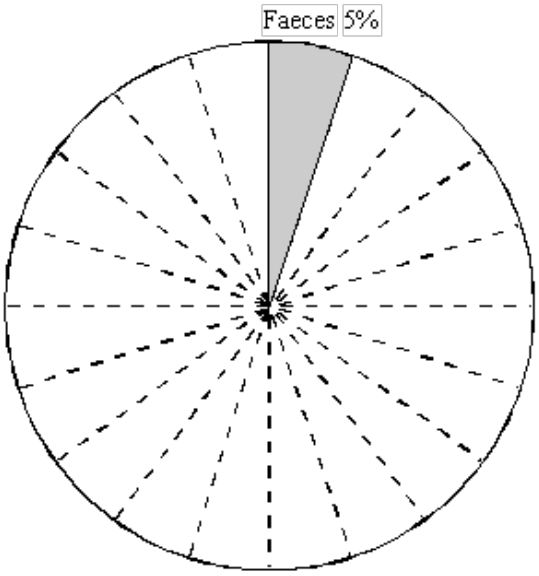
Q1. The table below shows how the body loses water.

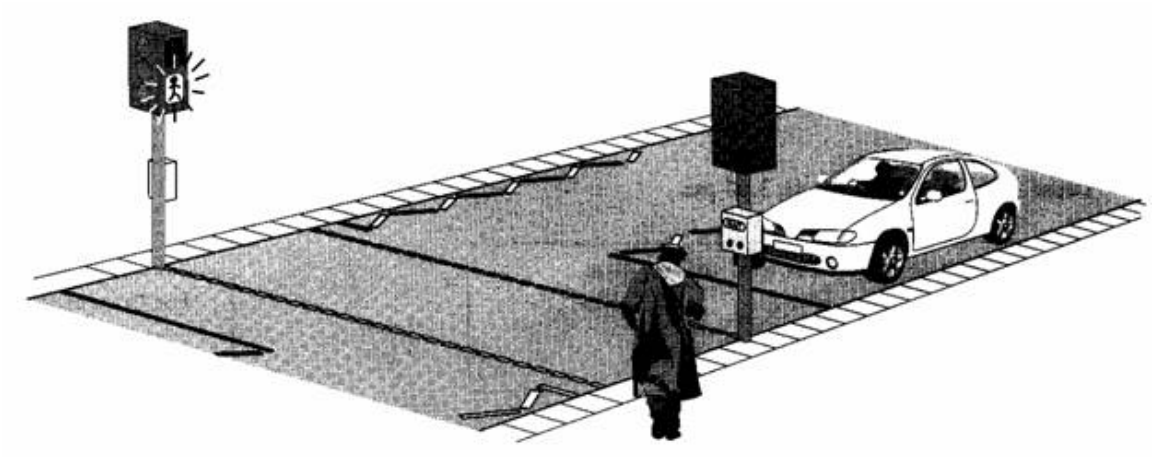
HOW WATER IS LOST	% (PERCENTAGE)
Breathing	10
Faeces	5
Sweat	45
Urine	40

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



(Total 3 marks)

Q2. 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?

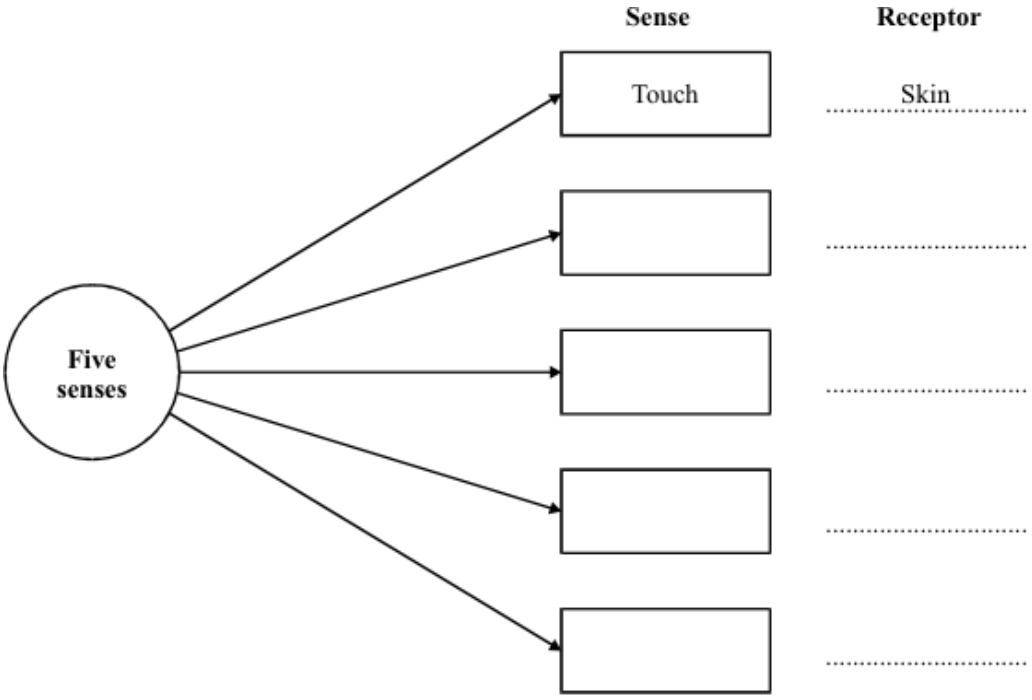
.....

