

- 1 The table shows four ways in which water leaves the body, and the amounts lost on a cool day.

	WATER LOSS (cm ³)	
	COLD DAY	HOT DAY
Breath	400	the same
Skin	500	
Urine	1500	
Faeces	150	

- (a) (i) Fill in the table to show whether on a hot day the amount of water lost would be

less more the same

The first answer has been done for you.

(3)

- (ii) Name the process by which we lose water from the skin.

(1)

- (b) On a cool day the body gained 2550 cm³ of water.
1500 cm³ came directly from drinking.
Give **two** other ways in which the body may gain water.

1. _____

2. _____

(2)

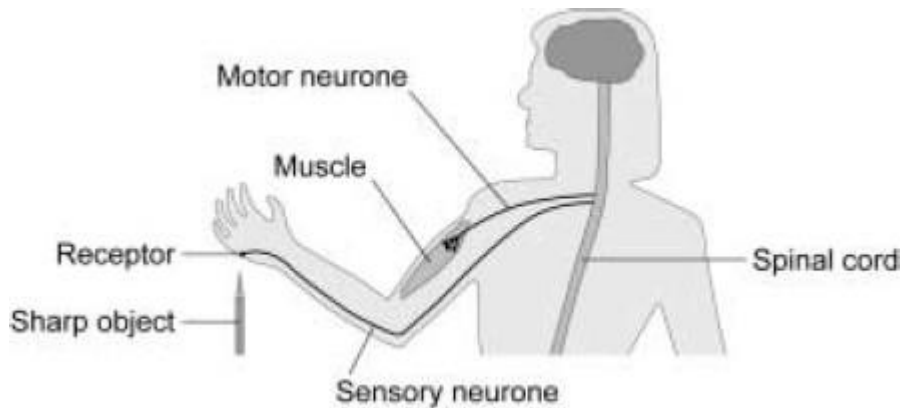
(Total 6 marks)

2

A student accidentally touches a sharp object.

Her hand is immediately pulled away from the object.

The diagram shows the structures involved in this response.



Describe how the structures labelled on the diagram are involved in this reflex action.

(Total 4 marks)

3

In Vitro Fertilisation (IVF) treatment helps infertile women to become pregnant.

(a) Use words from the box to complete each sentence.

ovary	pituitary gland	sperm	uterus
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The eggs are collected from the mother's _____

Each egg is fertilised by a _____.

Each fertilised egg develops into a ball of cells called an embryo.

One or two of these embryos are inserted into the mother's _____.

(3)

(b) The table shows the effectiveness of IVF treatment in one clinic in 2010.

Age of women in years	Under 35	35 – 37	38 – 40	Over 40
Number of IVF treatments	130.0	100.0	29.0	20.0
Average number of embryos transferred	2.6	2.8	3.3	3.6
Percentage of successful pregnancies	43.0	30.0	21.0	13.0

(i) How does the age of the women affect the average number of embryos transferred?

(1)

(ii) Look again at the information in the table.

Suggest **one** ethical reason why many people are against IVF treatment.

(1)

(Total 5 marks)

4 Hormones can be used to control fertility in women.

List A gives the names of three hormones.

List B gives some information about the hormones.

Draw **one** line from each hormone in **List A** to the correct information about the hormone in **List B**.

List A Hormone	List B Information
FSH	Used in some contraceptive pills
LH	Causes the womb lining to break down
Progesterone	Stimulates the release of an egg from the ovary
	Stimulates eggs to mature in the ovaries

(Total 3 marks)

5 A student investigated her reaction time.

A computer measured how quickly she clicked the mouse when she detected each of three different stimuli as shown in the diagrams.



- (a) Give the stimulus each sense organ detected in this investigation.

Complete each sentence using the correct word from the box.

chemicals	light	sound	touch
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Receptors in her eyes detected _____.

Receptors in her ears detected _____.

Receptors in her skin detected _____.

(3)

- (b) Each sense organ was tested 4 times and the mean reaction times were calculated.

The table shows the results.

	Reaction time for each sense organ in seconds		
	Eyes	Ears	Skin
Test 1	0.23	0.17	0.18
Test 2	0.27	0.14	0.16
Test 3	0.24	0.15	0.35
Test 4	0.26	0.14	0.17
Mean reaction time		0.15	0.17

- (i) There is one anomalous result in the table.

