AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.5.3 HORMONAL COORDINATION IN HUMANS (PACK 6)

SCORE	PERCENTAGE
/257	%

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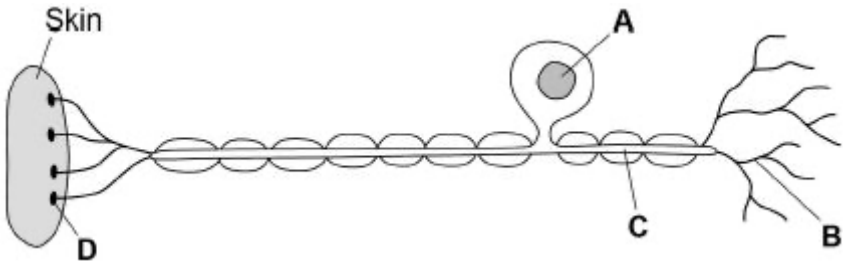
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Q1.

This question is about coordination in the human body.

Figure 1 shows a sensory neurone (nerve cell).

Figure 1



(a) Which label is the cell nucleus?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(b) Which label is the receptor?

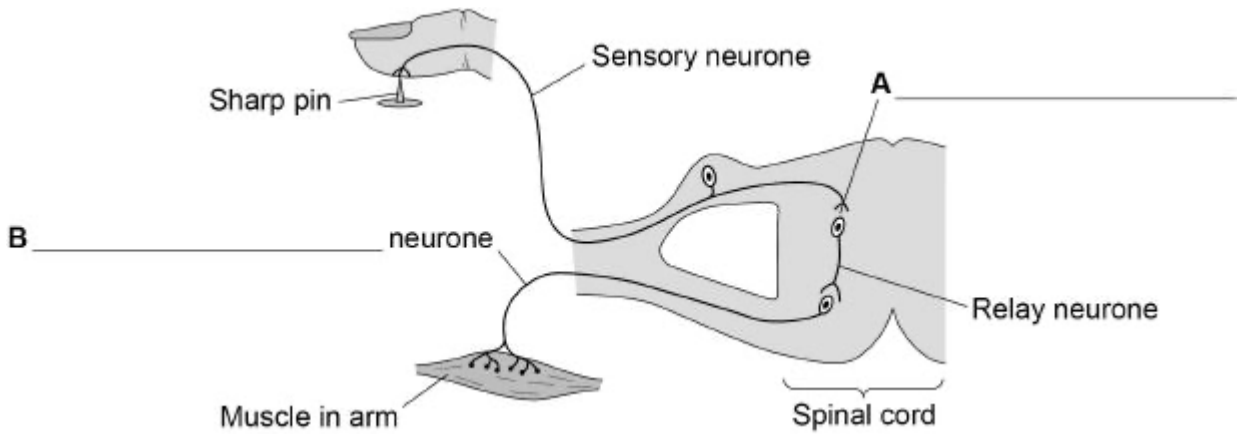
Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(c) **Figure 2** shows the nerve pathway when a person touches a sharp pin.

Figure 2



Name structures **A** and **B** on **Figure 2**

(2)

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(d) When the finger touches the sharp pin, the muscle in the arm contracts to pull the arm away.

What type of action is this?

Tick **two** boxes

A conscious action ☐

A delayed action ☐

A reflex action ☐

(1)

(e) Doctors tested people of different ages to time how long it took between touching a sharp pin and the arm muscle contracting.

At each age they tested five men and calculated a mean value for the time.

The table below shows the results.

Age in years	**Mean time for muscle to contract in milliseconds**
20	18
40	20
60	23
80	30

How much longer does it take for the muscle to contract at 80 years of age compared to at 20 years of age?

Give your answer in seconds.

_____

_____

_____

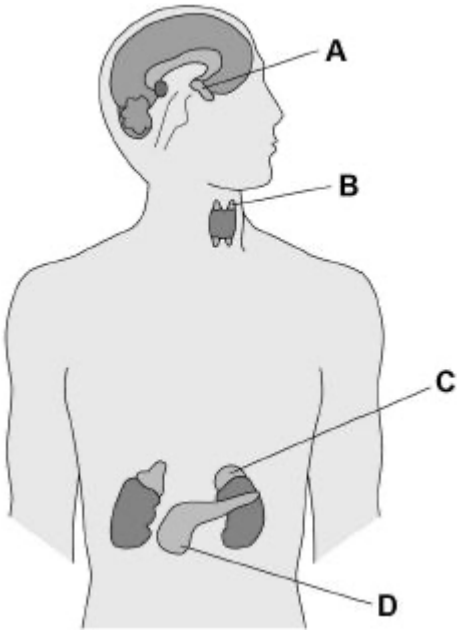
Time = _____ s

(2)

(f) **Figure 3** shows the position of some of the glands which release hormones.

