

## **B12- Triple only- Exam Practice 1**

### **Q1.**

Two of the substances the body excretes are urea and carbon dioxide.

- (a) Complete the sentence.

Choose the answer from the box.

<b>carbohydrate</b>	<b>lipid</b>	<b>protein</b>	<b>salt</b>
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A person makes a lot of urea if the person's diet contains

a lot of \_\_\_\_\_

(1)

- (b) Why must urea be excreted from the body?

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(1)

- (c) A person produces more carbon dioxide during exercise than when resting.

Complete the sentences.

Choose answers from the box.

<b>breathing</b>	<b>digestion</b>	<b>egestion</b>
<b>osmosis</b>	<b>respiration</b>	

The process that makes carbon dioxide is \_\_\_\_\_

During exercise, extra carbon dioxide can be removed from the body by increasing the rate of \_\_\_\_\_.

(2)

- (d) Excess water must also be removed from the body.

If a person sweats a lot, less water will be excreted in the urine.

A healthy person did the same amount of exercise on each of 3 days.

The following table shows information for the 3 days.

Day	Air temperature in °C	Volume of water consumed in cm <sup>3</sup>	Relative amount of urine produced by the kidneys
1	30	1500	
2	20	1500	
3	15	2000	

Complete the table.

Choose answers from the box.

least	medium	most
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(2)

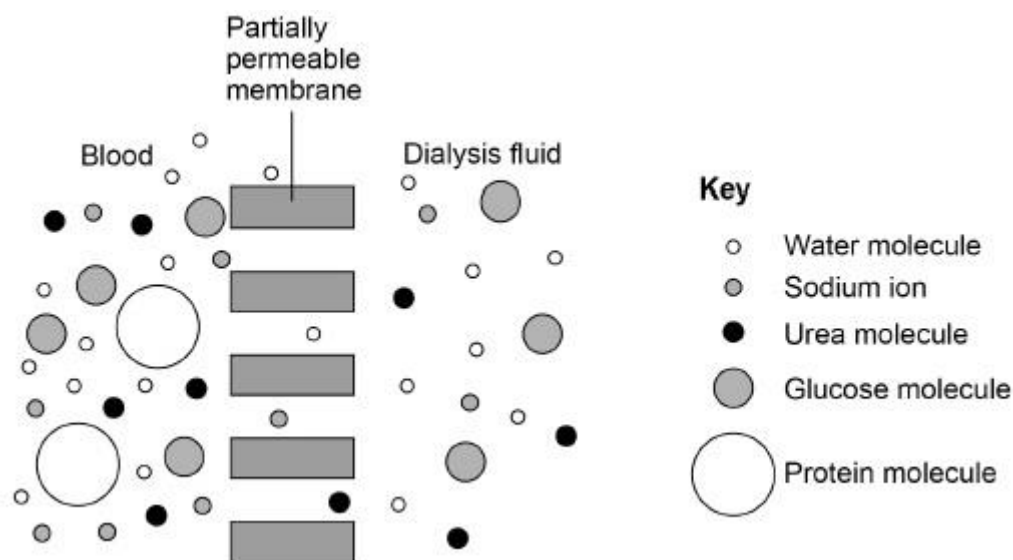
Some people have kidney disease.

Kidney disease may be treated by dialysis or by having a kidney transplant operation.

- During dialysis, a person is connected to a machine that filters the blood.
- Each dialysis session lasts about 6 hours.
- The person has several dialysis sessions each week.

Figure 1 shows how dialysis works.

Figure 1



(e) How does urea move out of the blood during dialysis?

Tick (✓) **one** box.

Diffusion

- Digestion
- Osmosis
- Respiration

(1)

(f) Which substance in **Figure 1** does **not** pass from the blood into the dialysis fluid?

Give the reason for your answer.

