This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Loueizeh - Baabda

Stage Exam 06

13JUN2024 and 14JUN2024

Do NOT write in this box. Your MARK will be placed here.

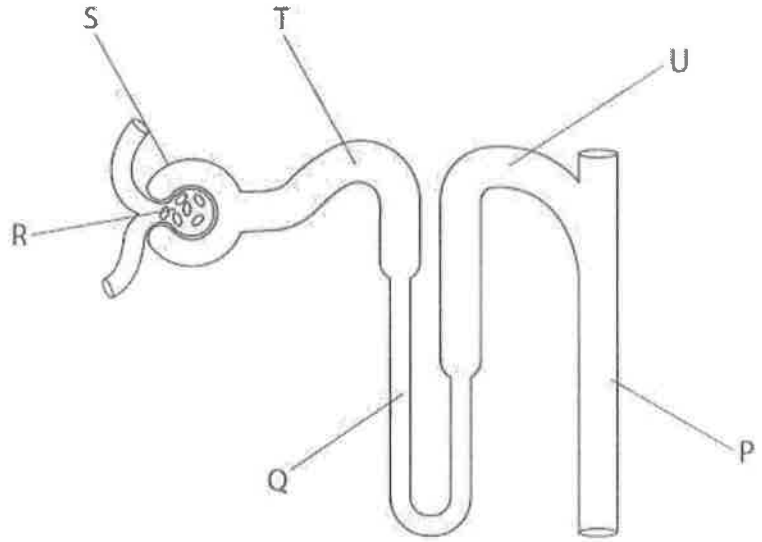
Subject :	Biology
Class :	9A
Teacher :	Miss Rahmeh Hilal
Duration :	1 hour

Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

Q1.

The diagram shows a nephron from a human kidney with some structures labelled.



(a) (i) Which structure is the Bowman's capsule?

(1)

- ☐ **A** P
- ☐ **B** R
- ☐ **C** S
- ☐ **D** T

(ii) Which structure is the loop of Henle?

(1)

- ☐ **A** P
- ☐ **B** Q
- ☐ **C** S
- ☐ **D** U

(iii) Which structure is affected by ADH?

(1)

- ☐ **A** P
- ☐ **B** Q
- ☐ **C** S
- ☐ **D** T

(b) Blood plasma contains much glucose, but urine normally does not.

Explain what happens to glucose in the kidney.

(3)

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(c) As a person sweats, they may become dehydrated.

Describe the changes in a person's urine if they become dehydrated.

(2)

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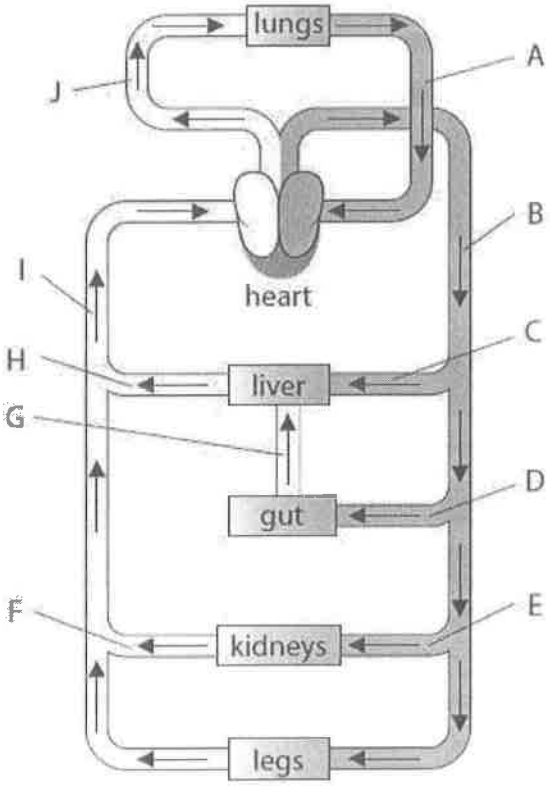
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(Total for question = 8 marks)

Q2.

The diagram shows the human circulation system with some blood vessels labelled A to J. The arrows show the direction of blood flow.



(a) The table gives some statements about the content of blood vessels in this circulation system. Complete the table by giving the letter of the blood vessel that matches each statement.

(5)

Statement	Letter
contains the least carbon dioxide	
contains the most glucose after a meal	
contains the least oxygen	
contains the least urea	
contains blood at the highest pressure	

(b) Muscles in the legs contain capillaries.