Figure 3

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Which label on **Figure 3** shows the position of the pituitary gland?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(g) Luteinising hormone (LH) is a hormone released by the pituitary gland.

What is the function of LH?

Tick **one** box.

Controls blood glucose concentration ☐

Controls the formation of sperm ☐

Controls the growth of muscles ☐

Controls the release of an egg ☐

(1)

(h) How does LH travel from the pituitary gland to its target organ?

_____

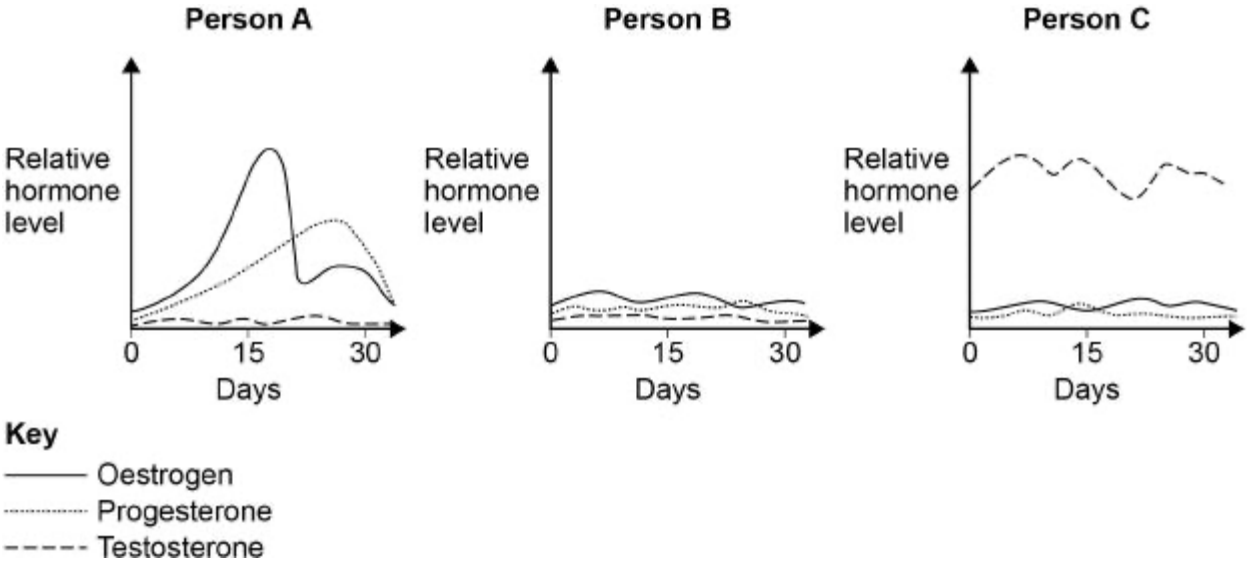
(1)

(i) **Figure 4** shows the relative levels of sex hormones of three young people over 30 days.

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One person is an 8-year-old girl, one is an 18-year-old boy and the other is an 18-year-old girl.

Figure 4



Which person is the 18-year-old boy?

Give **one** reason for your answer.