Substance \_\_\_\_\_

Reason \_\_\_\_\_

\_\_\_\_\_

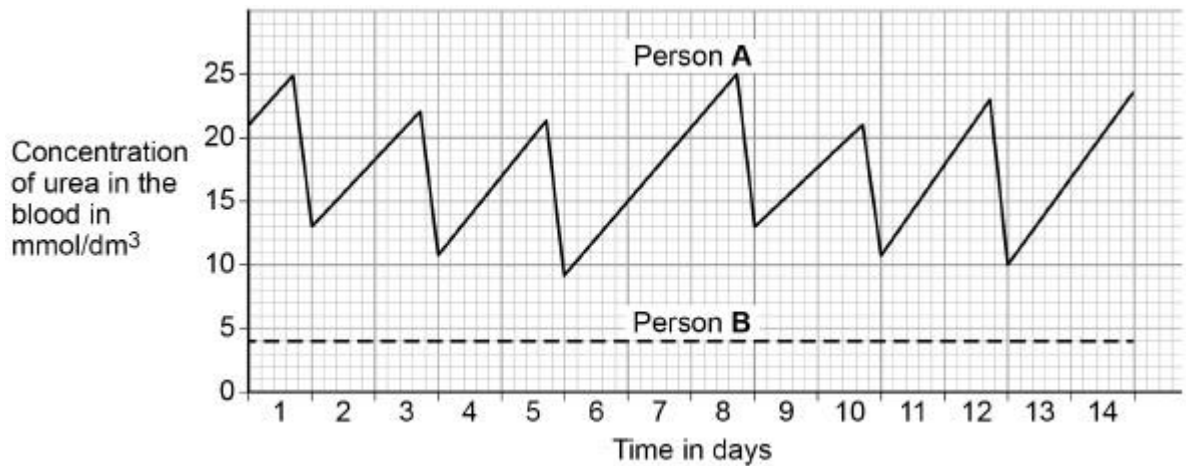
(2)

Two people have kidney disease.

- Person **A** is treated by dialysis.
- Person **B** has had a kidney transplant.

**Figure 2** shows changes in the urea concentration in the blood of each person over 2 weeks.

**Figure 2**



(g) How many dialysis sessions did person **A** have **each week**?

\_\_\_\_\_

(1)

(h) What happens to the concentration of urea in the blood between dialysis sessions?

\_\_\_\_\_

(1)

- (i) Give **two** reasons why a kidney transplant is a better method for treating kidney disease than dialysis.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

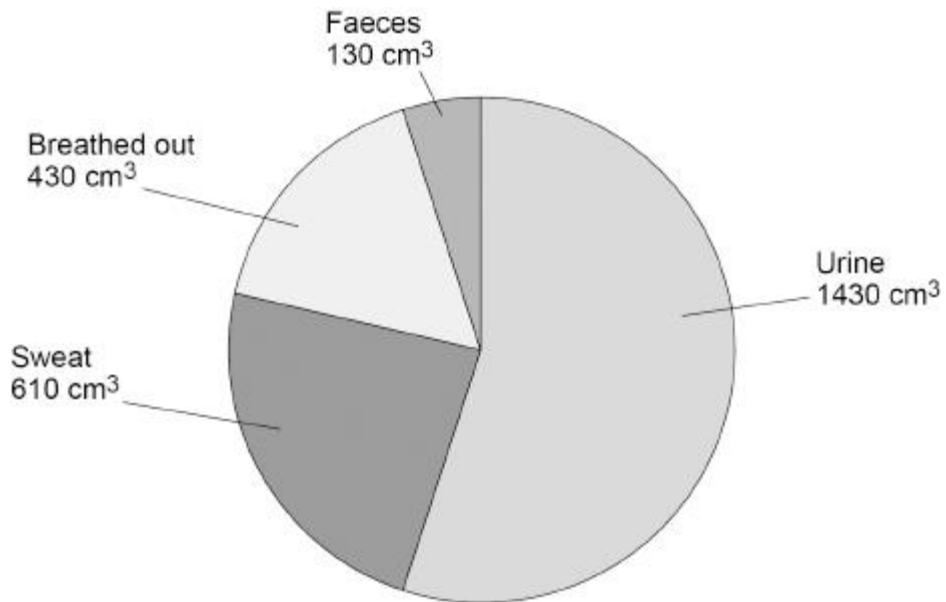
\_\_\_\_\_

(2)

(Total 13 marks)

**Q2.**

The pie chart below shows the water loss from a person on one day.



- (a) The total water loss was 2600 cm<sup>3</sup>.

Calculate the percentage of the total water loss that was lost as urine.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Percentage lost as urine = \_\_\_\_\_ %

(2)

A marathon race is 42 km long.

- (b) What happens to the volume of water lost as sweat when a person runs a marathon?

\_\_\_\_\_

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(1)

(c) What must marathon runners do to prevent themselves becoming dehydrated?

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(1)

(d) Complete the sentences.

Choose answers from the box.

<b>digestion</b>	<b>excretion</b>	<b>fertilisation</b>	<b>filtration</b>	<b>reabsorption</b>
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Blood entering the kidneys goes through the process of \_\_\_\_\_.

Glucose is **not** found in urine because of \_\_\_\_\_.

Urine is removed from the body in the process of \_\_\_\_\_.

(3)

(e) People with kidney failure can have dialysis or a kidney transplant.

Dialysis is often needed 3 times each week and can take over 4 hours each time.

Dialysis usually happens in a hospital.

Kidney transplants require a donor and major surgery.

Describe the advantages **and** disadvantages of having a kidney transplant instead of having dialysis.

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**Q3.**

Human body temperature is controlled within very narrow limits.

