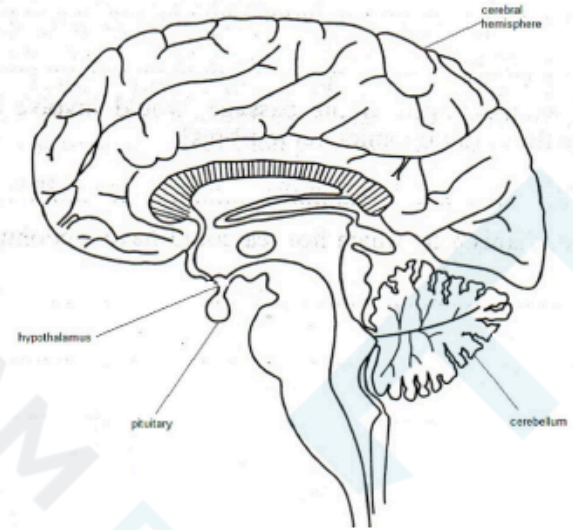


Mark Scheme

Q1.

Question number	Answer	Notes	Marks
(a) (i)	Eustachian tube (1)		1
(ii)	any three from <ul style="list-style-type: none"> • pinna (1) • semi-circular canals (1) • auditory nerve (1) • cochlea (1) 	Ignore oval/round window/utricle / stacculus Allow organ of corti	3
(b) (i)	4 of <ul style="list-style-type: none"> • transmit vibration (1) • from ear drum/tympanum (1) • across middle ear/to (named) ossicles (1) • to oval window/cochlea (1) • amplify vibration (1) 		4 max
(ii)	A; (air)		1
(c)	<ul style="list-style-type: none"> • equalises pressure (1) • either side of eardrum (1) • which allows it to vibrate/transmit vibrations (1) 	Allow tympanic membrane	3

Q2.

Question number	Answer	Notes	Marks										
(a)	 <p>correct labels ;;;;</p>		4										
(b)	<table><tr><th>Function</th><th>Structure</th></tr><tr><td>control of muscle tone and posture</td><td>cerebellum</td></tr><tr><td>intelligence and thought</td><td>cerebral hemisphere</td></tr><tr><td>monitoring of body temperature</td><td>hypothalamus</td></tr><tr><td>release of ADH</td><td>Pituitary</td></tr></table>	Function	Structure	control of muscle tone and posture	cerebellum	intelligence and thought	cerebral hemisphere	monitoring of body temperature	hypothalamus	release of ADH	Pituitary		4
Function	Structure												
control of muscle tone and posture	cerebellum												
intelligence and thought	cerebral hemisphere												
monitoring of body temperature	hypothalamus												
release of ADH	Pituitary												
Total 8 marks													

Q3.

Question number	Answer	Mark
(a)	In the following order: <ul style="list-style-type: none"> Alzheimer's (1) 65 (1) stroke (1) forgetfulness (1) confusion (1) } either order	5

Question number	Answer	Mark
(b)(i)	A description that makes reference to two of the following points: <ul style="list-style-type: none"> greatest number of people with dementia in England (1) lowest number of people with dementia in Northern Ireland (1) manipulation of data, e.g. 605 208 more people with dementia in England compared to Wales (1) 	2

Question number	Answer	Additional guidance	Mark
(b)(ii)	Process: <ul style="list-style-type: none"> $800\,000 \times (2 \div 5)$ (1) 320 000 (1) 	allow 2 marks for correct final answer	2

Question number	Answer	Additional guidance	Mark
(b)(iii)	A suggestion that makes reference to any of two of the following points: <ul style="list-style-type: none"> poor diet (in early life)/high fat diet (1) smoking/reference to atmospheric pollution (1) leading to stroke (1) lack of blood/oxygen to brain (1) people living longer so more chance of it developing (1) 	allow reference to genetic inheritance where greater number of people to pass on genes that predispose to dementia	2

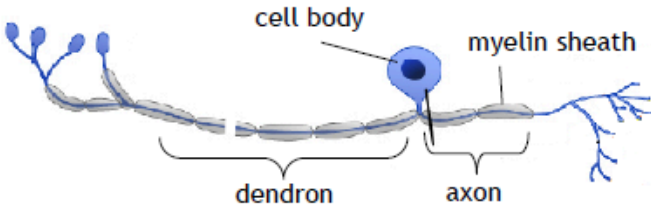
Q4.