(1)

(Total 7 marks)

Q3. (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)

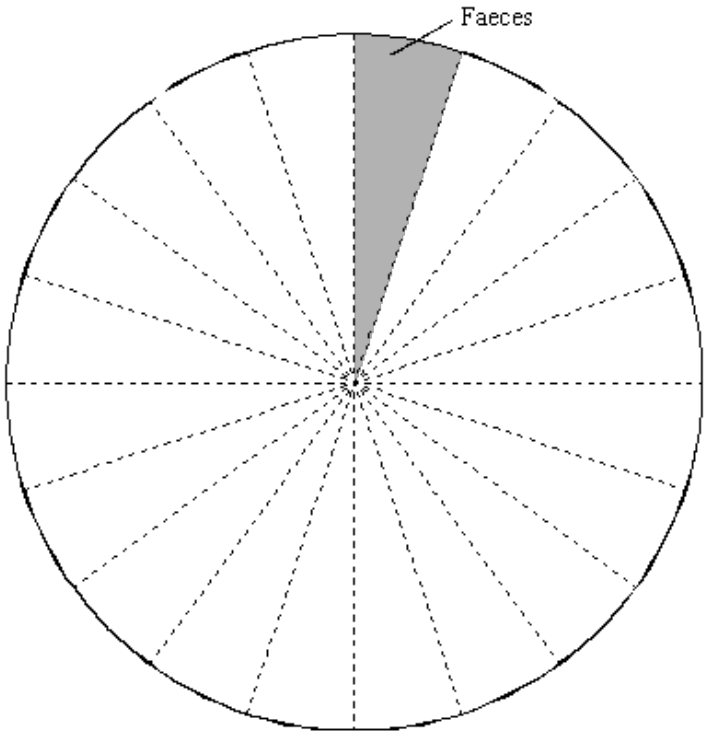
##

The table shows how much water is lost in different ways from a student's body.

Way in which water is lost	Percentage of total
Breath	15
Faeces	5
Sweat	50
Urine	30

(a) Complete the pie chart.

One part has been done for you. Remember to label the pie chart.



(3)

(b) The table is about waste products which are removed from the student's body.

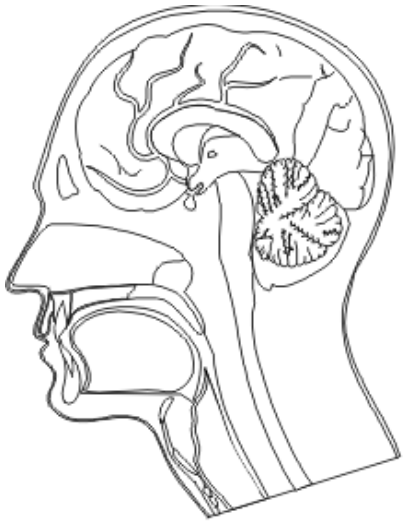
Complete the table by using the correct words from the box.

amino acids	breath	circulation	digestion	fatty acids
glucose	respiration	sweat	urine	

Waste product	How it is produced	How it leaves the body
carbon dioxide	by	in .....
urea	from	in .....

(4)

(Total 7 marks)



Q5.

(a) **On the diagram**, use guidelines to label:

1 the brain;

2 the spinal cord.

(2)

(b) Some students are investigating the behaviour of a mouse. They use a large empty box. The box has squares marked on the floor, as shown in the diagram.

(C = corner square, S = side square, I = inside square)

C_1	S_1	S_2	S_3	C_2
S_{10}	I_1	I_2	I_3	S_4
S_9	I_6	I_5	I_4	S_5
C_4	S_8	S_7	S_6	C_3

They put a mouse in the empty box. They record which square the mouse is in every minute for 15 minutes. They get these results.

Time (minutes)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Position of mouse	C_1	C_1	S_2	C_3	C_3	S_9	I_3	C_1	C_1	C_1	S_8	C_4	C_4	C_1	S_2

(i) Fill in the table below to show how much time the mouse spends in the corner squares (C), the side squares (S) and the inside squares (I).

POSITION	TIME (minutes)
Corner (C)	
Side (S)	
Inside (I)	

(3)

(ii) What pattern is shown by the results?

.....

.....

(1)

(iii) Suggest how the behaviour of the mouse might help its survival.

.....

.....

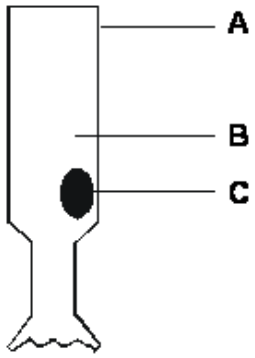
.....

.....

(2)

(Total 8 marks)

Q6. The drawing below shows a light-sensitive (receptor) cell from the eye. The structures labelled A, B and C, can be found in most animal cells.



(a) Name the structures labelled A, B and C.

A .....

B .....

C .....

(3)

(b) Describe, as fully as you can, what happens in the nervous system when this receptor cell is stimulated by light.

.....

.....

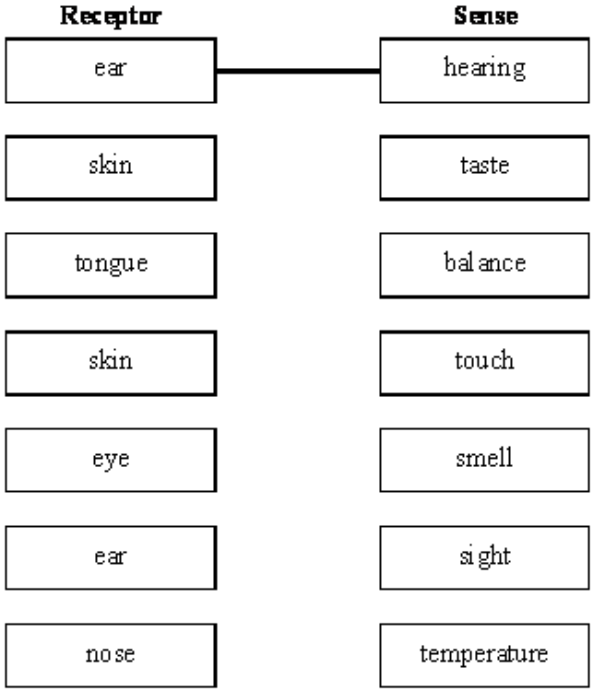
.....

.....