A scientist investigates how long-term training affects the number of capillaries in an athlete's leg muscles.
The scientist determines the mean number of capillaries per mm^2 in samples of leg muscle from the athlete before and after a period of training.
The table shows the scientist's results.

Muscle sample	Mean number of capillaries per mm^2
before training	313
after training	349

The scientist concludes that training improves the athletic performance.
Discuss this conclusion.

(5)

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(Total for question = 10 marks)

Q3.

The human heart pumps blood when its muscle tissue contracts.

Diagram 1 shows a human heart and a cross-section through its ventricles.

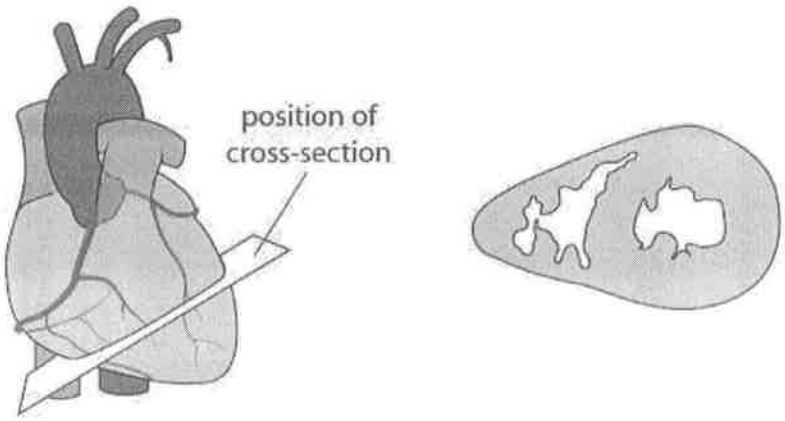


Diagram 1

Which of these statements about the ventricles is correct?

(1)

- ☒ **A** the left ventricle wall is thick because it has to pump blood to the body
- ☒ **B** the left ventricle wall is thin because it has to pump blood to the lungs
- ☒ **C** the right ventricle wall is thin because it has to pump blood to the body
- ☒ **D** the right ventricle wall is thick because it has to pump blood to the lungs

(Total for question = 1 marks)

Q4.

Human blood cells have different roles within the body.

Some people have a condition called anaemia, in which the blood contains less haemoglobin. This alters the percentage of each layer.

(a) Describe how a blood sample from a person with anaemia would differ in appearance from a normal blood sample.

(1)

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(b) Name two substances that are transported around the body in plasma.

(2)

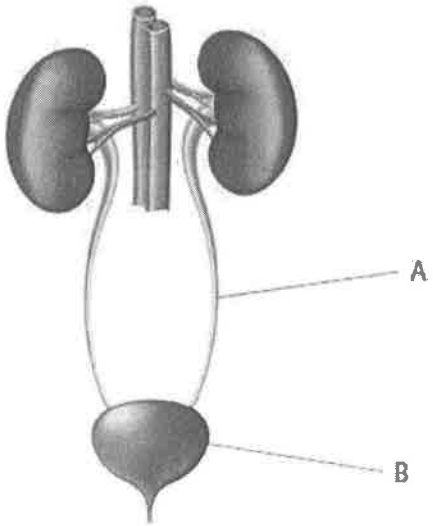
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(Total for question = 3 marks)

Q5.

The diagram shows part of the human urinary system.



(Source: © La Gorda/Shutterstock)

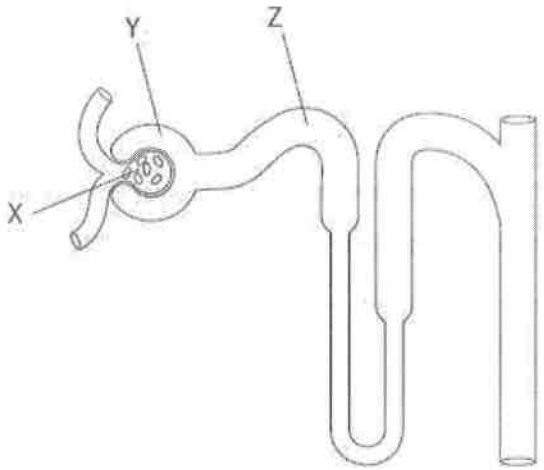
(a) Name the structures labelled A and B.

(2)

A .....

B .....

(b) The diagram shows a kidney nephron.



The table shows the relative concentrations of glucose and protein in the areas labelled X, Y and Z on the diagram.