Draw a ring around the anomalous result.

(1)

- (ii) Calculate the mean reaction time for the eyes.

Mean reaction time for the eyes = _____ seconds

(2)

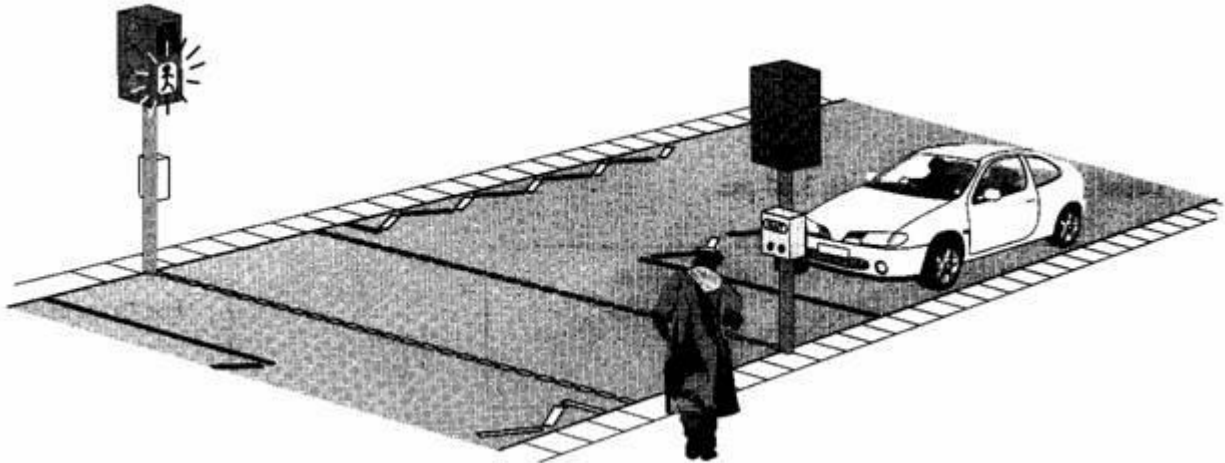
- (iii) Give **one** conclusion you can make from these results.

(1)

(Total 7 marks)

6

A man is walking along a street. He plans to cross the road at the pelican crossing. Pelican crossings show a flashing green person and bleep when it is safe to cross.



(a) State **two** different ways the man uses:

(i) his eyes, to help him cross the road safely;

1. _____

2. _____

(2)

(ii) his ears, to help him cross the road safely.

1. _____

2. _____

(2)

(b) (i) Eyes, ears and skin contain sense receptors.

State the names of **two** other parts of the body which contain sense receptors.

_____ and _____

(2)

(ii) What type of sense receptor is in the skin of his feet?

(1)

(Total 7 marks)

7 Internal conditions in the body are controlled.

Use words from the box to complete each of the following sentences.

blood	FSH	glands
hormones	LH	white blood cells

Many processes in the body are controlled by chemical substances called

_____.

The chemicals are secreted by_____.

They are transported to their target organs in_____.

One of these chemical substances stimulates the release of an egg from a woman's ovary.

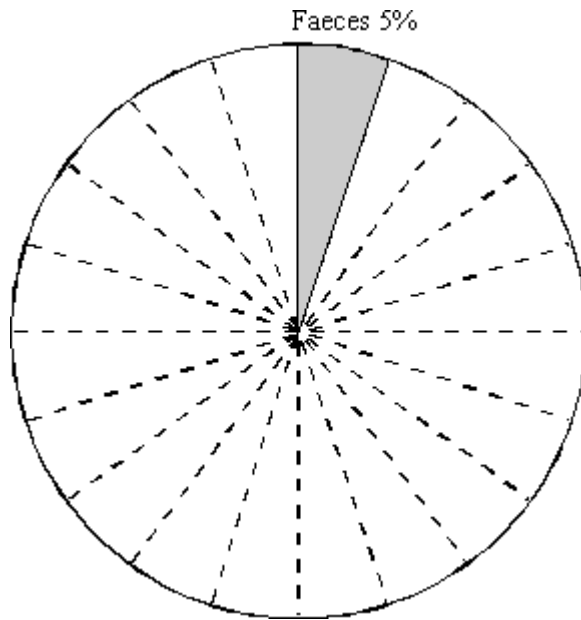
This chemical substance is called_____.