(3)

(Total 6 marks)

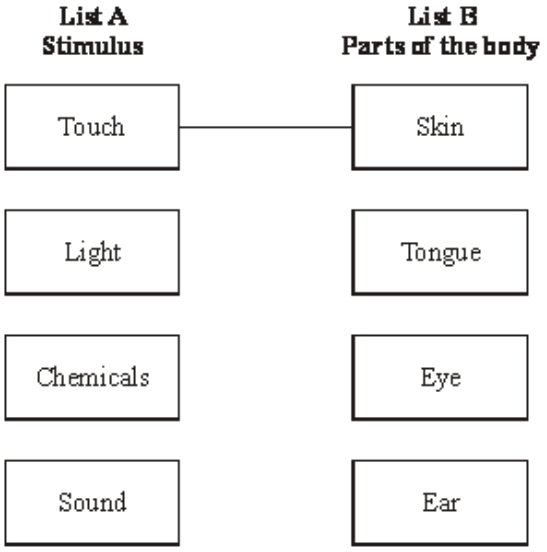
Q7. Humans use receptors to help them to respond to stimuli in the environment. Match up each receptor with the correct sense. One has been done for you.



(Total 5 marks)

Q8. (a) List **A** gives the names of four stimuli. List **B** gives four parts of the human body.

Draw a straight line from each stimulus in List **A** to the part of the body in List **B** which has receptors for that stimulus.
(One has been done for you.)



(3)

(b) Complete the following sentence by choosing the correct words from the box.

brain **glands** **motor** **sensory**

To make us aware of a stimulus, impulses are sent along a …….…. neurone

to the .....

(2)
(Total 5 marks)

Q9. Each week, an athlete trains on 5 days (training days) but does not train on the other 2 days (rest days).

The table shows how water losses from the athlete's body are different on a rest day from those on a training day.

	Volume of water lost in cm^3	
Method	**Rest day**	**Training day**
Urine	1500	900
Sweating	625	2400
Breathing	450	1500
Faeces	125	120
Total	2700	

(a) Complete the table to show the total volume of water lost by the athlete on a training day.

(1)

(b) Explain why the athlete sweats more on a training day.

.....

.....

.....

.....

(2)

(c) On a training day, the athlete needs to take in more water.

Explain why the athlete needs to take in more water on a training day.

.....

.....

.....

.....

(2)

(Total 5 marks)

Q10. (a) We control many conditions inside our bodies.

Name **three** conditions which are controlled inside our bodies.

1. .....

2. .....

3. .....

(3)

(b) Hormones are used to control fertility in women.

Use words from the box to complete the sentences.

antibiotic	**contraceptive drug**	**fertility drug**	**vaccine**

A woman can prevent pregnancy by taking a .....

A woman can be helped to become pregnant by taking a .....

(2)

(c) Some drugs are addictive.

(i) Name **one** addictive drug.

.....

(1)

(ii) Explain why it is very difficult to give up using an addictive drug.

.....

.....

.....

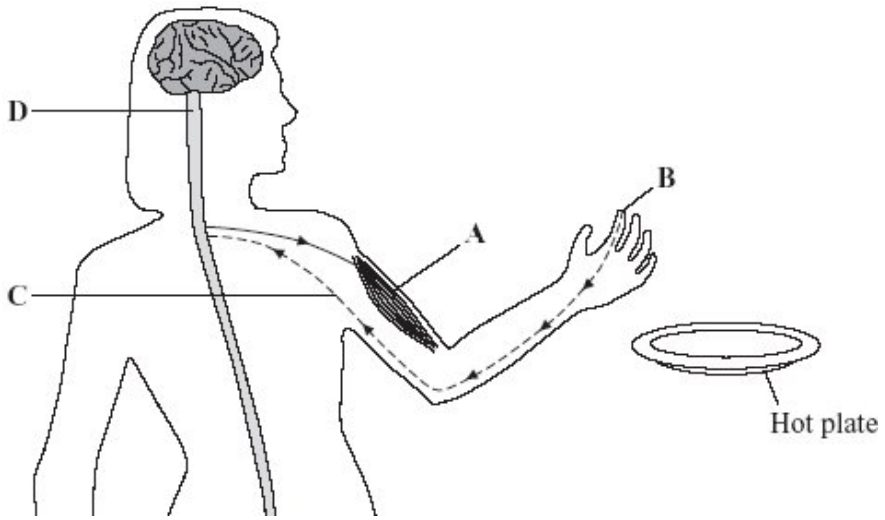
.....

(2)

(Total 8 marks)

Q11. A girl picks up a hot plate. A reflex action causes her to drop it.

The diagram shows some of the structures involved in this reflex action.



Use words from the box to name the structures labelled **A**, **B**, **C** and **D**.

brain	gland	muscle	neurone	receptor	spinal cord

A .....

B .....

C .....

D .....

(Total 4 marks)

Q12. The volume of water that the body loses must balance the volume of water that it gains.

Tables 1 and **2** show losses and gains of water by the body in one day.

Table 1
Losses of water by the body

Method	Volume in cm^3
breathing	300
sweating	600
faeces	
urine	100
Total	**2400**

Table 2
Gains of water by the body

Method	Volume in cm^3
drinking	1300
food	800
chemical reactions	300
Total	**2400**

(a) (i) Calculate the volume of urine lost by the body.

Show clearly how you work out your answer.

.....

.....

Volume of urine lost by the body = ... cm^3

(2)

(ii) What proportion of water gained by the body comes from food?

Put a tick (✓) in the box next to your choice.

$\frac{1}{4}$ ☐

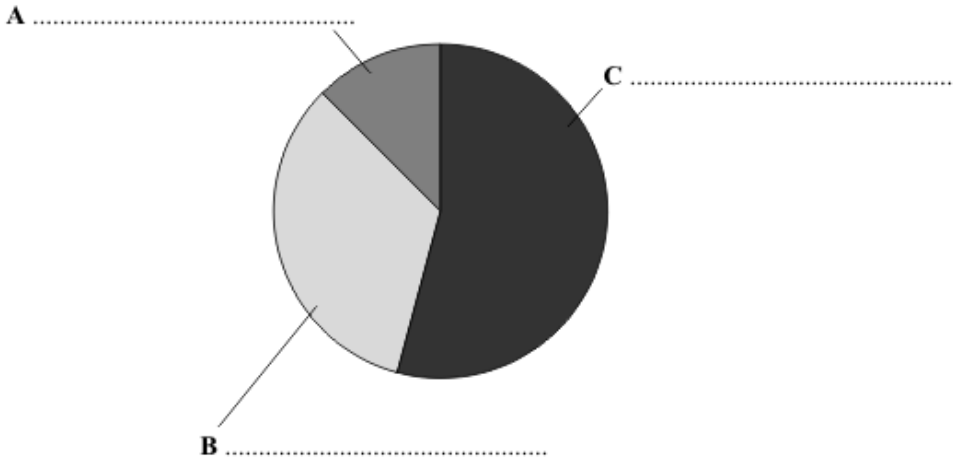
$\frac{1}{3}$ ☐

$\frac{1}{2}$ ☐

(1)

(b) One pupil decided to show the figures from **Table 2** as a pie chart.

