

Abbreviations, annotations and conventions used in the Mark Scheme	/	= alternative and acceptable answers for the same marking point
	;	= separates marking points
	NOT	= answers which are not worthy of credit
	R	= reject
	()	= words which are not essential to gain credit
	<u> </u>	= (underlining) key words which must be used to gain credit
	ecf	= error carried forward
	AW	= alternative wording
	A	= accept
	ora	= or reverse argument

Ques
2 (

Question	Expected Answers	Marks
1 (a)	A – sinusoid ; B – (branch of) bile duct ; C – (branch of hepatic) portal vein / HPV ; D – (branch of) hepatic artery ;	4
(b)	emulsifies ; breaks droplets into globules / AW ; ref to increase in surface area ; neutralises acid ; AVP ; e.g. globules 0.5 – 1.0 µm / ref to easier digestion by lipase	3 max
(c)	bile pigments build up in blood ; (pigments) do not enter gut / AW ; AVP ; e.g. bile, canaliculi / duct, blocked / gall stones	2 max
(d) (i)	reduction / oxidation / dehydrogenation / redox ;	1
(ii)	ethanal / acetaldehyde ;	1
(iii)	combines with CoA / forms acetyl CoA ; combines with oxaloacetate / enters Krebs cycle ; production of ATP ; will be, dehydrogenated / decarboxylated ; may be used to synthesise, fatty acids / ketones ;	3 max
(iv)	1. hepatocytes, die / destroyed / function inefficiently ; 2. replaced by, fibrous tissue / fibres / collagen / connective tissue / scar tissue ; 3. liver becomes, hard / nodular / shrunken ; 4. named function not carried out efficiently e.g. gluconeogenesis ; 5. named function not carried out efficiently e.g. deamination ; 6. build up of ammonia ; 7. blood bypasses sinusoids / AW ; 8. irreversible / permanent ; 9. AVP ; e.g. correct ref to NAD	5 max
[Total: 19]		

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Question	Expected Answers	Marks
2 (a) (i)	habituation / associative ;	1
(ii)	no threat ; no waste of energy ; less stress ; AVP ;	2 max
(b)	1. hear sound of van / AW ; 2. sound is stimulus ; 3. ref to associate sound with food / AW ; 4. conditioned response ; 5. food acts as, reinforcer / reward ; 6. ref to association centre (in brain) ; 7. AVP ;	4 max
(c)	ref. faster / rapid / AW ; AVP ; e.g. survival	1 max
(d) (i)	relay / intermediate / internuncial / bipolar / connector ;	1
(ii)	P – receptor / named receptor ; R – effector / named effector ;	2 max
[Total:		11]

Question	Expected Answers	Marks
3 (a) (i)	corpus callosum ;	1
(ii)	cerebellum ; medulla (oblongata) ; hypothalamus ; cerebrum / cerebral cortex ;	4
(b)	acetylcholine – neurotransmitter / AW ; acetylcholinesterase – breaks down ACh / enables repolarisation of post synaptic membrane ;	2
(c) (i)	1. ACh at reduced level (in individuals with Alzheimer's) ; <i>inhibitor</i> 2. binds to enzyme ; 3. competitive / non-competitive (inhibition) ; 4. ref. further detail ; 5. ACh does not bind (to active site) ; 6. ACh not broken down ; 7. more ACh available (for receptor sites) / more action potentials generated ;	4 max
(ii)	keep brain active / AW ; head protection / AW ; ref to healthy lifestyle ; AVP ;	2 max
[Total:		13]