Question number	Answer	Mark
(a)	Mouse	1

Question number	Answer	Mark
(b)	A description that makes reference to any three of the following points: <ul style="list-style-type: none"> reference to instrument producing sound (1) at a range of frequencies (1) from low to high pitch (1) indication of when sound can/cannot be heard (1) 	3

Question number	Answer	Additional guidance	Mark
(c)(i)	K = hammer (1) L = anvil (1) M = stirrup (1)	allow: malleus (1) incus (1) stapes(1)	3

Question number	Answer	Mark
(c)(ii)	A description that makes reference any two of the following points: <ul style="list-style-type: none"> • amplifies sound signals (1) • transmit sound/vibrations (1) • from eardrum (1) • to cochlea/oval window (1) 	2

Question number	Answer	Mark
(d)	Diagram (1) axon (1) cell body (1) dendron (1) myelin sheath (1) 	5

Question number	Answer	Mark
(e)	An explanation that makes reference to three of the following points: <ul style="list-style-type: none"> • hearing is reduced (1) • (because) impulse not instigated/information from cochlea not detected (1) • therefore impulses not transmitted (1) • to temporal lobe/auditory cortex (1) • to brain/CNS (1) 	3

Q5.

Question number	Answer	Notes	Marks
(a)	$\frac{14}{100} \times 250 = 35;$	Ecf one mark for correct answer from wrong numbers	1
	$35 \div 10 = 3.5$	Full marks for correct final answer of 3.5	1
(b) (i)	$4 \times 3.5 = 14$ (units);	e cf from 7a	1
	$14 - 3 = 11$ (hours);	Full marks for correct final answer of 11 hours	1
(ii)	Any two from: <ul style="list-style-type: none"> alcohol is a depressant; (alcohol) affects the nervous system/brain; slows reactions/increases reaction <u>time</u>; 		Max 2
(c)	Any five from: <ul style="list-style-type: none"> less/no bile produced; less/no emulsification of fat; surface area of fat remains low; less fat digested/broken down (by lipase); pH of small intestine remains low/acidic; enzymes denatured/reduced enzyme activity; reduced/no digestion by protease / carbohydrase/fewer proteins/carbohydrates digested/broken down; more fat egested; 	Allow trypsin for protease and amylase for carbohydrase	Max 5
Total question = 11 marks			

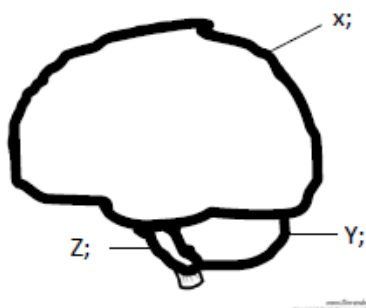
Q6.

Question number	Answer	Notes	Marks
(a) (i)	<ul style="list-style-type: none"> axes labelled (1) suitable scale (1) axes correct way round (1) correct plots (1) lines labelled/key given (1) 		5
(ii)	any two from <ul style="list-style-type: none"> <u>volume</u> of water (1) mass of carbohydrate/aspirin (1) temperature (1) time interval between each reading (1) 	Allow type of aspirin Allow amount as an alternative to mass Ignore concentration	2
(iii)	pH (1)		1
(b)	<ul style="list-style-type: none"> (aspirin) dissolves/reduces pH more quickly (1) (when combined) with sucrose (1) so will act more quickly/relieves pain faster (1) 		3

Q7.

Question number	Answer	Notes	Marks
(a) (i)	<ul style="list-style-type: none"> eat too much; too little exercise; increased fat storage; 		3
(ii)	<ul style="list-style-type: none"> heart disease/attacks/strokes; causes joints in legs to develop arthritis; 		2
(b) (i)	C (pancreas); A is for excretion B is site of insulin action D produces other hormones		1
(ii)	B (liver); A is for excretion C is site of production D produces other hormones		1
(c) (i)	$26378 - 22092 = 4286;$ $\frac{4286 \times 100}{22092}$ $= 19.4\%;$		3
(ii)	$0.9 \times 3.8 = 3.4(2) \text{ million};$		1
(d)	any three from <ul style="list-style-type: none"> less blood flows; death of tissues; increased risk of infection; less white blood cells to deal with infection; 		3
Total 14 marks			

Q8.