Person _____

Reason _____

_____

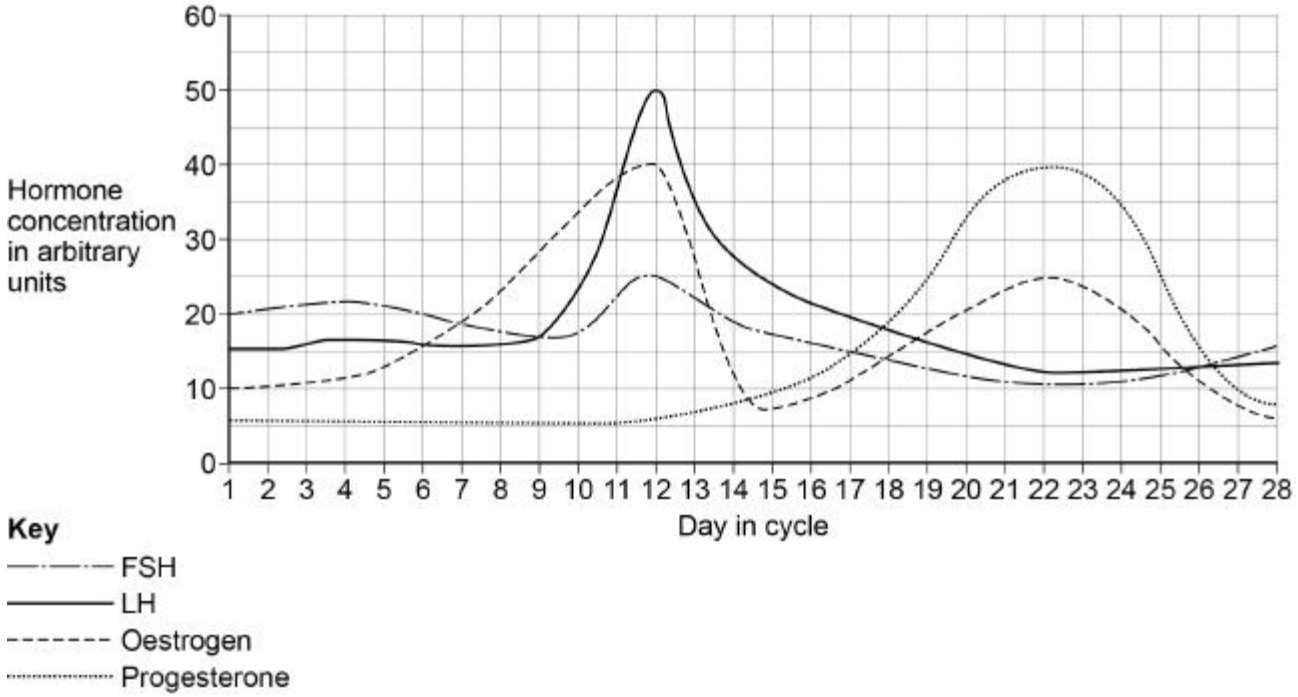
(2)

(Total 12 marks)

Q2.

The graph below shows how hormone concentrations vary during a normal human menstrual cycle if a woman does not become pregnant.

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(a) Calculate the rate of increase in LH concentration between day 9 and day 12

Give your answer in arbitrary units per hour.

Give your answer to 2 significant figures.

Rate = _____ arbitrary units per hour

(2)

(b) Describe the sequence of hormone interactions in the menstrual cycle.

Name where each hormone is produced.

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_____

_____

_____

(5)

(c) Progesterone is used in some contraceptives.

Suggest **one** advantage of using a progesterone patch rather than a progesterone oral contraceptive.

_____

_____

(1)

(Total 8 marks)

Q3.

The concentration of glucose in the blood is controlled by homeostasis.

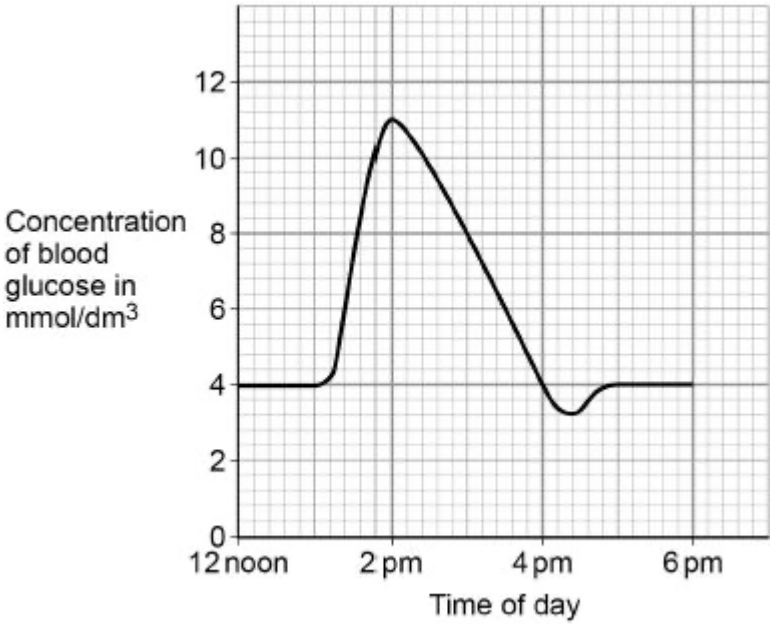
(a) Give **one** other example of an internal condition controlled by homeostasis.