Scientists investigated the effect of drinking ice-cold water on:

- internal body temperature
- the rate of sweating.

This is the method used.

1. Sit a person inside a room kept at a constant temperature of 25 °C.
2. Measure the person's internal body temperature near the brain.
3. Measure the person's rate of sweating.
4. After 20 minutes, give the person 500 cm<sup>3</sup> of ice-cold water to drink.
5. Continue to measure the person's internal body temperature and sweating rate for a further 50 minutes.

- (a) Give the reason why the person should **not** move during the investigation.

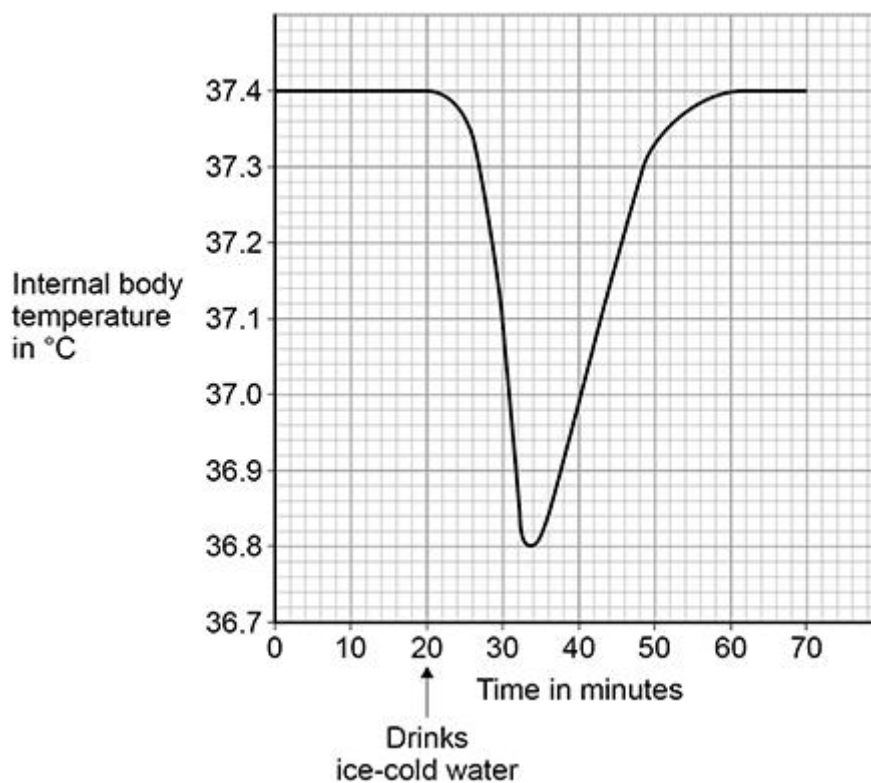
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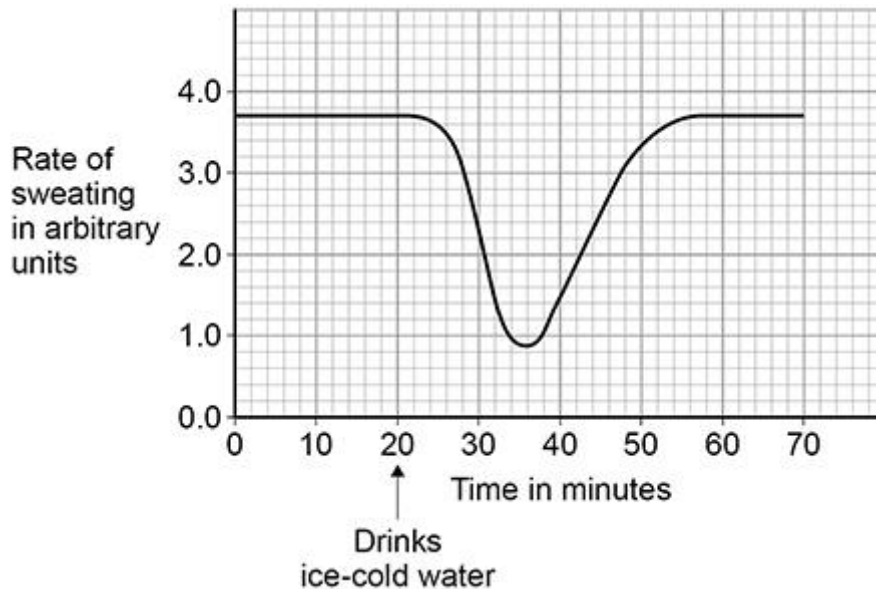
(1)

**Figure 1** and **Figure 2** show the scientists' results.

**Figure 1**



**Figure 2**



(b) What is this person's normal internal body temperature?

Tick (✓) **one** box.

