

Q2.

Figure 12 shows the urinary system of a mammal.

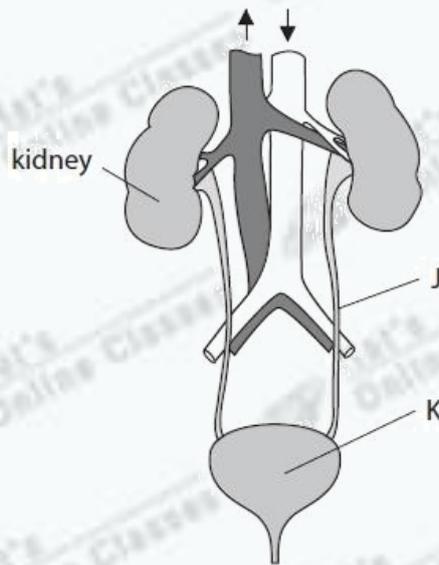


Figure 12

Name structure J and structure K.

(2)

Structure J

Structure K

(Total for question = 2 marks)

Q3.

Nephrons in the kidney filter the blood to produce urine.

Urine contains urea.

(i) What is urea made from?

(1)

- A** excess amino acids
- B** excess carbohydrates
- C** excess vitamins
- D** excess lipids

(ii) Figure 13 shows which components of the blood are filtered into the nephron.

blood component	is the component filtered into the nephron?
blood cells	no
large proteins	no
glucose	yes
sodium ions	yes

Explain the conclusions that can be made from this information.

(2)

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(Total for question = 3 marks)

Q4.

Figure 16 shows the urinary system of a human.

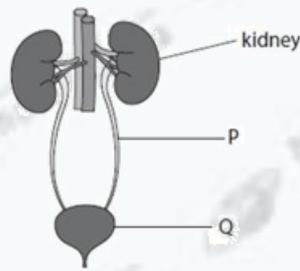


Figure 16

* Figure 18 shows a patient undergoing kidney dialysis.

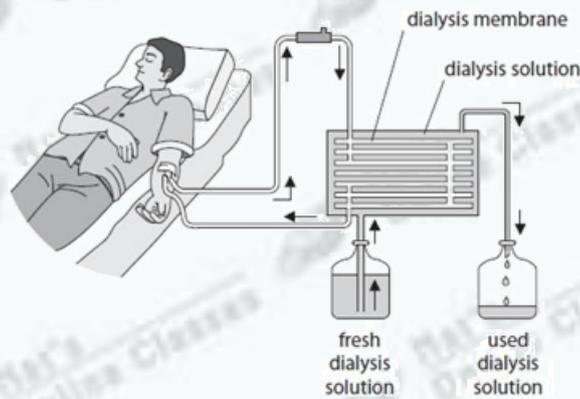


Figure 18

Describe how dialysis removes unwanted substances from the blood. Include examples of unwanted substances in your answer.

(6)

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(Total for question = 6 marks)

Q5.

A patient cannot remove enough urea from the blood when making urine.

Figure 22 shows a dialysis machine attached to the arm of this patient.

Their blood is pumped out of their arm, passed through the dialysis machine, and then put back into the patient.

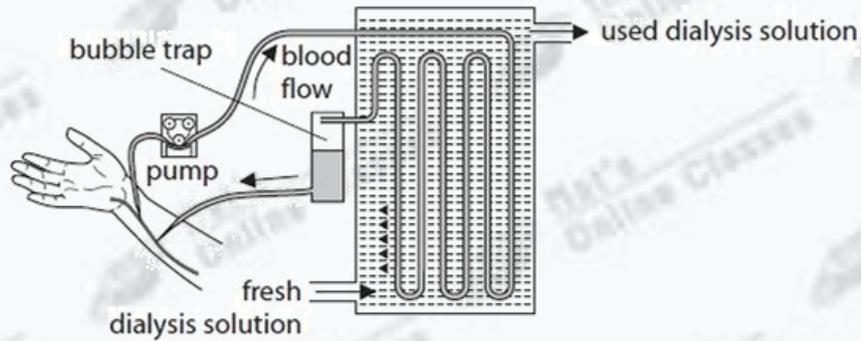


Figure 22

(i) Describe what happens to urea as the blood passes through the dialysis machine.