Label sections **A**, **B** and **C** of the pie chart.



(1)

(c) How does sweating help the body?

.....

.....

(1)

(d) On a hotter day, the volumes of water lost and gained will be different.

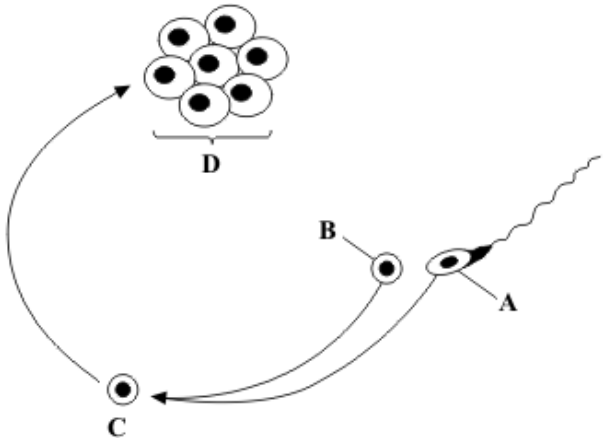
What differences will there be?

Tick (✓) **two** answers from the list.

More sweat produced	☐
More faeces produced	☐
More food eaten	☐
Less urine produced	☐
Less liquid drunk	☐

(2)
(Total 7 marks)

Q13. The diagram shows some of the stages in IVF (in-vitro fertilisation).



(a) Use words from the box to name structures **A, B, C** and **D.**

egg	**embryo**	**fertilised egg**	**ovary**	**sperm**

Structure **A** .....

Structure **B** .....

Structure **C** .....

Structure **D** .....

(4)

(b) What do the doctors do next with structure **D**?

.....

.....

.....

.....

(2)

(c) The table gives statistics for an IVF clinic.

	Age of women treated			
	Below 35 years	**35-37 years**	**38-39 years**	**40-42 years**
Number of women treated	414	207	106	53
Number of women who produced one baby	90	43	17	1
Number of women who produced twins	24	8	4	1
Number of women who produced triplets	1	0	0	0

(i) About what proportion of the treated women aged 35 − 37 produced one or more babies?

Draw a ring around your answer.

one quarter **one third** **half**

(1)

(ii) IVF treatment is not given by this clinic to women over 42 years of age.

Use data from the table to explain why.

.....

.....

.....

.....

.....

(2)

(iii) The committee which regulates IVF treatment now advises that only one embryo is used in each treatment.

Suggest **one** reason for this.

.....

.....

(1)

(Total 10 marks)

Q14. The drawing shows a group of people in a café.

(a) Use words from the box to answer the questions.

brain	**eye**	**nose**	**skin**	**tongue**

Which organ contains receptors that allow a person to:

(i) read the newspaper .....

(1)

(ii) smell the coffee .....

(1)

(iii) feel how hot the cup is .....

(1)

(iv) taste the coffee? .....

(1)

(c) A cigarette manufacturer increased the amount of nicotine in cigarettes by 11% between 1997 and 2006. The manufacturer did not tell the public about this change.

(i) Suggest **one** reason why the manufacturer increased the amount of nicotine in the cigarettes.

.....

.....

(1)

(ii) Suggest **one** reason why the manufacturer did not tell the public about the change.

.....

.....

(1)

(Total 6 marks)

Q15. (a) Use words from the box to complete the sentences about controlling conditions in our bodies.

kidneys	**liver**	**lungs**	**skin**

(i) When we breathe out, water leaves the .....

(1)

(ii) When we sweat, water leaves the body through the .....

(1)

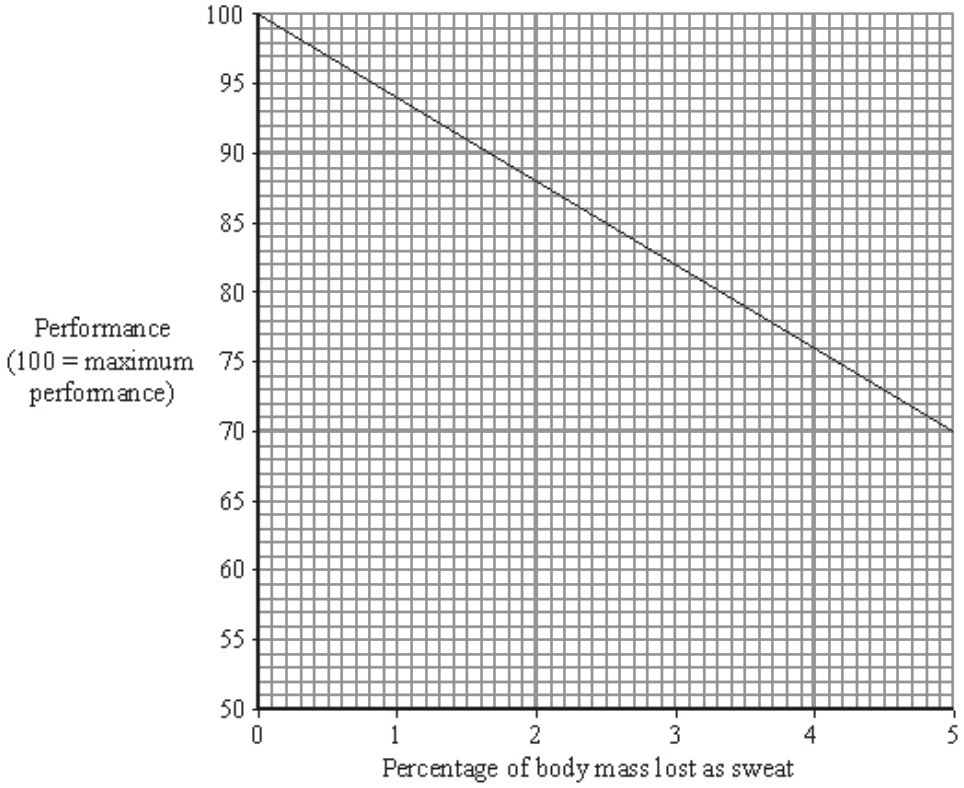
(iii) Excess water leaves the body in a liquid called urine.