(Total 4 marks)

8 The table below shows how the body loses water.

HOW WATER IS LOST	% (PERCENTAGE)
Breathing	10
Faeces	5
Sweat	45
Urine	40

Complete the diagram by showing the water loss for breathing, sweat and urine.



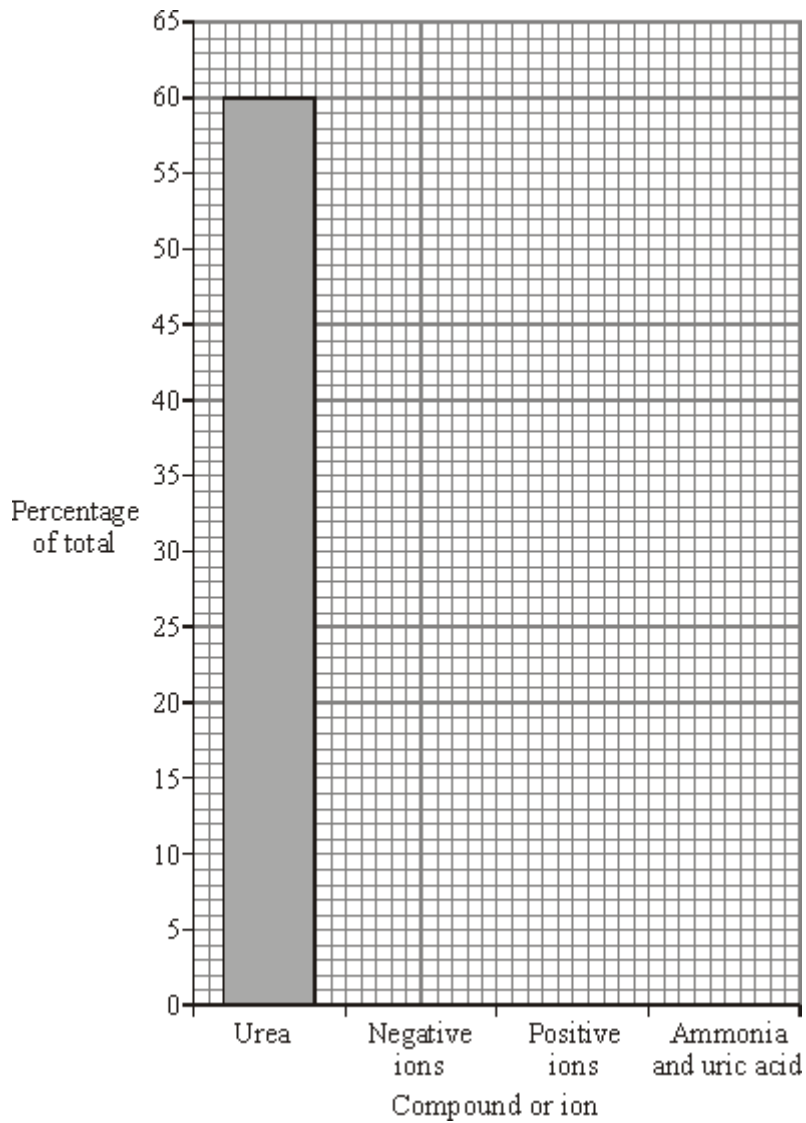
(Total 3 marks)

9

(a) The table shows the compounds and ions dissolved in a student's urine.

Compound or ion	Percentage of total
urea	60
negative ions	25
positive ions	10
ammonia and uric acid	5

(i) Complete the bar chart. One bar has been drawn for you.



(2)

(ii) There is a total of 10 g of compounds and ions dissolved in a sample of this student's urine. Calculate the mass of urea in the sample. Show clearly how you work out your answer.

Mass of urea _____ g

(2)

(b) Use words from the box to complete the sentences.

anus bladder kidneys liver lungs
--

Plasma transports carbon dioxide from the body to the _____.

Plasma transports urea from the _____ to the _____.

(3)

(Total 7 marks)

10

Two common medicines are paracetamol and ibuprofen. These medicines help to reduce high body temperature.

