

A-level Biology Summer Learning Double Catch-up Questions Mark Scheme

Q1.

Question Number	Answer	Acceptable answers	Mark
(i)	$(5.2 + 2.8 + 4.9 + 3.5 =) 16.4$ (1) $(16.4/4 =) 4.1$	two marks for correct answer	(2)

Question Number	Answer	Acceptable answers	Mark
(ii)	A suggestion including two of the following variation in human population/different body sizes (1) hydration level (1) salt intake (1) drug influence (1)	accept genetic variation accept fluid / food intake / level of exercise accept levels vary depending on the time of day (1)	(2)

Question Number	Answer	Acceptable answers	Mark
(iii)	C <input checked="" type="checkbox"/> pituitary gland		(1)

Question Number	Answer	Acceptable answers	Mark
(iv)	dehydration / thirst / increased volume of urine	accept dilute urine/frequent urination/tiredness/dizzy/headache	(1)

Q2.

Question Number	Indicative Content	Mark
QWC *	<p>An explanation to include some of the following points</p> <ul style="list-style-type: none"> • negative feedback <p>Hydration</p> <ul style="list-style-type: none"> • increased water/decreased salt in blood • detected by hypothalamus • acts on the pituitary gland • decreased release of ADH • decreased permeability of collecting duct/renal tubules/nephron • less re-absorption of water • Increased volume of urine <p>Dehydration</p> <ul style="list-style-type: none"> • decreased water/increase salt in blood • detected by hypothalamus • acts on the pituitary gland • increased release of ADH • increased permeability of collecting duct/renal tubules/nephron • more re-absorption of water • decreased volume of urine 	(6)

Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited explanation of increase in ADH OR decrease in ADH OR the role of the pituitary gland, hypothalamus or negative feedback in the release of ADH • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	<ul style="list-style-type: none"> • a simple explanation of both ADH increase and decrease OR a detailed explanation of either an increase or decrease • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	<ul style="list-style-type: none"> • a detailed explanation of both ADH increase and decrease including mention of permeability of the renal tubules and role of the hypothalamus or pituitary gland • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Q3.

Question number	Answer	Notes	Marks
(i)	$P - Q / 170 - 80 = 90$ (1) or $80/170 \times 100 = 47/47.1\%$ (1) and $53 / 52.9 / 52.94 (\%)$	two marks for correct answer	(2)

Question number	Answer	Notes	Marks
(ii)	<p>An description including two of the following</p> <p>selective re-absorption/reabsorbed into the blood (1)</p> <p>using energy (1)</p> <p>by active transport/against the concentration gradient (1)</p> <p>in convoluted tubule/at location Q (1)</p>	<p>accept diffuses into the blood</p> <p>accept from a low concentration to a high concentration</p>	(2)

Question number	Answer	Notes	Marks
(iii)	<p>A explanation including the following</p> <p>increases (1)</p> <p>water is re-absorbed (1)</p>	<p>accept water is absorbed into the blood</p>	(2)

Q4.

Question number	Answer	Notes	Marks
(i)	A X_hX_H		(1)

Question number	Answer	Notes	Marks									
(ii)	<p>correct gametes (1)</p> <p>correct offspring (1)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>XH</td> <td>XH</td> </tr> <tr> <td>Xh</td> <td>XhXH</td> <td>XhXH</td> </tr> <tr> <td>Y</td> <td>XHY</td> <td>XHY</td> </tr> </table> <p>0%/ 0 in 4 (1)</p>		XH	XH	Xh	XhXH	XhXH	Y	XHY	XHY	<p>accept ecf if person F and person G switched in the Punnett square for offspring</p>	(3)
	XH	XH										
Xh	XhXH	XhXH										
Y	XHY	XHY										

Q5.