Urine is produced by the .....

(1)

(b) We lose a lot of sweat during exercise. When this happens, we cannot perform as well as we could at the start of the exercise.

The graph shows the effect of losing sweat on the performance of an athlete.



(i) Describe the effect of losing sweat on performance.

.....

.....

(1)

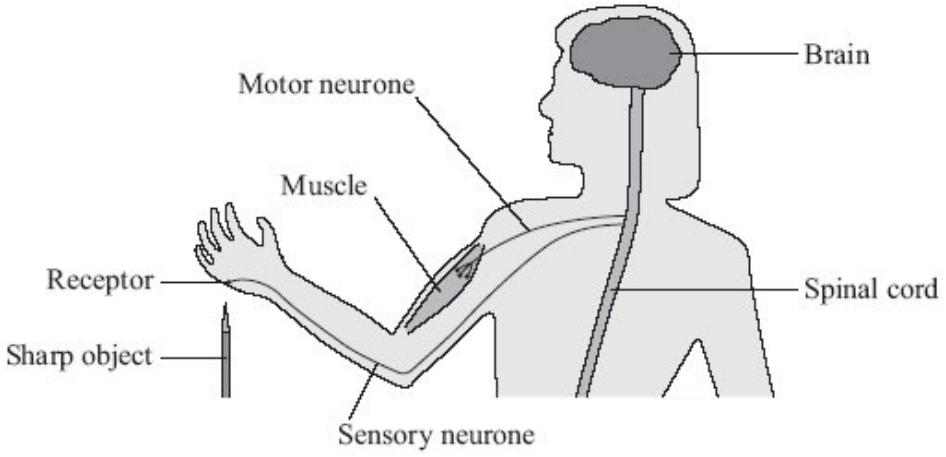
(ii) How can athletes reduce this effect on performance?

.....

.....

(1)
(Total 5 marks)

Q16. 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.



(a) Use the correct word or phrase **from the diagram** to complete each sentence.

(i) The stimulus is detected by the .....

(1)

(ii) Impulses travel to the central nervous system along a

cell called a .....

(1)

(iii) Impulses travel from the central nervous system to the effector

along a cell called a .....

(1)

(iv) The hand is pulled away from the sharp object by the

.....

(1)

(b) Where in the body are there cells sensitive to:

(i) light .....

(1)

(ii) sound .....

(1)

(iii) changes in position?.....

(1)

(Total 7 marks)

Q17. In-vitro fertilisation (IVF) is used to help infertile women to have babies.

The table gives statistics from one clinic that gives IVF treatment.

	Age of women given IVF treatment			
	Under 35 years	35 – 37 years	38 – 39 years	40 – 42 years
Number of women treated	425	208	106	53
Number of single births	90	44	17	1
Number of sets of twins	24	8	4	1
Number of sets of triplets	1	0	0	0

Use data from the table to help you to answer these questions.

(a) How many of the women aged 38 – 39 had babies?

.....

.....

(1)

(b) What proportion of the treated women aged 35 – 37 had twins?

.....

.....

(1)

(c) For which age group was IVF treatment most successful?

.....

.....

(1)

(d) Give **two** disadvantages of IVF treatment.

1 .....

.....

.....

2 .....

.....

.....

(2)

(Total 5 marks)

Q18. The photograph shows a girl waiting to cross a road.

© Lionel Lassman

(a) Name **two** different sense organs she would use to detect when it is safe to cross the road.

1 .....

2 .....

(2)

(b) Which sense organ contains receptors that help the girl to keep her balance?

.....

(1)

(c) (i) Complete the sentence.

A car driver automatically brakes if a child dashes out into the road.

This is called a ..... action.

(1)

(ii) Draw a ring around the correct answer to complete the sentence.

In the nervous system, information passes along cells called

effectors
neurones
synapses

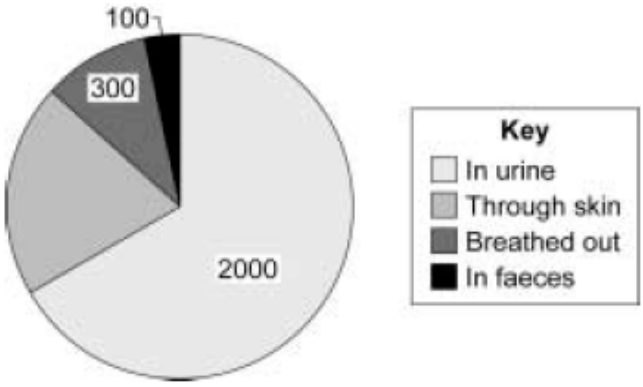
.

(1)

(Total 5 marks)

Q19. Water is lost from the body in several ways.

The pie chart shows the volume of water lost, in cm^3, by a man on a cold day.



(a) (i) The total volume of water lost by the man was 3000 cm^3.

How much water was lost through the skin?

Volume of water lost through skin ..... cm^3

(1)

(ii) The same man lost 1200 cm^3 of water through the skin on a warm day.

Give **one** reason for the different volumes of water lost on the two days.

.....

.....

(1)

(b) To maintain water balance in the body, the total volume of water taken in must equal the total volume of water lost.
Give **two** ways this is achieved on a hot day, when compared to a cold day.
Tick (✓) **two** boxes.