_____

_____

(1)

The graph below shows the change in glucose concentration in the blood of a person with Type 1 diabetes.



(b) Calculate the increase in blood glucose concentration between 1 pm and 2 pm.

_____

_____

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Increase in blood glucose = _____ mmol/dm^3

(1)

(c) Suggest at what time the person ate lunch.

Use the graph above.

_____

(1)

(d) Name the hormone the person injected that caused the blood glucose concentration to decrease.

_____

(1)

(e) Explain the decrease in blood glucose concentration after the hormone was injected.

Use all the words in the box in your explanation.

blood	**cells**	**glucose**	**glycogen**

_____

_____

_____

_____

(2)

(f) Normal blood glucose concentration is approximately 4 mmol/dm^3

What could be the reason for the blood glucose concentration falling below normal at 4 pm?

Tick **one** box.

The food contained too much glucose ☐

The person ate another meal ☐

The person injected too much hormone ☐

The person fell asleep ☐

(1)

(g) Explain what would happen to the blood glucose concentration if the person went for a run at 6 pm.

_____

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_____

_____

_____

(2)

(h) Look at the graph above.

Suggest **one** way that the graph would be different for a person who does not have diabetes.

_____

_____

(1)

(Total 10 marks)

Q4.

There are several methods of contraception.

(a) Draw **one** line from each method of contraception to how the method works.

Method of contraception	How the method works
diaphragm	prevents embryo implanting
intrauterine device	prevents release of the egg
oral contraceptive	prevents sperm reaching the egg

(2)

(b) When a new oral contraceptive is tested on volunteers, the contraceptive is first given at a low dose. Later, the dose is increased.

Why are new drugs given at low doses at first?

_____

_____

(1)

(c) The table below shows information about three methods of contraception.

	Condom	Oral contraceptive	Hormone skin patch
Percentage (%) effectiveness	98.0	99.7	99.8
How contraception is	From shops or sexual	From doctor or sexual health clinic	

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obtained	health clinic		
Possible side effects	No serious side effects	Headaches, nausea, high blood pressure	Headaches, nausea, blood clots

Evaluate the use of these contraceptive methods.

(6)
(Total 9 marks)

Q5.

In 2017 more than 420 million people worldwide had diabetes.

The table below shows how the percentage of the population with diabetes has changed.

Year	Percentage of population with diabetes		
	Low-income countries	**High-income countries**	**World**
1986	3.5	5.5	5.1
1992	4.4	5.9	5.8
1998	5.2	6.2	6.6
2004	6.0	6.5	7.2
2010	6.9	6.9	8.0

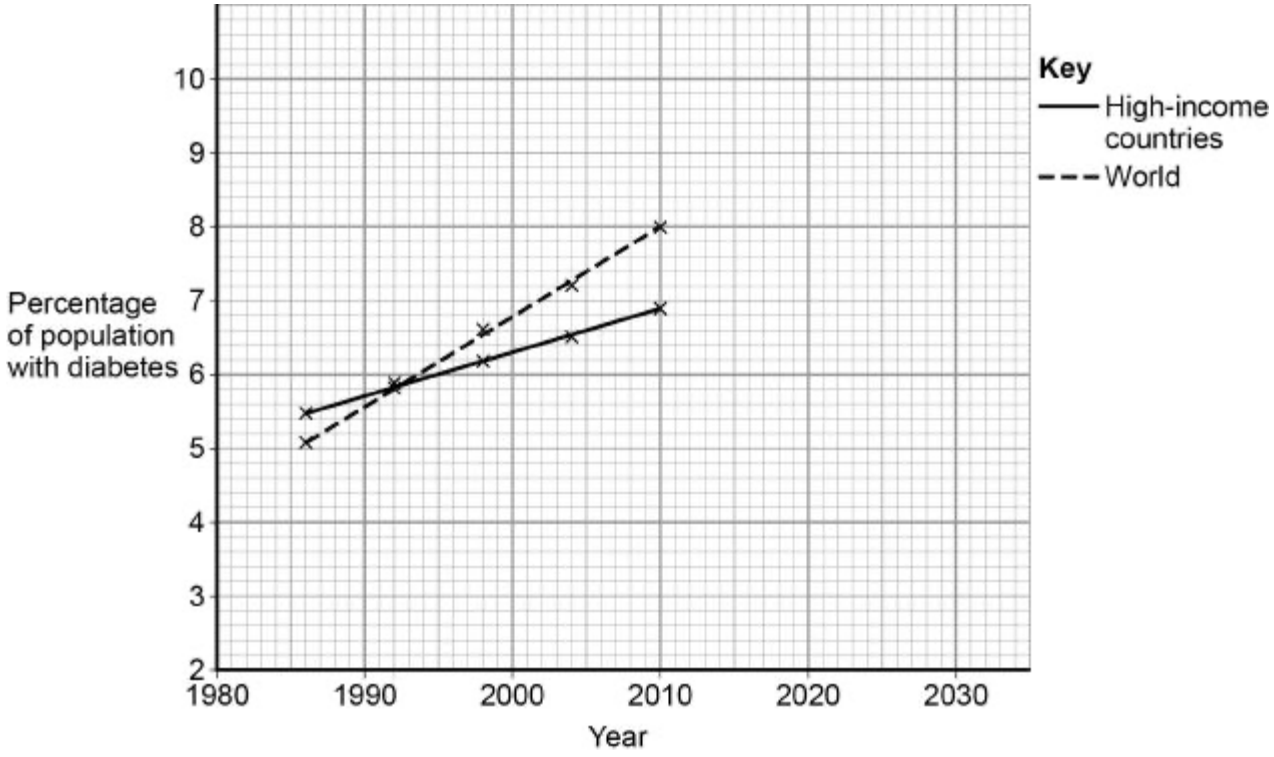
(a) Use data from the table above to complete the graph in the graph below.