(a) Children who were ill with high body temperatures were identified at doctors' surgeries.

These children were put into two groups.

The children in each group were matched for age, gender and body mass.

Group 1: 50 children were given paracetamol.

Group 2: 50 children were given ibuprofen.

(i) Give **one** control variable in this investigation.

(1)

(ii) In some investigations when medicines are tested, a placebo is given to one group.

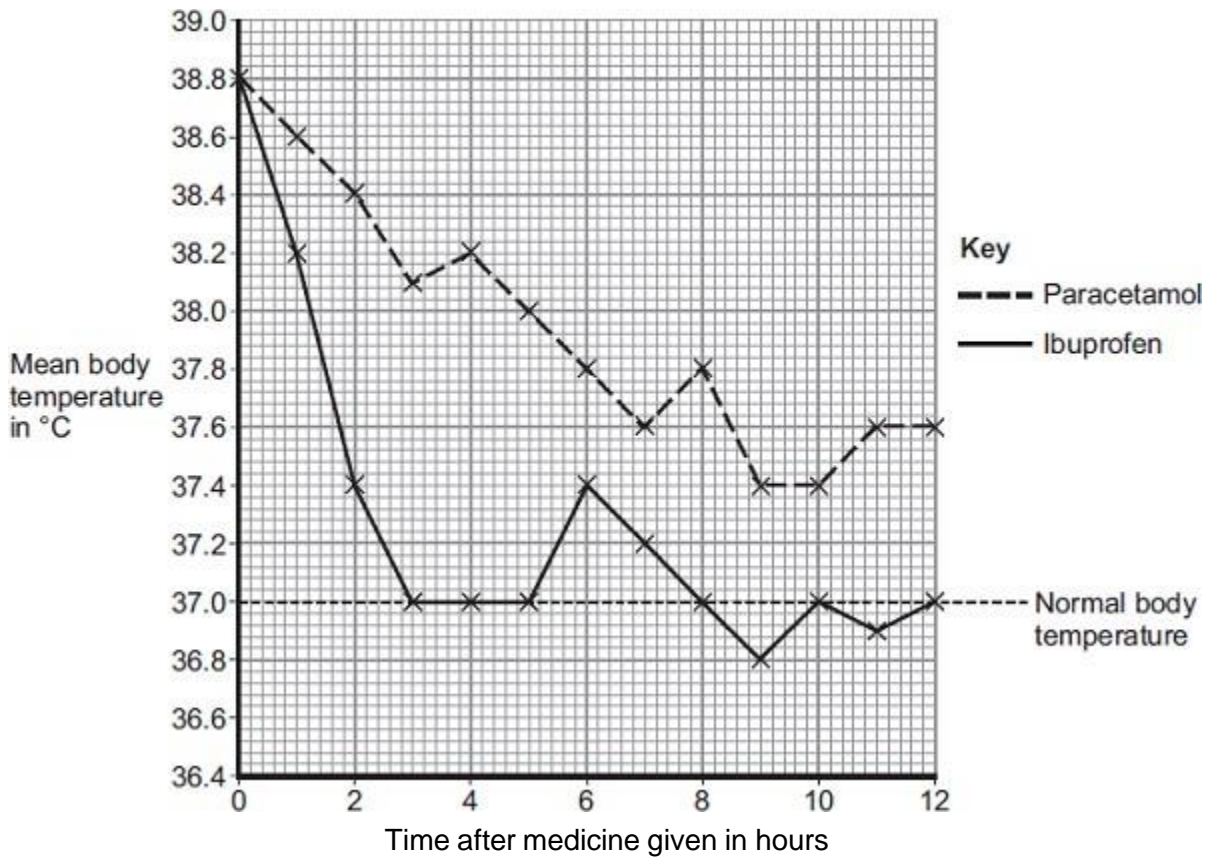
What is a placebo?

(1)

- (b) The children's body temperatures were measured before any medicine was given and every hour after treatment started.

Paracetamol was given every 4 hours. Ibuprofen was given every 6 hours.

The results for the two groups are shown in the figure below.



- (i) What was the mean body temperature 4 hours after paracetamol was given?

_____ °C

(1)

- (ii) Suggest which medicine a parent should give to their child to reduce a high body temperature to normal.