	Answer	Acceptable answers	Mark
(a)(i)	$(1600 + 1000) - (1400 + 200)$ Or $2600 - 1600$ Or	2 marks for bald answer - 1000	(2)

	(1600 – 1400) + (1000 – 200) or 200 + 800 (1) = 1000		
(a)(ii)	Description including two of the following: <ul style="list-style-type: none"> • no (overall) / little effect on cases of meningitis B (1) • (significant overall) decrease in meningitis C (1) • correct manipulation of data (1) 	fluctuates a little / rises and then goes slightly down	(2)
(b)	A <input checked="" type="checkbox"/> antigens		(1)
(c)(i)	A description linking three of the following <ul style="list-style-type: none"> • inject mammal / named mammal with antigen (1) • (select) B lymphocytes / lymphocyte that produces the (specific) antibody / spleen cells(1) • fuse with tumour / myeloma cells (1) • (to produce a) <u>hybridoma</u> (which divide)(1) • antibodies are isolated / screened(1) 	Accept animal for mammal Accept B cells Accept cancer cells Ignore antibodies produced	(3)
(c)(ii)	An explanation linking two of the following: <ul style="list-style-type: none"> • antibody (only) attach to cancer cell (1) • drug / radioactive source / toxin bound to antibody / alerts immune system to target cancer cells (1) • no / fewer adverse effect to non cancerous cells (1) 	Accept named effect	(2)

Q6.

Question Number	Answer	Acceptable answers	Mark
	A description including the following (immunisation) introduces an antigen/(immunisation) causes an immune response (1) (B) lymphocytes (1) production of antibodies (1) (the production of) <u>memory lymphocytes</u> (1)	accept immune system recognises an antigen (in the immunisation) ignore white blood cells	(3)

Q7.

Question Number	Answer	Acceptable answers	Mark
(a)(i)1	immune (1)		(1)

Question Number	Answer	Acceptable answers	Mark
(a)(i)2	memory lymphocytes (1)		(1)

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	B hybridomas		(1)

Question Number	Answer	Acceptable answers	Mark
(a)(iii)	Two of the following: pregnancy testing (1) locating the position of blood clots (1) locating the position of cancers (1)	accept detecting blood clots accept detecting cancer cells	(2)

Question Number	Answer	Acceptable answers	Mark
(b)(i)	<p>A comparison including two from:</p> <p>first response</p> <ul style="list-style-type: none"> • delay in production of antibodies (1) • less antibodies produced (1) • production of antibodies slower (1) 	<p>or a second response</p> <ul style="list-style-type: none"> • no delay in production of antibodies (1) • more antibodies produced (1) • production of antibodies faster (1) <p>accept comparisons of data</p> <p>ignore references to decrease in antibody number</p>	(2)

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	<p>faster recovery / {no/less} symptoms of infection / increased chance of survival / kills pathogen faster(1)</p>	<p>accept more <u>memory</u> lymphocytes produced/ immune / fights infection faster</p>	(1)

Question Number	Answer	Acceptable answers	Mark
(b)(iii)	B Edward Jenner		(1)

Q8.

Question number	Answer	Notes	Marks
(i)	<p>A description including four of the following</p> <p>injection of antigen into {mouse/mammal}(1)</p> <p>{production/collection} of B lymphocytes (1)</p> <p>(B-lymphocyte) fused with {tumour/cancer/myeloma} cells (1)</p> <p>hybridoma (1)</p> <p>(hybridoma) can divide and produce antibodies (1)</p>	<p>accept protein from blood clot for antigen</p> <p>accept multiply or reproduce for divide when linked to the hybridoma</p>	(4)

Question number	Answer	Notes	Marks
(ii)	<p>A description including two of the following</p> <p>attach radioisotope to monoclonal antibody (1)</p> <p>inject into the blood stream (1)</p> <p>antibodies {binds/attaches} to the clot (1)</p> <p>antibody {location/accumulation} determined using a {scanner/detector/computer} (1)</p>	<p>ignore inject into body</p> <p>accept binds to platelet/fibrin</p>	(2)

Q9.

Question Number	Answer	Acceptable answers	Mark
(i)	<p>An explanation linking three from the following</p> <p>urine sample (1)</p> <p>coloured bead attached to a (mobile monoclonal) antibody (1)</p> <p>antibody {specific to/detects/binds to} { hormone/hCG} (1)</p> <p>immobile antibody at test strip (1)</p> <p>colour accumulates in positive test window (1)</p>	accept named female sex hormones	(3)

Question Number	Answer	Acceptable answers	Mark
(ii)	<p>An explanation linking two of the following</p> <p>chemotherapy/radiotherapy drug attached to the monoclonal antibody (1)</p> <p>less use of the drug (1)</p> <p>only binds to cancer cells/doesn't target normal cells (1)</p> <p>reduces side effects/named side effects (1)</p>	monoclonal antibody binds to { tumour markers/cancer antigens } (1)	(2)

Question Number	Answer	Acceptable answers	Mark
(iii)	hybridoma (cell)		(1)