The volume of water in the urine decreases. ☐

The volume of water in the faeces increases. ☐

The volume of water taken as food or drink increases. ☐

The volume of water breathed out decreases. ☐

(2)
(Total 4 marks)

Q20. The *Invocell* device below is used in a new IVF (in-vitro fertilisation) treatment. Sperm and eggs are placed in the device which is then placed in the woman's vagina.

The table compares standard IVF treatment with *Invocell* IVF treatment.

	Standard IVF treatment	***Invocell* IVF treatment**
Success rate	29.6 %	19.7 %
Cost	£2500	£900
Laboratory equipment needed	Extra equipment needed	None
Fertility problems that can be treated	100 %	50 %
Hormone treatment needed	Yes	Yes
When the embryos can be seen	Within hours	After 3 days

Using **only** the information given in the table, answer these questions.

(a) Give **two** advantages of *Invocell* IVF treatment compared with standard IVF treatment.

1 .....

.....

2 .....

.....

(2)

(b) Give **two** disadvantages of *Invocell* IVF treatment compared with standard IVF treatment.

1 .....

.....

2 .....

.....

(2)
(Total 4 marks)

Q21. Hormones control the menstrual cycle.

(a) Name **two** of the hormones involved in the menstrual cycle.

1 .....

2 .....

(2)

(b) Hormones are used in some types of contraception.

Complete the sentence.

When used as contraceptives, hormones stop ..... becoming mature.

(1)

(c) There are several ways of using hormones as contraceptives.

These include:

- taking a contraceptive pill each day for 21 days of the menstrual cycle
- using a contraceptive implant.

The contraceptive implant is put under the skin of a woman's arm.

The implant releases contraceptive hormones for three years before the implant needs to be replaced.

(i) Suggest **one** advantage of using this implant rather than taking contraceptive pills.

.....

.....

(1)

(ii) Suggest **one** disadvantage of using this implant rather than taking contraceptive pills.

.....

.....

(1)
(Total 5 marks)

Q22. The photograph shows a new-born baby.

By SCA Svenska Cellulosa Aktiebolaget [CC-BY-2.0], via Wikimedia Commons

(a) New-born babies have reflex actions. The reflex actions help new-born babies to survive.

Draw a line from each reflex action to the way in which it helps the baby to survive.

Reflex action	How the reflex action helps the baby
If milk goes down the baby's windpipe the baby coughs	Helps the baby to hold on to the mother
If the mother touches the palm of the baby's hand, the baby clenches its fist.	Prevents the baby from choking
If the mother strokes the baby's mouth, the baby begins to suck.	Helps to protect some of the baby's receptors
If a bright light shines on the baby, the baby's eyes shut.	Helps the baby to crawl
	Helps the baby to feed

(4)

(b) Which **two** of the following may be effectors in reflex actions?

Tick (✓) **two** boxes.

Brain ☐

Glands ☐

Motor neurones ☐

Muscles ☐

Sensory neurones ☐

(2)
(Total 6 marks)

Q23. (a) **List A** gives the names of three hormones.

List B gives information about the three hormones.

Draw a line from each substance in **List A** to the correct information in **List B**.

List A **Hormone**	**List B** **Information**
	Used in some contraceptive pills to stop eggs maturing
FSH	
	Used as a fertility drug to make eggs mature
LH	
	Causes the lining of the womb to break down
Oestrogen	
	Stimulates the release of eggs in IVF

(3)

(b) The table gives information about three methods of giving hormones to stop a woman becoming pregnant.

	The 'pill'	**The 'patch'**	**The 'implant'**
How the hormone is given	Swallowed each day for 21 days out of every 28 days.	Stuck onto the skin. Each patch lasts three weeks. There is a one week gap between each patch.	Needs an operation to put it under the skin. Lasts for up to 5 years.

Use the information in the table to answer these questions.

(i) Which of the three methods is likely to be the most reliable?

.....

(1)

(ii) Explain why you chose this method.

.....

.....

(1)

(iii) Give **one** disadvantage of the method you have chosen.

.....

(1)
(Total 6 marks)

Q24. Thalidomide is a drug that was developed in the 1950s.
In the 1950s some pregnant women took thalidomide to prevent morning sickness during pregnancy.

Today, thalidomide is **not** used to prevent morning sickness.

(a) (i) Give **one** medical use of thalidomide, today.

.....

.....

(1)

(ii) Today, before a woman is given thalidomide, she is

- checked to see if she is pregnant
- told to use two different methods of contraception at the same time.

Give the reason why:

the woman is checked to see if she is pregnant

.....

.....

the woman is told to use two different methods of contraception at the same time

.....

.....

(2)

(b) The information is about two types of contraceptive pill used by women.

Combined pill

- contains two hormones
- is taken for 21 days, then no pills are taken for 7 days
- > 99 % effective at preventing pregnancy
- increases chance of headaches
- increases chance of breast cancer
- decreases chance of cancer of the ovary

Mini-pill

- contains one hormone
- must be taken at the same time every day
- < 99 % effective at preventing pregnancy
- increases chance of breast cancer

(i) Which **two** hormones does the combined pill contain?

Draw a ring around **two** answers.

LH **oestrogen** **progesterone** **FSH**

(2)

(ii) Give **two** advantages of taking the combined pill and **not** the mini-pill.

.....

.....

.....

.....

(2)

(iii) Give **one** advantage of taking the mini-pill and **not** the combined pill.

.....

.....

(1)

(Total 8 marks)

Q25. The nervous system allows humans to react to their surroundings.

(a) Sense organs have receptors. Receptors detect *changes in the environment.*

Which word describes *a change in the environment?*

Draw a ring around **one** answer.

an effector **a neurone** **a stimulus**

(1)

(b) The photograph shows a baby.
Labels **A**, **B**, **C**, **D** and **E** show some of the baby's sense organs.

Photo by D. Sharon Pruitt [CC-BY-2.0], via Wikimedia Commons

Answer each question by writing **one** letter, **A**, **B**, **C**, **D** or **E**, in each box.

(i) Which sense organ has receptors sensitive to light? ☐

(1)

(ii) Which **two** sense organs have receptors sensitive to chemicals?

☐ and ☐

(2)

(iii) Which sense organ has receptors sensitive to changes in the baby's position? ☐

(1)

(c) Information from sense organ **A** is passed along nerve cells.
The information is coordinated to produce a response.

