 effects are / target is, specific / localised, in nervous system <u>and</u> (can be) widespread in endocrine system ; 5 effect / response, happens quickly in nervous system and slowly in endocrine system ; 6 effect / response, lasts a short time in nervous system <u>and</u> long time in endocrine system ; 7 AVP ;				
5(c)(i)	C ;				
5(c)(ii)	B ;				
5(c)(iii)	1 (D / it), shortens / contracts / decreases ; <i>and any three from:</i> 2 calcium ions / Ca ²⁺ , bind to troponin ; 3 tropomyosin, moves / shifts position / exposes binding sites on actin ; 4 myosin (head) binds to actin / myosin-actin cross-bridges form ; 5 power stroke / myosin head, pulls actin ; 6 more actin, enters / overlaps with, A band / B or more overlap between actin and myosin ;				

10(a)	<i>any three from :</i> 1 myelin sheath / Schwann cells, acts as an insulator / prevents movement of ions ; 2 depolarisation / action potential, only occurs at the nodes ; I impulses 3 action potentials jump from node to node / saltatory conduction ; I impulses 4 long(er) local circuits ; 5 AVP ; e.g. wide axon diameter
10(b)	<i>any four from :</i> 1 ACh binds to receptors on <u>sarcolemma</u> ; 2 (ligand-gated) Na ⁺ channels open or Na ⁺ enters, muscle cell / sarcoplasm ; 3 <u>sarcolemma</u> depolarised ; 4 depolarisation / action potential, spreads, to / down, T-tubules ; 5 voltage-gated Ca ²⁺ channels open ; 6 Ca ²⁺ , diffuse / move, out of sarcoplasmic reticulum (and bind to troponin) ;

10(c)	<i>any three from :</i> 1 (decreased rate of respiration so), no / less, ATP produced ; 2 no / less, Ca ²⁺ pumped back into sarcoplasmic reticulum ; 3 no / less, release of myosin heads from actin / cross bridges broken or no / less, hydrolysis of ATP by myosin head / return of myosin head to original position ; AW 4 sarcomere, permanently contracted / cannot relax ; A paralysis 5 slower sarcomere contraction / less sarcomere shortening / weaker power stroke ;
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1(a)	1 A ; 2 C ; 3 F ; 4 B ;
1(b)	<i>any four from:</i> 1 no / less, Ca ²⁺ / calcium ions, enter (synaptic knob / presynaptic neurone) ; 2 no / less, vesicles of acetylcholine, move towards / fuse with / do exocytosis at, <u>presynaptic</u> membrane ; 3 no / less, acetylcholine / ACh, binds to receptors (on postsynaptic membrane) ; 4 no / less, Na ⁺ / sodium ions, enter (postsynaptic neurone) or no / less, depolarisation of <u>postsynaptic membrane</u> ; 5 no / fewer, actions potentials ;

10(a)	causing X / -70 (mV) any three from: 1 active transport / sodium-potassium pump ; 2 moves three Na ⁺ out of and two K ⁺ in (to neurone) ; 3 more K ⁺ <u>diffuses</u> out than Na ⁺ <u>diffuses</u> in ; 4 makes outside of membrane (relatively) more positive ; 5 maintaining / establishing, resting potential ; causing Y / +40 (mV) any two from: 6 depolarisation ; 7 Na ⁺ / sodium ion, channels open ; 8 Na ⁺ , moves / diffuses, in (to neurone) ; causing Z / -90 (mV) any two from: 9 hyperpolarisation ; 10 (voltage-gated) K ⁺ / potassium ion, channels open ; 11 K ⁺ , moves / diffuses, out (of neurone) ;
10(b)	1 local, circuit / current ; 2 from, depolarised / positive, area to, resting / negative, area ;
10(c)	<i>any three from:</i> 1 speeds up (nerve) impulse / impulse transmission faster ; 2 (as) myelin sheath / Schwann cells, act(s) as an insulator ; 3 (as) local circuits flow between, nodes of Ranvier / gaps in sheath ; 4 saltatory conduction ; 5 fast(er), (described) response / muscle contraction ;