Use information from the graph.

Medicine: _____

Give **two** reasons for your answer.

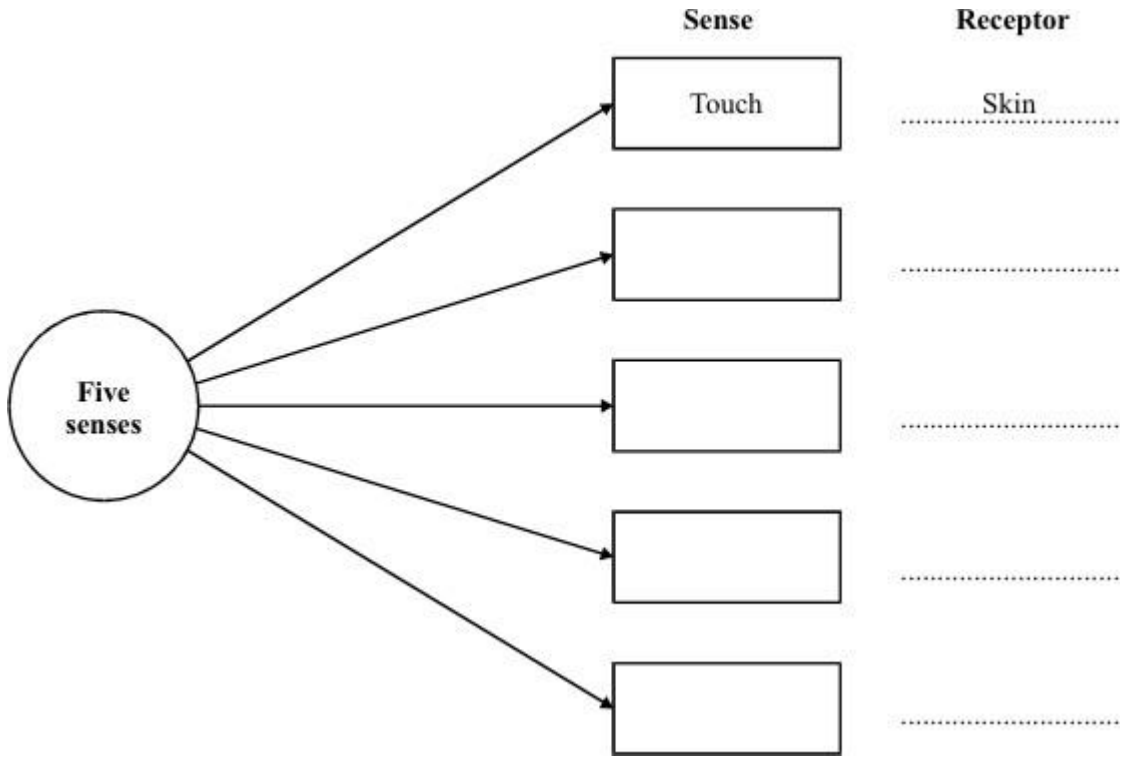
(2)

(Total 5 marks)

11

- (a) Humans have a number of senses, for example touch. Senses are detected by receptors, for example skin detects touch.

In the boxes write the names of **four** other senses. By each box write the name of the receptor.



(8)

- (b) When your hand is touched, the information is passed to your brain. Describe how the information gets from your skin to your brain.

(2)

(Total 10 marks)

Mark schemes

1	(a) (i) more less the same (<i>accept</i> appropriate numbers) <i>for 1 mark each</i>	3	
	(ii) sweating / evaporation / perspiration <i>for 1 mark</i>	1	
	(b) in food / named solid food / eating from respiration <i>for 1 mark each</i>	2	[6]
2	receptor detects stimulus / sharp object	1	
	impulse / information / message passes along sensory neurone to spinal cord	1	
	from spinal cord along motor neurone to muscle	1	
	muscle contracts	1	[4]
3	(a) ovary	1	
	sperm	1	
	uterus	1	
	<i>must be in correct order</i> <i>accept phonetic spelling – see marking guidance 3.6</i>		
(b) (i)	more embryos transferred in older women / average increases with age <i>ignore chance of pregnancy / number of treatments</i>	1	