marks	Question	Expected Answers	Marks
1	4 (a) (i)	stimulus causes, increase in tension / twitch ; fluctuation in tension / AW ; overall increase in tension ; AVP ; e.g. ref to figs (must have time units)	2 max
1	(ii)	state of constant, contraction / tension ; R paralysed alone correct ref. to heart ; difficulty in ingestion / jaw muscles fixed ; rib / intercostal, muscles remain contracted ; difficulty in, lung ventilation / breathing ; AVP ; e.g. fever / headache	3 max
ax	(b) 1	ATP produced ;	
	2	Na ⁺ or K ⁺ pump / maintains concentration gradient / repolarisation ;	
		<i>transmission of impulses</i>	
	3	acetylcholine / neurotransmitter formation ;	
	4	vesicle formation ;	
	5	movement of vesicles ;	
	6	exocytosis / vesicles fuse with membrane ;	
	7	ref. active transport (of ACh / Ca ²⁺) ;	
	8	AVP ; e.g. ref to microtubules / endocytosis	4 max
		<i>muscular contraction</i>	
ax	9	ATP attaches to myosin head / ATPase ;	
	10	hydrolysis of ATP / ATP → ADP + P ;	
	11	myosin head tilts / shortening of sarcomere ;	
	12	ATP / energy, required for detachment of myosin head ;	
	13	from actin ;	
	14	calcium pumps in <u>sarcoplasmic reticulum</u> ;	
	15	synthesis of protein (for repair, growth) ;	
	16	AVP ;	5 max
		QWC – clear well organised using specialist terms ;	8 max
		<i>award the QWC mark if four of the following are used in correct context</i> acetylcholine, actin, myosin, sarcoplasmic reticulum, exocytosis, hydrolysis, repolarisation	1

[Total: 14]

Question	Expected Answers	Marks
5 (a)	<i>accept anywhere in mark scheme for part (a)</i> 1. low light intensity under water ; 2. reason ; (i) 3. ref. good sensitivity ; 4. rods respond (to low intensities) ; 5. poor visual acuity ; 6. cones less sensitive (in low intensities) ; 7. no need for colour vision ; (ii) 8. improves efficiency of (rod) cells ; 9. prevents absorption of light by choroid ; (iii) 10. more light enters eye ; 11. ref. hunting / predation ;	3 max
(b)	<i>accept anywhere for part (a)</i> 1. ciliary muscles contract ; 2. ref. circular ; 3. release tension on suspensory ligaments ; 4. lens, fatter / more convex / thicker ; 5. ref. lens returns to original shape ; 6. stronger lens / greater refraction ;	6 max 3 max
(c) (i)	denaturing / denaturation ;	1
(ii)	plastic lens cannot change shape ; fixed strength / AW ; lens suitable for far vision ; near vision needs strong converging lens (in spectacles) ;	3 max
		[Total: 13]

Marks	Question	Expected Answers	Marks
6	(a)	<p>person A description</p> <ol style="list-style-type: none"> 1. rises sharply (during meal) ; 2. and up to 1 hour after / peaks at 1 hour after meal ; 3. decreases steadily ; <p>person B description</p> <ol style="list-style-type: none"> 4. remains constant / AW ; <p>5. comparative figs ;</p> <p>person A explanation</p> <ol style="list-style-type: none"> 6. sight / smell / anticipation, of food ; 7. impulses from brain ; 8. ref to, parasympathetic nervous system / vagus nerve ; 9. release / secretion, of gastrin ; 10. by stomach mucosa ; 11. also contact of food with, mucosa / stomach lining ; 12. (local) reflex action (in stomach wall) ; <p>13. AVP ;</p>	3 max
max	(b)	<ol style="list-style-type: none"> 1 named e.g. ; 2 anaerobic ; 3 microbes ; A e.g. of microbe 4 from, rumen / reticulum ; 5 make amino acids ; 6 from ruminant's food ; 7 and from saliva ; 8 (which contains) urea ; 9 from deamination (of amino acids) ; 10 in liver ; 11 protein formed ; 12 into omasum and abomasum ; 13 proteases ; 14 digest protein / microbes ; 15 ref to protein from plant cells ; 16 ref to internal nitrogen cycle ; 17 AVP ; 18 AVP ; <p><i>accept 1,3 and 4 only if refer to carbohydrates</i></p>	5 max 6 max
ax			
ax			
]			
		QWC – legible text with accurate spelling, punctuation and grammar ;	8 max
			1

(c) (i) *award two marks if correct answer (49) is given*

$$\frac{0.58 - 0.39}{0.39} \times 100 ;$$

49% ;

2

(ii) supplement / legume, had high nitrogen content ;
wool fibres made of protein ;
ref. nitrogen fixation / $N_2 \rightarrow$ ammonium (ions / salts) ;
further detail ; e.g. ref. to amino acids
AVP ; e.g. keratin

3 max

[Total: 20]