You should:

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- plot the data for the low-income countries
- draw a line of best fit for the low-income countries.

The lines for high-income countries and the world have been drawn for you.



(3)

(b) Predict the percentage of the world population with diabetes in **2022** if the current pattern were to continue.

You should extend the line of best fit for the world on the graph above.

Percentage = _____ %

(2)

(c) The trend may **not** continue in the same pattern after 2010.

Suggest **one** reason why the trend may change.

_____

_____

(1)

(d) Give **two** conclusions from the data shown in the graph above.

1. _____

_____

2. _____

_____

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(2)

(e) The table above shows that the percentage of people with diabetes in the world has changed.

What are **two** possible reasons for this change?

Tick **two** boxes.

People are becoming more obese ☐

People are doing more exercise ☐

People are eating less salt ☐

People are eating more sugar ☐

People are smoking less ☐

(2)
(Total 10 marks)

Q6.

Contraceptives are used to prevent pregnancy.

(a) Draw **one** line from each contraceptive to the method of preventing pregnancy.

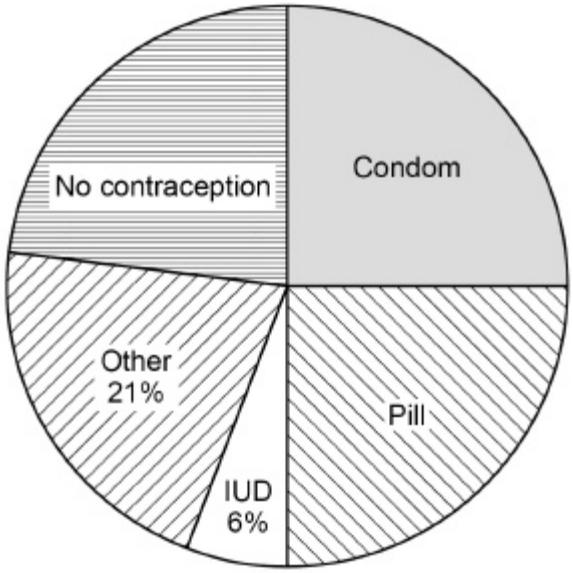
Contraceptive device	Method of preventing pregnancy
	Contains hormones to stop eggs maturing
	Prevents the sperm reaching the egg
	Kills sperm
	Slows down sperm production
	Stops an embryo implanting in the uterus

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(3)

The pie chart shows the percentages of people who used different types of contraception in the UK in 2016.

The people are aged 16–49 years.



(b) Determine the percentage of people who used no contraception.

_____

_____

_____

Percentage of people = _____ %

(2)

(c) Suggest **two** reasons why a person aged 16–49 years might **not** be using contraception.

1. _____

_____

2. _____

_____

(2)

The table shows some information about three methods of contraception.

Method	**Effectiveness**	**Other information**
Combined pill	99.5%	• Must be taken every day • Free from your GP or sexual health clinic

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		• May cause headaches
Male condom	98.0%	• May split or leak • Only used when you have sexual intercourse • Inexpensive in supermarkets or free from a sexual health clinic
Sterilisation	100.0%	• Needs an operation in hospital • Usually cannot be reversed

(d) A man and a woman plan to start a family in 5 years' time.