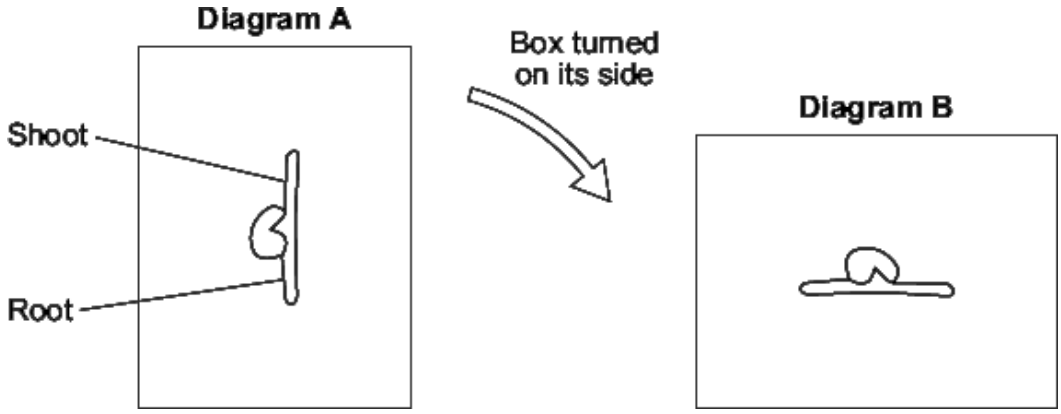
Which organ in the body coordinates the information?

.....

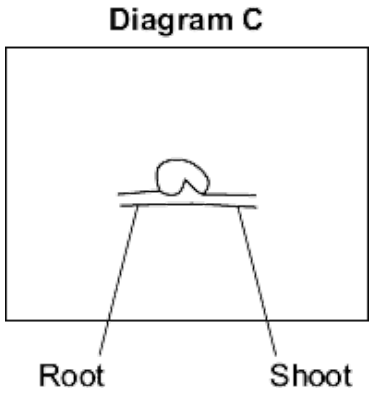
(1)
(Total 6 marks)

Q26. A student investigated growth responses in plants.

The student grew a bean seed in a box filled with moist soil, as shown in **Diagram A**. After the seed had started to grow, the box was turned onto its side and placed in a dark room, as shown in **Diagram B**.



(a) Complete **Diagram C** to show what the root and shoot will look like three days later.



(2)

(b) Draw a ring around the correct answer to complete the sentence.

The results of the investigation show that the root is sensitive to

light.
moisture.
gravity.

(1)

(c) A hormone in the plant causes the growth responses.

What is the name of this hormone?

Tick (✓) **one** box.

Auxin ☐

Statin ☐

Steroid ☐

(1)

(d) Gardeners can use some plant hormones as weed killers.

(i) Give **one different** use of plant hormones by gardeners.

.....

.....

(1)

(ii) Selective weed killers only kill some plants in a garden.

Killing weeds in a garden reduces competition between plants.

Give **three** factors that plants compete for.

1 .....

2 .....

3 .....

(3)
(Total 8 marks)

Q27. Diabetes is a disease in which the concentration of glucose in a person's blood may rise to fatally high levels.
Insulin controls the concentration of glucose in the blood.

(a) Where is insulin produced?

Draw a ring around **one** answer.

gall bladder **liver** **pancreas**

(1)

(b) People with diabetes may control their blood glucose by injecting insulin.

(i) If insulin is taken by mouth, it is digested in the stomach.

What type of substance is insulin?

Draw a ring around **one** answer.

carbohydrate **fat** **protein**

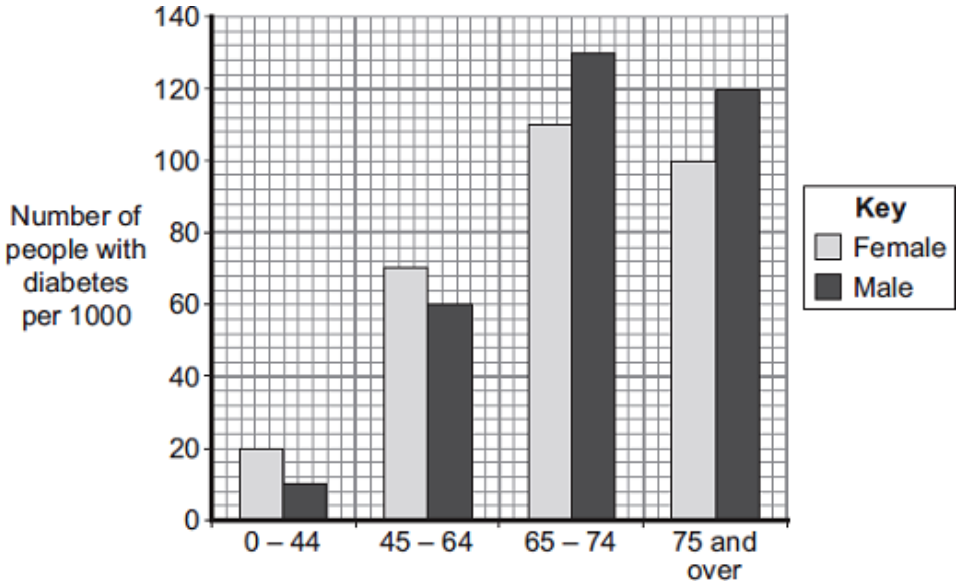
(1)

(ii) Apart from using insulin, give **one** other way people with diabetes may reduce their blood glucose.

.....

(1)

(c) The bar chart shows the number of people with diabetes in different age groups in the UK.



(i) Describe how the number of males with diabetes changes between the ages of 0 – 44 years and 75 years and over.

.....

.....

.....

.....

.....

.....

.....

.....

(3)

(ii) Compare the number of males and females with diabetes:

between the ages of 0 and 64 years

.....

.....

.....

over the age of 65 years.