Substance	Relative concentration of substance in arbitrary units		
	Area X	Area Y	Area Z
protein	100	0	0
glucose	100	50	0

Explain the difference between the concentration of protein in area X and the concentration of protein in area Y.

(2)

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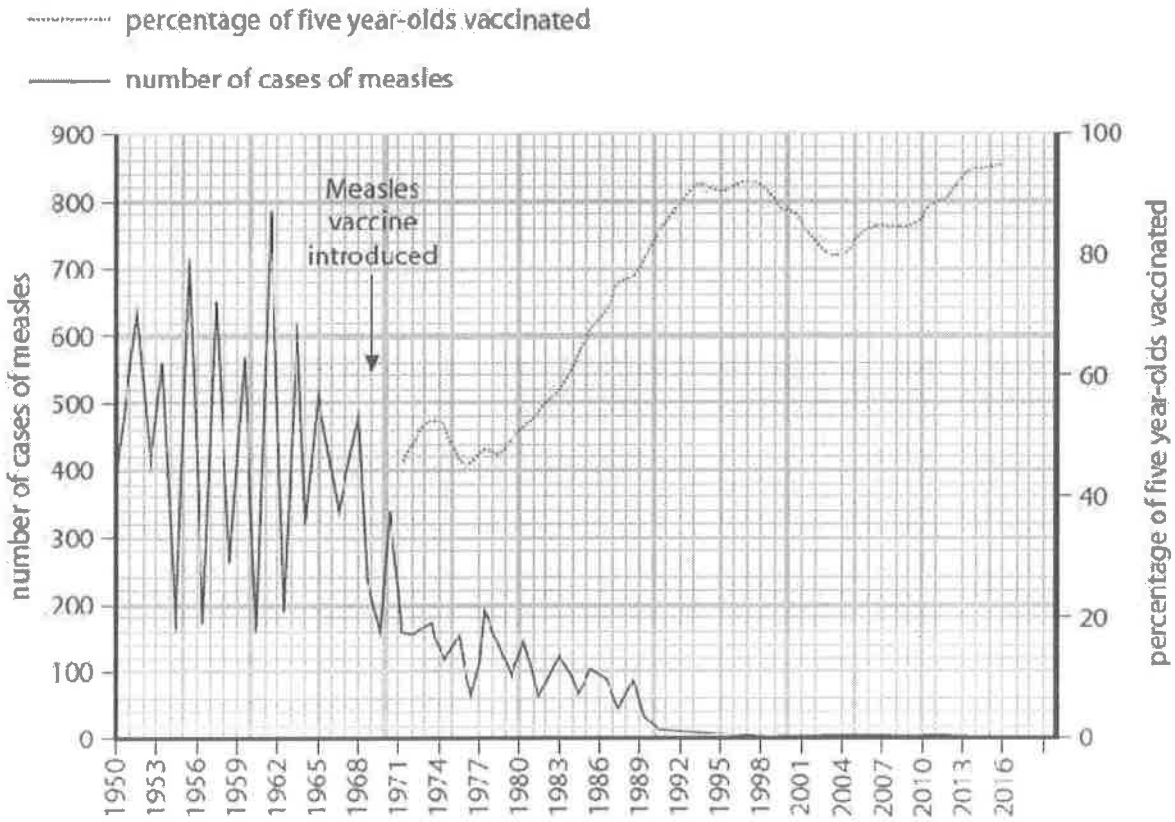
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(Total for question = 4 marks)

Q6.

Measles is a disease caused by a virus. The graph shows the number of cases of measles each year and the percentage of five year-olds vaccinated between 1950 and 2016 in the United Kingdom.



(a) Explain the relationship between the number of cases of measles and the percentage of five year-olds vaccinated.

Use information from the graph in your answer.

(4)

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(b) Some children are receiving treatments that reduce the activity of their immune system.

Explain why vaccinations are not used on these children.

(2)

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(Total for question = 6 marks)

Q7.

Phagocytes and lymphocytes are white blood cells involved in the immune response.

(a) Explain the role of lymphocytes in the immune response.

(3)

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(b) Phagocytes ingest bacteria.

Explain what happens to bacteria after they have been ingested by phagocytes.