Compare the risks and benefits for this couple of the three methods of contraception.

(4)

(Total 11 marks)

Q7.

This question is about reproduction.

(a) Describe the difference between the way hormonal and non-hormonal methods of contraception work.

Give **one** example of each method of contraception.

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_____

_____

_____

(3)

The urine of women using hormonal methods of contraception contains high levels of progesterone.

Concentrations of 1–3 ng/dm^3 of progesterone are found in the water of rivers near sewage outflow points.

Scientists investigated the effect of different concentrations of progesterone in water on fish reproduction.

This is the method used.

1. Prepare tanks of water containing different concentrations of progesterone.

2. Put a breeding pair of fish into each tank.

3. Record the number of eggs produced per day by the female in each tank for 14 days.

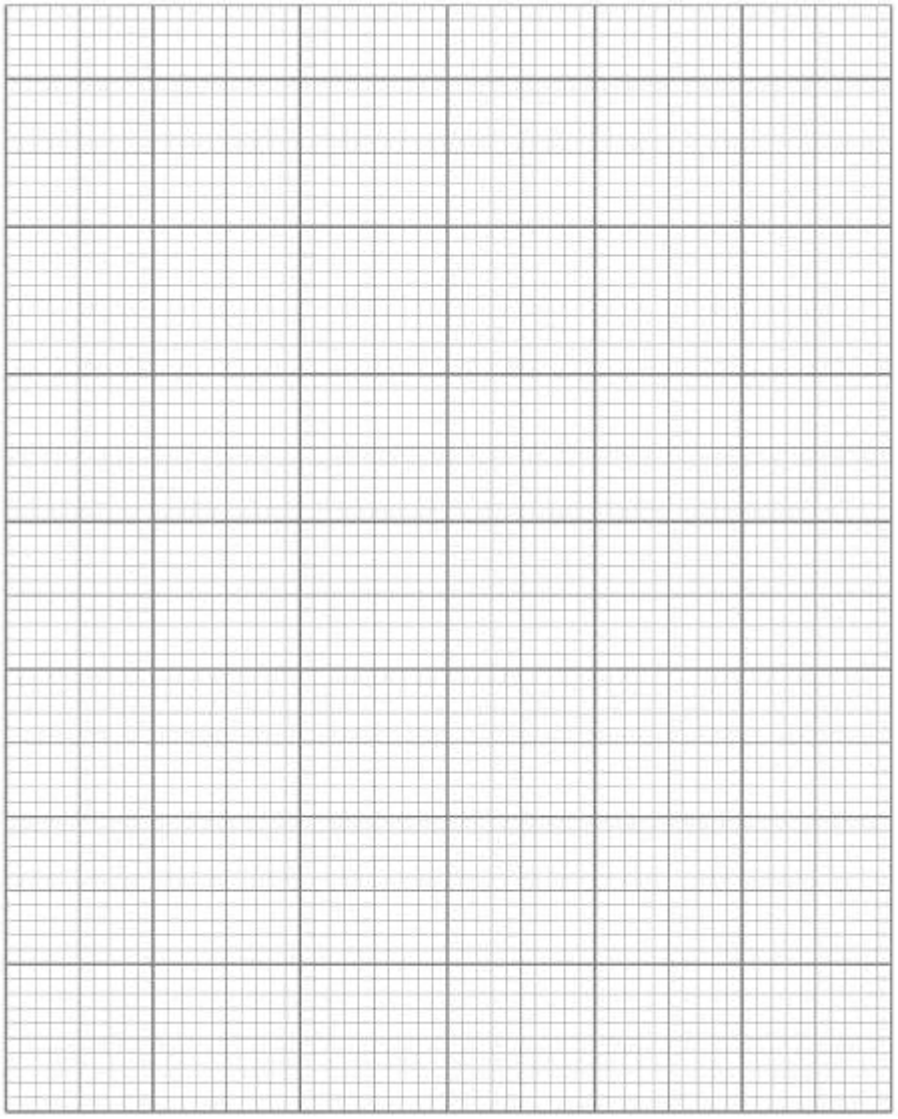
The table shows the results.

Concentration of progesterone in water in ng/dm^3	**Mean number of eggs produced per day**
0.0	28.6
0.8	4.5
1.5	3.2
3.0	2.8
10.0	1.1
20.0	0.2

(b) Plot the data from the table on the grid.