36.8 °C

37.0 °C

37.4 °C

(1)

The results show that when the ice-cold water was drunk, the temperature near the brain decreased.

(c) Explain why the temperature near the brain decreased.

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(2)

(d) The thermoregulatory centre in the brain responds to the decrease in temperature.

How does the thermoregulatory centre send information to sweat glands in the skin?

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(1)

(e) The rate of sweating changes between 24 minutes and 36 minutes.

Explain how this change helps to maintain the person's normal body temperature.

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(2)

(f) During exercise, the skin appears red.

What causes the skin to appear red?

Tick (✓) **one** box.

Blood vessels moving closer to the skin surface

Constriction of blood vessels in the skin

Decrease in heart rate

Dilation of blood vessels in the skin

(1)

(Total 8 marks)

**Q4.**

Humans keep their internal conditions almost constant.

Body temperature is kept within a narrow range.

When the core body temperature is too low, this is detected by the thermoregulatory centre in the brain.

Describe how the body responds when a decrease in core body temperature is detected.

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(Total 6 marks)

## Mark schemes

### Q1.

- (a) protein 1
- (b) urea is a waste (product)  
*allow toxic / poisonous or may damage cells or denatures proteins*  
*ignore harmful / dangerous* 1
- (c)  
*in this order*
- respiration 1
- breathing 1
- (d)  
*in this order*
- least
- medium
- most
- 3 correct = 2 marks*  
*1 or 2 correct = 1 mark* 2
- (e) diffusion 1
- (f) protein 1
- (molecules too) large  
*this mark may only be awarded if mp1 is correct or not attempted*  
*allow pores in membrane are too small* 1
- (g) 3  
*allow three* 1
- (h) increases  
*ignore numbers* 1
- (i) any **two** from:  
*allow converse points for person A / dialysis*
- has a low(er) concentration of urea

- constant urea concentration / level  
*allow substance (if named must be correct)*
- less time attached to machine **or** fewer hospital visits
- no / less restriction on travel
- not piercing skin repeatedly
- less chance of infection / blood clots
- cheaper in the long term  
*ignore cheaper unqualified*
- no restrictions on diet

2

[13]

**Q2.**

(a)

$$\frac{1430}{2600} \times 100$$

1

55 (%)

1

(b) (volume) increases

*allow (volume) goes up*

1

(c) drink (a lot / more)

1

(d) filtration

1

reabsorption

1

excretion

*this order only*

1

(e) **Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.

3-4

**Level 1:** Facts, events or processes are identified and simply stated but their relevance is not clear.

1-2

**No relevant content**

0

**Indicative content****Advantages of kidney transplant**

- no need for regular / long hospital visits **or** is a long-term solution
- flexible lifestyle, such as can go on holidays
- may not live near a hospital **or** reference to transport costs
- no risk of infection from frequent needles / treatment
- less / no need to control diet

- maintains correct concentration of substances in blood / body
- cheaper long term for NHS / hospital

#### Disadvantages of kidney transplant

- may be rejected
- have to keep taking anti-rejection drugs **or** immunosuppressants
- (suitable) donor may not be available **or** need for tissue matching
- risk from surgery (e.g. anaesthesia or infection)
- recovery from surgery will take a long time
- does not last forever (therefore further surgery needed)

For Level 2, answers must refer to both advantages **and** disadvantages

[11]

### Q3.

- (a) any **one** from:
- movement would release (extra) heat
  - movement would increase body temperature
  - movement would increase sweating
- 1
- (b) 37.4 °C
- 1
- (c) blood is cooled at stomach / mouth
- 1
- (cooled) blood flows to the brain
- 1
- (d) via nerve(s) / neurones  
**or**  
via (nerve) impulse(s)
- ignore type of neurone*  
*allow electrical signals*  
*allow via the nervous system*
- 1
- (e) less sweating occurs
- allow less sweat evaporates*  
*do **not** accept no sweating*
- 1
- so less heat is lost **or** less cooling
- allow less heat used for evaporation of sweat / water*
- 1
- (f) dilation of blood vessels in the skin
- 1

[8]

### Q4.

- blood vessels supplying skin
- 1

constrict

*allow vasoconstriction*

*do **not** allow capillaries /veins constricting*

*do **not** allow moving blood vessel*

1

less blood flow (to / through capillaries / to skin)

*allow blood flows further away from skin surface*

1

so less energy is lost (to the surroundings)

*allow less heat is lost*

1

'shivering' by muscle (contraction)

*allow muscles contract (and relax) rapidly*

1

releasing energy **or** respiring (more)

*allow 'heat produced'*

*do **not** allow energy produced / made*

*do **not** allow energy **for** respiration*

*allow sweating stops / reduces*

*ignore hair erection*

1

[6]