(3)

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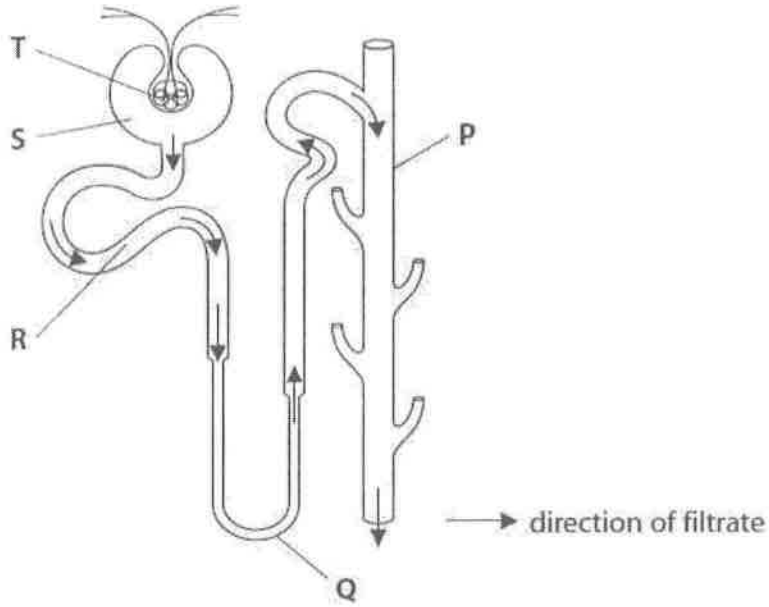
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(Total for question = 6 marks)

Q8.

The diagram shows part of a human nephron, with parts labelled P, Q, R, S and T.

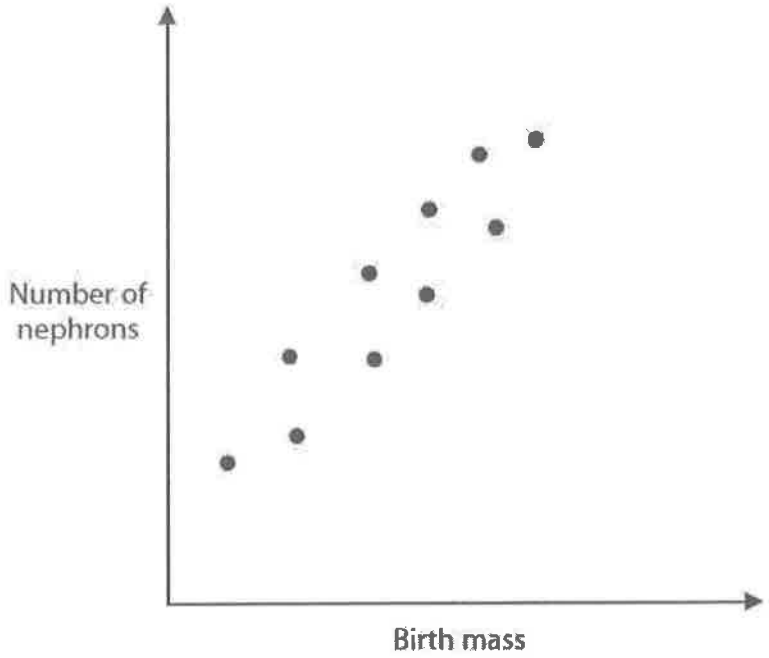


(a) Where does ultrafiltration occur?

(1)

- ☐ A P
- ☐ B Q
- ☐ C R
- ☐ D T

(b) Scientists investigate the relationship between birth mass and the number of nephrons in the kidney.
The scatter diagram shows their results.



(i) Describe the relationship shown by the scatter diagram.

(2)

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(ii) Babies born with low birth mass are more likely to develop high blood pressure when they become adults.
Explain why protein in the urine of these adults may be an indication of kidney damage caused by high blood pressure.

(4)

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(Total for question = 7 marks)

Q9.

(a) In homeostasis, the kidney is involved in the control of blood concentration.

(i) State the name for the control of blood concentration.

(1)

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(ii) Another function carried out by the kidney is excretion.
State what is meant by the term excretion.

(1)

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(b) Diabetes insipidus is a medical condition in which the body is unable to produce ADH.

Explain how diabetes insipidus affects the control of blood concentration.

(4)

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(c) Desmopressin is a drug used to reduce the symptoms of diabetes insipidus.

(i) Suggest what effect the drug would have on the nephron.

(1)

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(ii) Describe the effects the drug would have on urine production.