(2)

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(ii) Two patients need to have dialysis treatment.

Patient A needs this treatment three times a week.

Patient B needs this treatment once a week.

Give **one** reason why patient B needs dialysis treatment less often than patient A.

(1)

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(Total for question = 3 marks)

Mark scheme:

Q1.

Question Number	Answer	Additional guidance	Mark
	<p>An explanation linking four from:</p> <ul style="list-style-type: none"> • because excess amino acids are broken down into urea (1) • amino acids broken down in the liver (1) • it is then transported in the blood to the kidney (1) • enter the nephron (1) • during ultrafiltration (1) • pass through the nephron / not reabsorbed back into the blood (1) • (so urine with a high concentration of urea) forms in the collecting duct (1) 	<p>accept deamination</p> <p>accept named blood vessels</p> <p>accept Bowman's capsule / renal capsule / glomerulus</p> <p>accept bladder for collecting duct</p>	<p>(4) AO1 1</p>

Q2.

Question Number	Answer	Mark
	<p>J - ureter (1)</p> <p>K - bladder (1)</p> <p>Accept ureta</p> <p>Do not accept urethra, uthra</p>	<p>(2) AO1 1</p>

Q3.

Question Number	Answer	Mark
(i)	<p>A excess amino acids</p> <p>The only correct answer is A</p> <p><i>B is not correct because urea is not made from excess carbohydrates</i></p> <p><i>C is not correct because urea is not made from excess vitamins</i></p> <p><i>D is not correct because urea is not made from excess lipids</i></p>	(1) AO1 1

Question Number	Answer	Mark
(ii)	<p>An explanation including two from:</p> <ul style="list-style-type: none">• blood cells / large proteins (are not found in the filtrate because they) are too large (1)• to pass through nephron wall / capillary / Bowman's capsule (1)• glucose / sodium ions are small enough (1)• to pass through nephron wall / capillary / Bowman's capsule (1)	(2) AO3 2a 2b

Q4.

Question number	Indicative content	Mark
*	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p>Blood to machine</p> <ul style="list-style-type: none"> • kidney dialysis is used when a person's kidneys are damaged / don't remove urea from blood • blood taken from arm / passes into the dialysis machine • blood is separated from the dialysis solution by a (partially permeable) membrane • blood returned to body <p>Unwanted substances</p> <ul style="list-style-type: none"> • toxic substances • for example urea / alcohol • excess ions / named ions e.g. sodium and chloride <p>How substances are removed from blood</p> <ul style="list-style-type: none"> • (unwanted substances) move into the dialysis fluid • by diffusion across the membrane • down a concentration gradient • fresh dialysis fluid is pumped through to maintain the concentration gradient 	<p>(6)</p> <p>AO 1 1</p>

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> • Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail • Presents an explanation with some structure and coherence
Level 2	3-4	<ul style="list-style-type: none"> • Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and fully developed. • Presents an explanation that has a structure which is mostly clear, coherent and logical.
Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. • Presents an explanation that has a well-developed structure which is clear, coherent and logical.

Q5.

Question Number	Answer	Additional guidance	Mark
(i)	A description including: <ul style="list-style-type: none">• blood is filtered (in a dialysis machine) (1)• urea moves {out of the blood / into dialysis solution} (1)• by diffusion (1)	accept tube for blood	(2) AO2 1

Question Number	Answer	Additional guidance	Mark
(ii)	Any one from: <ul style="list-style-type: none">• patient B has {kidney failure / disease} which is less advanced than patient A (1)• patient B may have a {better diet / low protein diet} (1)	accept patient B only just developed kidney disease	(1) AO2 1