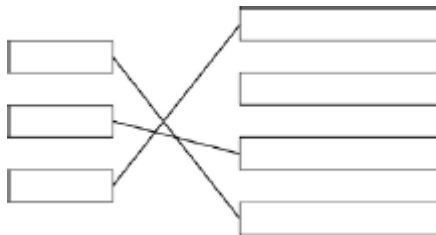
(ii) answer must relate to data in table

(many) embryos die / destroyed / do not survive
allow low success rate / often does not work
allow could lead to multiple births
ignore less successful in older women
ignore older women should not have babies
ignore not natural / finance
ignore religion / 'against God's will'

1

[5]

4



extra lines negate mark(s)

[3]

5

(a) light

must be in correct order
allow light waves

1

sound

allow sound waves

1

touch

1

(b) (i) 0.35 in skin column circled

only look at figures in table more than one figure circled negates mark

ignore values written in table for mean reaction time for eyes

1

(ii) 0.25 (seconds)

allow 1 mark for $\frac{0.23 + 0.27 + 0.24 + 0.26}{4}$

or 1 / 4

2

(iii) any **one** from:

ignore figures / references to sensitivity

- the ears / sound had the shortest reaction time
allow fastest
- the eyes / light had the longest reaction time
allow slowest
- ears and skin had similar reaction times
ignore references to anomalies or repeat values

1

[7]

6

(a) (i) any **two** from

see the (green) light **or** sign **or** man
for seeing where to go to avoid
objects

see cars (that are stopped)

answer must show that the person sees something

2

(ii) any **two** from

hear the bleeps **or** noise
to listen for traffic or danger
for balance

answer must show that the person hears something

2

(b) (i) nose

credit smell

1

tongue

credit taste but not mouth

credit temperature sensor

1

(ii) any **one** from
do not accept sensory receptors or neurone

touch
pain

credit nerves

pressure
temperature

credit heat

do not accept cold

1

[7]

7 hormones

words must be in correct order

1

glands

1

blood

1

LH

1

[4]

8 1 sector correct

gains 1 mark

but all sectors correct B = 2 S = 9 U = 8

gains 2 marks

all sections labelled correctly (w.r.t. sector size)

for 1 mark

[3]

9 (a) (i) all plots correct

Tolerance $\pm \frac{1}{2}$ square

allow 1 mark for 2 correct plots

2

(ii) 6

correct answer with no working = 2

allow 1 mark for $(60 \div 100) \times 10$

N.B. correct answer from incorrectly recalled relationship / substitution = 0

2

(b)	lungs	1
	liver	1
	kidneys	1

[7]

10

(a) (i) any **one** from:

- age
- gender
- body mass
- number in group / 50
allow number of children
- high body temperature
allow starting temperature
allow dose / amount of drug given

1

(ii) any **one** from:

- tablet that does not contain a drug / anything
allow sugar pill
*do **not** allow a different drug*
- fake drug

1

(b) (i) 38.2 (°C)

1

(ii) ibuprofen

no mark for drug
no marks if wrong drug selected

any **two** from:

- reduced body temperature fast(er)
allow acts fast(er)
- maintained temperature in normal range / around 37 °C (longer / for several hours)
- paracetamol did not reduce temperature to normal / 37 °C
accept ibuprofen did reduce temperature to normal / 37 °C
- ibuprofen given less frequently
allow less drug needed
ignore cheaper unless qualified

2

[5]

(a)

*the senses may be in any box.
do not credit list of receptors
the appropriate organ must be adjacent*

2

Mark first Look for
 suitable
Sense **Receptor**
taste tongue **or**
 taste buds

do not credit mouth

2

smell nose

hearing ear
 cochlea

2

vision **or** sight **or** eye **or** retina
seeing

*do not credit light but eye correct as receptor
do not credit looking*

heat **or** temperature skin
movement ear **or** semi-circular
 canals

do not credit feel or alternatives to touch or pressure

balance eye **or** ear
 or both **or**
 semi-circular
 canals

2

(b) any **two** from three

a sensor **or** receptor **or** detector feels
the touch **or** starts the process

accept nerve endings in skin

a signal **or** impulse is sent
along a nerve **or** neurone **or** spinal
cord **or** (central) nervous system

*do not credit message
do not credit spine*

beware of repeat of stem

2

[10]