(2)

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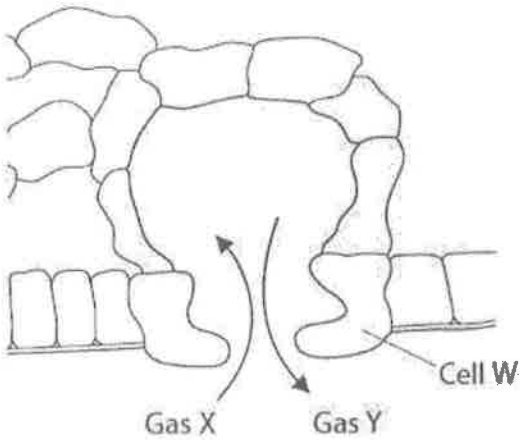
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(Total for question = 9 marks)

Q10.

The leaf contains pores called stomata.
The diagram shows a section of a leaf showing a stoma.



(a) The arrows show the diffusion of two different gases on a sunny day.

(i) Which row of the table correctly names gas X and gas Y?

(1)

	Gas in (X)	Gas out (Y)
☐ A	oxygen	carbon dioxide
☐ B	carbon dioxide	oxygen
☐ C	water vapour	carbon dioxide
☐ D	oxygen	water vapour

(ii) Which of the following is correct on a sunny day?

(1)

☐ **A** The volume of cell W increases and the stoma opens.
☐ **B** The volume of cell W decreases and the stoma closes.
☐ **C** The volume of cell W increases and the stoma closes.
☐ **D** The volume of cell W decreases and the stoma opens.

(Total for question = 2 marks)

Q1.

Question Number	Answer	Mark
(a)(i)	The only correct answer is **C (S)** A is not the answer as P is not the Bowman's capsule B is not the answer as R is not the Bowman's capsule D is not the answer as T is not the Bowman's capsule	**1**

Question Number	Answer	Mark
(a)(ii)	The only correct answer is **B (Q)** A is not the answer as P is not the Loop of Henle C is not the answer as S is not the Loop of Henle D is not the answer as U is not the Loop of Henle	**1**

Question Number	Answer	Mark
(a)(iii)	The only correct answer is **A (P)** B is not the answer as Q is not affected C is not the answer as S is not affected D is not the answer as T is not affected	**1**

Question Number	Answer	Additional guidance	Mark
(b)(i)	An explanation that makes reference to three of the following points: • glucose passes from glomerulus / glucose passes into renal / Bowman's capsule / eq (1) • reabsorbed / absorbed back into blood / eq (1) • by active transport / eq (1) • (reabsorbed) in the proximal convoluted tubule / PCT / first convoluted tubule / eq (1)	**Accept** glucose passes out from R / passes into S **Accept** in T	3

Question Number	Answer	Mark
(c)	A description that makes reference to the following points: • less urine / lower volume / less water / eq (1) • more concentrated / more urea / darker / eq (1)	2
		Total 10 marks

Q2.

Question Number	Answer	Mark
(a)(i)		5

statement	letter
contains the least carbon dioxide	A
contains the most glucose after a meal	G
contains the least oxygen	J
contains the least urea	F
contains blood at the highest pressure	B

Question Number	Answer	Mark
(b)	An answer that makes reference to five of the following points: • more (capillaries to transport) oxygen / glucose (1) • more (aerobic) respiration / less anaerobic respiration (1) • more ATP/ more energy (1) • (more) muscle contraction (1) • less lactic acid (1) • effective for long distance events / ineffective for power events / type of performance not specified /only leg muscle sampled / eq(1) • other factor(s) / age / lung (capacity) / heart (rate) named other factors affect performance (1) • need to test more than one person / not repeated / eq (1)	5
		Total 12 marks

Q3.

Question Number	Answer	Mark
(a)	A the left ventricle is thick to pump blood to the body *B is not correct because the left ventricle wall is not thin* *C is not correct because the right ventricle pumps to the lungs* *D is not correct because the right ventricle wall is not thick*	**1**

Q4.

Question Number	Answer	Mark
(a)(iii)	An answer that makes reference to one of the following points • fewer red blood cells / eq (1) • smaller or lower percentage of layer R / less of layer R /eq (1)	**1**

Question Number	Answer	Mark
(c)	An answer that includes two of the following: • antibodies (1) • hormone /named hormone (1) • ion / named ion / mineral / eq (1) • digested / food (1) • protein / named protein (1) • amino acid / named amino acid (1) • glucose (1) • carbon dioxide / CO_2 (1) • vitamin /named vitamin (1) • urea (1) • cholesterol / fatty acids / glycerol / eq (1)	**2**
		Total 9 marks

Q5.