Question number	Answer	Notes	Marks
(a)		Letters can be anywhere within outline shown. Allow labels in place of than letters.	3

(b) (i)	Motor;		1
(ii)	Any one from the following: (sensory neurone): longer dendrites/shorter axon/cell body outside of spinal cord/CNS/in middle of neurone/transmit impulse to the CNS/brain/spinal cord (motor neurone) shorter dendrites/longer axon/cell body at one end of neurone/inside spinal cord/transmit impulses from CNS/brain/spinal cord	Answer must be comparative and state which type of neurone is being referred to	1
(iii)	<ul style="list-style-type: none"> chemicals/neurotransmitters; diffuse; across a synapse; bind to receptors (on post-synaptic membrane); 		3
(c)	<ul style="list-style-type: none"> stem cells are undifferentiated/unspecialised/can differentiate; could be made to form nerve cells; to replace damaged cells in brain; 		1
			1
			1
Total question = 11 marks			

Q9.

Question number	Answer	Notes	Marks
(a)	C hypothalamus; A does not control sweating B does not control sweating D does not control sweating		1
(b)	B motor; A transmits impulse from sensory to motor C alternative name for A with same function D transmits impulse to brain		1
(c)	<ul style="list-style-type: none"> • (sweat) evaporates from (the surface of) the skin; • using heat from body/blood; • cools body/reduces body temperature; 		3
(d)	<ul style="list-style-type: none"> • runs in families; • must be faulty/mutated gene/chromosome/allele; • which transfers/passes on information to offspring; 		3
(e)	obesity / high sugar intake / high BMI;		1
(f)	<ul style="list-style-type: none"> • exercise/activity of individual varies; • greater rate of aerobic respiration; • heat given off as by-product/increased body temperature; • external temperature varies; • hotter more sweating/cooler less sweating; • mass of individual varies; • volume of water in the body/fluid intake varies; 	Allow reverse argument for mps 2 and 3	5
			Total 14

Q10.

Question number	Answer	Notes	Marks
(a)	any three from <ul style="list-style-type: none"> • rapid response; • automatic; • to protect body; • from harmful effects/named example; 		3
(b)	correct position;		1
(c)	any six from <ul style="list-style-type: none"> • impulse arrives at end of axon; • synapse; • causes release of neurotransmitter; • e.g. acetylcholine; • from vesicles; • diffuses across gap/cleft; • combines with/stimulates (post synaptic) receptors; • triggers impulse; 		6
Total 10 marks			

Q11.

Question number	Answer	Notes	Marks
(a)	any three from <ul style="list-style-type: none"> • rapid response (to a stimulus) (1) • involuntary/automatic (1) • no brain involvement (1) • protective (1) 		3 max
(b)	<ul style="list-style-type: none"> • A = motor (1) • B = relay/association/connector (1) • C = sensory (1) 		3
(c) (i)	<ul style="list-style-type: none"> • fewer branches/dendrons/dendrites (1) • shorter branches/ dendrons/dendrites (1) • fewer knobs/synapses (1) 	R axons	3
(ii)	<ul style="list-style-type: none"> • transmits impulse (1) • across synapse/(synaptic) cleft (1) • stimulates impulse in next neurone (1) 		3
(iii)	<ul style="list-style-type: none"> • secreted by synapses/synaptic knob (1) • fewer synapses/knobs (1) • less secreted by remaining synapses/knobs (1) 		3

Q12.

Question number	Answer	Notes	Marks
(a)	C (fovea); A/B /D have no light sensitive cells		1
(b) (i)	Any 5 from <ul style="list-style-type: none"> light becomes less/becomes darker; reference to dim light detected by retina; radial muscles in iris contract; circular muscles relax; widen/increase diameter of pupil; to keep a constant amount of light entering the eye 	allow more light entering the eye	5
(ii)	<ul style="list-style-type: none"> occurs when bright light is shone into eye; too much light could damage retina; occurs quickly to protect eye/prevent too much light entering; 		3
Total 9 marks			

Q13.

Question number	Answer	Notes	Marks
(a)	<ul style="list-style-type: none"> addition of figures = 1690; divide by 10 = 169; 		2
(b)	makes it faster/decreases reaction time;		1
(c)	<ul style="list-style-type: none"> caffeine has to be absorbed; into blood; transported to nervous system/brain; 	Ignore body	3
(d)	<ul style="list-style-type: none"> can't control what is in food/drink; could contain caffeine/other factors that would affect result/to ensure caffeine is the cause; 	Ignore coffee	2
(e)	185 ± 5 mm;		1
			Total 9

Q14.