You should:
- label each axis
- use a suitable scale
- draw a line of best fit.

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(4)

(c) Describe the effect on fish reproduction of the concentrations of progesterone found in rivers near sewage outflows.

Use data from your graph.

_____

_____

_____

_____

(2)

(Total 9 marks)

Q8.

Control of blood glucose concentration is an important aspect of homeostasis.

When the blood glucose concentration is too high the hormone insulin is released.

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(a) Name the hormone released when the blood glucose concentration is too low.

(1)

(b) Explain how the **two** hormones keep the blood glucose concentration at the correct level in a healthy human body.

(5)

The two hormones which control blood glucose concentration are proteins.

Proteins are made according to information stored in the DNA structure of genes.

(c) Describe the structure of DNA.

(2)

(d) Describe how DNA controls the structure of a protein.

(2)

(e) Polydactyly and cystic fibrosis are both inherited disorders caused by faulty DNA.

- Polydactyly is caused by a dominant allele.
- Cystic fibrosis is caused by a recessive allele.

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Mother **A** has polydactyly.

Mother **B** has cystic fibrosis.

Mother **A** is more likely to have a child with polydactyly than Mother **B** having a child with cystic fibrosis.

Explain why.

Assume the fathers of the children have no alleles for polydactyly or cystic fibrosis.

You may use genetic diagrams in your answer.

_____

_____

_____

_____

_____

_____

(3)

(Total 13 marks)

Q9.

Fall armyworms are native to America.

Fall armyworms eat corn plants.

(a) The binomial name for fall armyworms is *Spodoptera frugiperda*.

Fall armyworms belong to an order of insects called Lepidoptera.

The table shows a classification table for the fall armyworm.

Complete the table.

Classification group	**Name**
Kingdom	
	Arthropoda

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	Insecta
Order	Lepidoptera
Family	Noctuidae
	frugiperda

(2)

Fall armyworms have been found in Africa.

By 2016 they had spread rapidly destroying corn crops.

(b) Suggest **one** reason why the fall armyworms are spreading so rapidly in Africa.

_____

_____

(1)

(c) Fall armyworms:
- are **not** worms (annelids)
- are the caterpillars of moths (arthropods).

Describe **one** way scientists could tell if a new 'worm' they found should be classified as an annelid or as an arthropod.

_____

_____

(1)

(d) In parts of Africa, aeroplanes have been used to spray insecticide on crops, to kill the worms.

Explain the advantages and disadvantages of spraying insecticide on the corn crops.

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

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(Total 8 marks)

Q10.

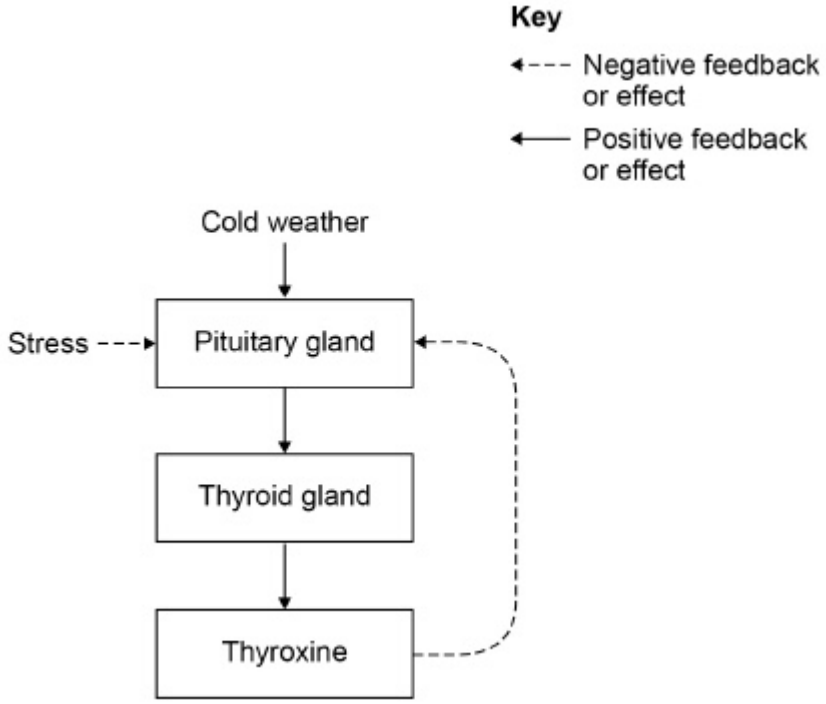
Thyroxine is produced by the thyroid gland and released into the blood.