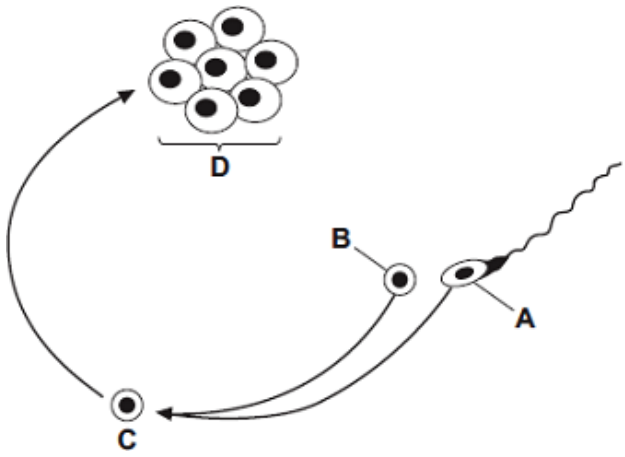
.....

.....

.....

(2)
(Total 8 marks)

Q28. The diagram shows some of the stages in IVF (in vitro fertilisation).



(a) Use words from the box to name structures **A**, **B**, **C** and **D**.

egg	**embryo**	**fertilised egg**	**ovary**	**sperm**

Structure **A** .....

Structure **B** .....

Structure **C** .....

Structure **D** .....

(4)

(b) What do doctors do next with structure **D**?

.....

.....

.....

.....

(2)

(c) The table gives statistics for an IVF clinic.

	Age of women treated			
	Below 35 years	**35 – 37 years**	**38 – 39 years**	**40 – 42 years**
Number of women treated	414	207	106	53
Number of women who produced one baby	90	43	17	1
Number of women who produced twins	24	8	4	1
Number of women who produced triplets	1	0	0	0

(i) About what proportion of the treated women aged 35 – 37 years produced one or more babies?

Draw a ring around your answer.

one quarter **one third** **half**

(1)

(ii) This clinic does **not** give IVF treatment to women over 42 years of age.

Use data from the table to explain why.

.....

.....

.....

.....

(2)

(iii) The committee which regulates IVF treatment now advises that only one embryo is used in each treatment.

Suggest **one** reason for this.

.....

.....

(1)

(Total 10 marks)

Q29. The body controls internal conditions.

(a) Use words from the box to complete the sentences about water loss from the body.

kidneys	**liver**	**lungs**	**skin**

(i) Water is lost in sweat via the .....

(1)

(ii) Water is lost in urine via the .....

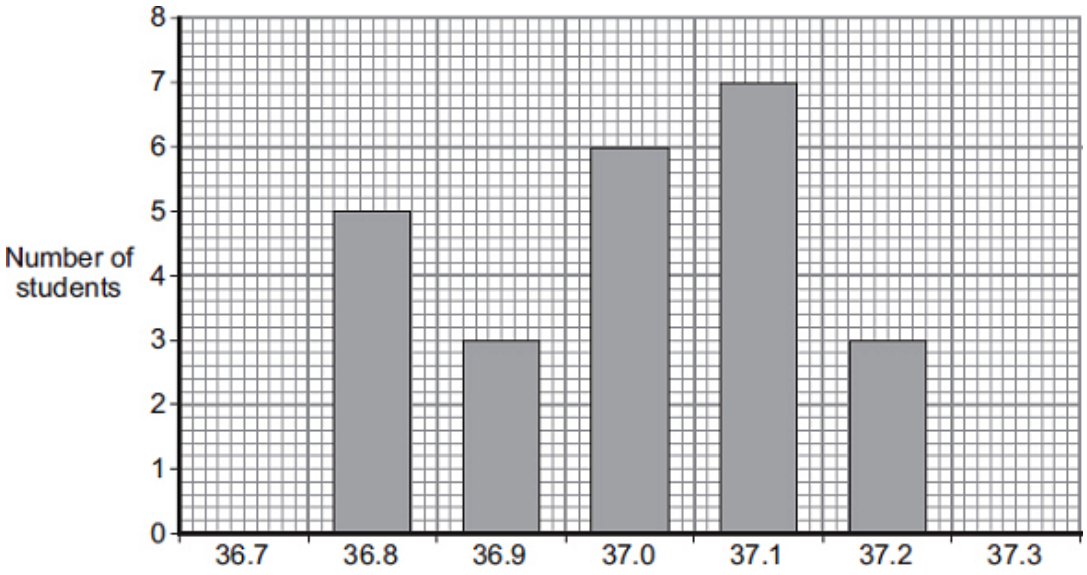
(1)

(iii) Water is lost in the breath via the .....

(1)

(b) Students investigated body temperature in the class.

The bar chart shows the results.



(i) One student used the bar chart to calculate the mean body temperature of the class.

The student calculated the mean body temperature as 37.0 °C.

How did the student use the bar chart to calculate the mean?

.....

.....

.....

.....

(2)

(ii) How many students had a body temperature higher than the mean of 37.0 °C

.....

(1)

(iii) Body temperature must be kept within a narrow range.

Why?

.....

.....

(1)

(Total 7 marks)

Q30. The photograph shows an athlete at the start of a race.

(a) The athlete's sense organs contain special cells.
These special cells detect changes in the environment.

(i) **List A** shows changes in the environment.

List B shows some of the athlete's sense organs.

Draw **one** line from each change in the environment in **List A** to the sense organ detecting the change in **List B**.

List A **Change in the environment**	**List B** **Sense organ**
	Ear
Sight of the finishing line	
	Nose
Sound of the starting gun	
	Eye
Pressure of the ground on the fingers	
	Skin

(3)

(ii) Which cells detect changes in the environment?

Tick (✓) **one** box.

Gland cells ☐

Muscle cells ☐

Receptor cells ☐

(1)

(b) During the race, the concentration of sugar in the athlete's blood decreases.

Why?

.....

.....

(1)

(c) Some athletes use anabolic steroids to improve performance.

(i) Draw a ring around the correct answer to complete the sentence.

Anabolic steroids increase

- breathing rate.
- growth of muscles.
- heart rate.

(1)

(ii) Sporting regulations ban the use of anabolic steroids.

Suggest **one** reason why.

.....

.....

(1)

(Total 7 marks)