Question number	Answer	Notes	Marks
(a) (i)	A; (brain)		1
(ii)	B; (endocrine)		1
(b) (i)	<ul style="list-style-type: none"> 75 (from weight of man) (1) 320×2 (extra from drinking beer) (1) 715cm^3 (1) 		3
(ii)	<ul style="list-style-type: none"> $715 - 75$ (1) $(640 \div 75) \times 100$ (1) $= 853\%$ (1) 		3
(c)	any two from <ul style="list-style-type: none"> increases permeability of collecting duct (1) more water reabsorbed (1) into blood (1) 		2
(d)	any two from <ul style="list-style-type: none"> red blood cells loses water (1) become distorted (1) less oxygen transported (1) volume of plasma decreases (1) blood becomes thicker/more difficult to circulate(1) increase in blood pressure (1) 	Ignore less water in blood Allow water potential decreases	2
(e)	any three from <ul style="list-style-type: none"> waste products continue to be produced (1) toxic (1) need to be removed in urine (1) less reabsorption of water (1) less ADH produced (1) 	Allow named waste product(s)	3

Q15.

Question number	Answer	Notes	Marks
(a) (i)	<ul style="list-style-type: none"> • arrow heads showing direction of light rays; • bent at cornea; • bent at lens; • cross over in eyeball; • inverted image on retina; 		5 marks
(ii)	transmits/carries impulses from the retina/rod and cones; to the brain;		2 marks
(b) (i)	behind the retina/fovea;		1 mark
(ii)	eyeball too short / eye lens not powerful enough/too flat/not convex enough;		1 mark
(iii)	use a convex / converging lens; to converge/refract/bend rays of light;		2 mark
(c)	<ul style="list-style-type: none"> • infection; • rejection; 		2 marks
Total 13 marks			

Q16.

Question number	Answer	Notes	Marks
(a) (i)	<p>A (cornea and lens);</p> <p>B is incorrect as the iris does not play a role in focusing light</p> <p>C is incorrect as the iris does not play a role in focusing light</p> <p>D is incorrect as the pupil does not play a role in focusing light</p>		1
<p>Clip (b)(i) with (b)(ii) and (b)(iii)</p>	(b) (i)	<p>Ignore lines that extended beyond points</p>	1
	(ii)		1
	(iii)		1
			1
	(iv)		1
(c)	<p>Idea that distant/far away objects are blurred/difficult to see/OR;</p> <p>as (light) rays do not meet on the retina/focused in front of retina/meet before the retina/light rays refracted too much;</p>	Reject can't see	1
Total question = 8 marks			

Q17.

Question number	Answer	Notes	Marks
(a) (i)	absorbs uv light; reduces/prevents risk of skin cancer;		2
(ii)	eye/ retina/ choroid/ red blood cell/ haemoglobin ;		1
(b) (i)	mother x father Hh hh; gametes H h h; fertilisation Hh hh; phenotype white forelock normal;		4
(ii)	chance of producing a boy is $0.5/\frac{1}{2}$; chance of producing offspring with condition $0.5/\frac{1}{2}$; chance of producing boy with condition is $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$;		3
(c)	Any 4 from different (genetic) code produced; different order of amino acids; codes for different proteins/enzymes; enzyme substrate complex not formed; causes change in pigment;		4
Total 14 marks			

Q18.

Question number	Answer	Notes	Marks
(a) (i)	<ul style="list-style-type: none"> axes labelled (1) suitable scale (1) independent variable on X axis (1) correct plots (2) suitable curve (1) 	-1 for each incorrect plot	6
(ii)	<ul style="list-style-type: none"> mean/average calculated (1) reliable / reproducible / repeatable (1) eliminate anomalies (1) 		2
(b) (i)	$\frac{70}{90} \times 100$ (1) 78%/77.78/77.8 (1)	correct answer = full marks	2
(ii)	<ul style="list-style-type: none"> travels in the blood (1) time to reach/affect nerve (1) 	R heart	2
(c)	<ul style="list-style-type: none"> carries impulses to heart muscle (1) reduces rate of contraction (1) 		2
Total for question = 14 marks			