Question Number	Answer	Additional guidance	Mark
(a)	A: ureter (1) B: bladder (1)	**Allow** phonetic spellings that cannot be mistaken for urethra, e.g. ureta **Reject** urethra **Reject** gall bladder	2

Question Number	Answer	Additional guidance	Mark
(b)(i)	An answer that makes reference to the following. • protein is large (1) • (so) does not pass out of glomerulus / capillary / through basement membrane / does not pass into (Bowman's) capsule (1)		2

Q6.

Question Number	Answer	additional guidance	Mark
(b)	An explanation that makes reference to four of the following points: 1. cases higher before vaccine introduced / lower after vaccination introduced/ eq (1) 2. cases more variable before vaccine introduced/ less variable after vaccine introduced / eq (1) 3. as no immunity / antibodies to measles / takes time to produce antibodies / eq (1) 4. as percentage / more of population vaccinated cases decrease/ eq (1) 5. as virus no longer reproducing in children / virus destroyed in children / no longer spreading / can no longer find a suitable host / eq (1) 6. as vaccinated children have antibodies / memory cells /eq (1) 7. quoting early data (eg up to 1974) (**cases and percent vaccinated**) 125 cases 52% vaccinated /eq (1) 8. quoting later data: (**cases and percent vaccinated**) (eg 1990 onwards) later data eg 80% vaccinated 20 cases / no cases (by 1998) when 90% vaccinated / eq (1)	herd immunity reject antibiotics mp 7 mp 8 allow range / leeway on cases and percentage	4

Question Number	Answer	Mark
(c)	An explanation that makes reference to two of the following points: • cannot produce antibodies /fewer antibodies produced / eq (1) • no / fewer memory cells produced / no / less secondary immune response / eq (1) • could develop disease / give child disease / give child illness / give child measles / eq (1)	2

Q7.

Question Number	Answer	Mark
(a)	An explanation that makes reference to three of the following points: • antibodies (1) • specific (1) • antigens / foreign / invading cells/ bacteria / virus /pathogen / eq (1) • attach to / clump / kill / destroy pathogens / make memory cells (1)	3

Question Number	Answer	Mark
(b)	An explanation that makes reference to the following points: • killed / destroyed (1) • digested / broken down (1) • by enzymes / named enzyme (1) • products absorbed (by phagocyte) (1)	3

Q8.

Question Number	Answer	Mark
(a)(ii)	D T *A is not correct because ultrafiltration does not occur here* *B is not correct because ultrafiltration does not occur here* *C is not correct because ultrafiltration does not occur here*	1

Question Number	Answer	Mark
(b)(i)	An answer that makes reference to the following points: • increasing birth mass associated with more nephrons / eq (1) • a positive correlation / linear / straight line / (directly) proportional (1)	2

Question Number	Answer	Mark
(b)(ii)	An explanation that makes reference to four of the following points: • proteins are big / large / only small molecules (1) • normally will not pass out of glomerulus / through basement membrane / into Bowman's capsule / not present in glomerular filtrate (1) • (high blood pressure) forces / squeezes / pushes protein molecules out (1) • damage to glomerulus / Bowman's capsule / basement membrane / nephron (1)	4

Q9.

Question Number	Answer	Mark
(b)(i)	• osmoregulation (1)	**1**

Question Number	Answer	additional guidance	Mark
(b)(ii)	• removal of metabolic waste / waste from chemical reactions (from cells) (1)	Ignore waste removal	**1**

Question Number	Answer	Mark
(c)	An explanation that makes reference to the following points: • collecting duct (1) • impermeable / less permeable / no change in permeability / eq (1) • less water reabsorbed / water is not reabsorbed / less water back into blood / eq (1) • more urine produced / dilute urine produced / more water lost / dehydration / eq (1) • blood concentration increases / eq (1)	**4**

Question Number	Answer	Mark
(d)(i)	• increases permeability of collecting duct (wall) / becomes permeable / will now be permeable / eq (1)	**1**

Question Number	Answer	Mark
(d)(ii)	An answer that makes reference to the following points: • decrease (volume) / less urine / eq (1) • increase concentration / eq (1)	**2**
		Total = 11 marks

Q10.

Question number	Answer	Mark
(a)(i)	B	1

Question number	Answer	Mark
(a)(ii)	A	1

(Total for question = 17 marks)