(a) What type of chemical is thyroxine?

_____

(1)

The diagram shows how the release of thyroxine is controlled.



(b) Explain how the body regulates the amount of thyroxine that is produced if the body is **not** stressed or cold.

Use information shown in the diagram.

_____

_____

_____

_____

(2)

Thyroxine stimulates basal metabolic rate.

One important chemical reaction of metabolism is respiration.

(c) Explain how the feedback mechanism in the diagram maintains normal body temperature in cold weather.

Use the information in the diagram and your own knowledge.

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(3)

(d) People in stressful situations produce a chemical that reduces the activity of the pituitary gland.

Explain how this can cause people to gain weight.

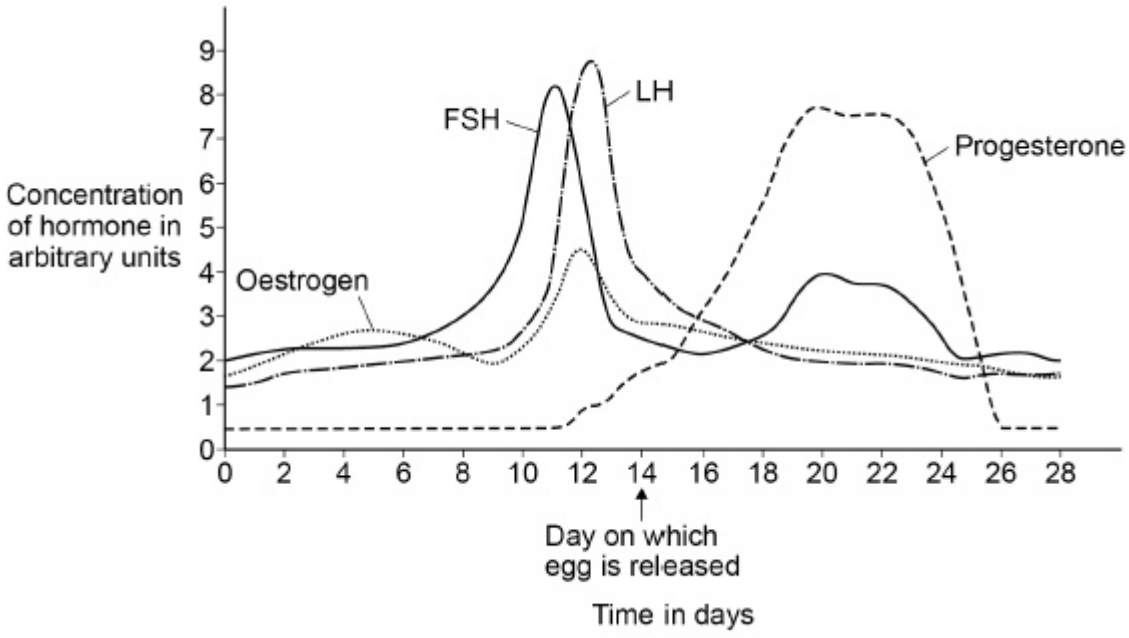
(3)

(Total 9 marks)

Q11.

Female reproductive hormones interact to control the menstrual cycle.

The graph shows how the concentration of four hormones changes during a 28 day cycle.



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(a) What are two effects of progesterone?

Tick **two** boxes.

- Causes eggs to develop ☐
- Maintains the lining of the uterus ☐
- Stimulates oestrogen production ☐
- Stimulates LH production ☐
- Suppresses FSH ☐

(2)

(b) In the graph menstruation starts on day 28.

Explain the change that takes place to cause menstruation.

Use information from the graph.

(2)

(c) Injections of specific hormones are used to treat infertility.

Explain how these hormones can increase the chance of having a baby.

(4)

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(Total 8 marks)

Q12.

A student measured the effect of concentration of glucose on the absorption of light using a colorimeter.

A colorimeter measures how much light is absorbed as it passes through a solution.

The student used reagent **A**. When reagent **A** is added to glucose solution a blue compound is formed.

This is the method used.

1. Put 10 cm^3 of 0.03 g/cm^3 into a test tube.

2. Add 5cm^3 of reagent **A**.

3. Place the test tube into the colorimeter.

4. Record the light absorbed.

5. Repeat steps 1–4 with different concentrations of glucose solution.

Table 1 shows the student's results.

Table 1

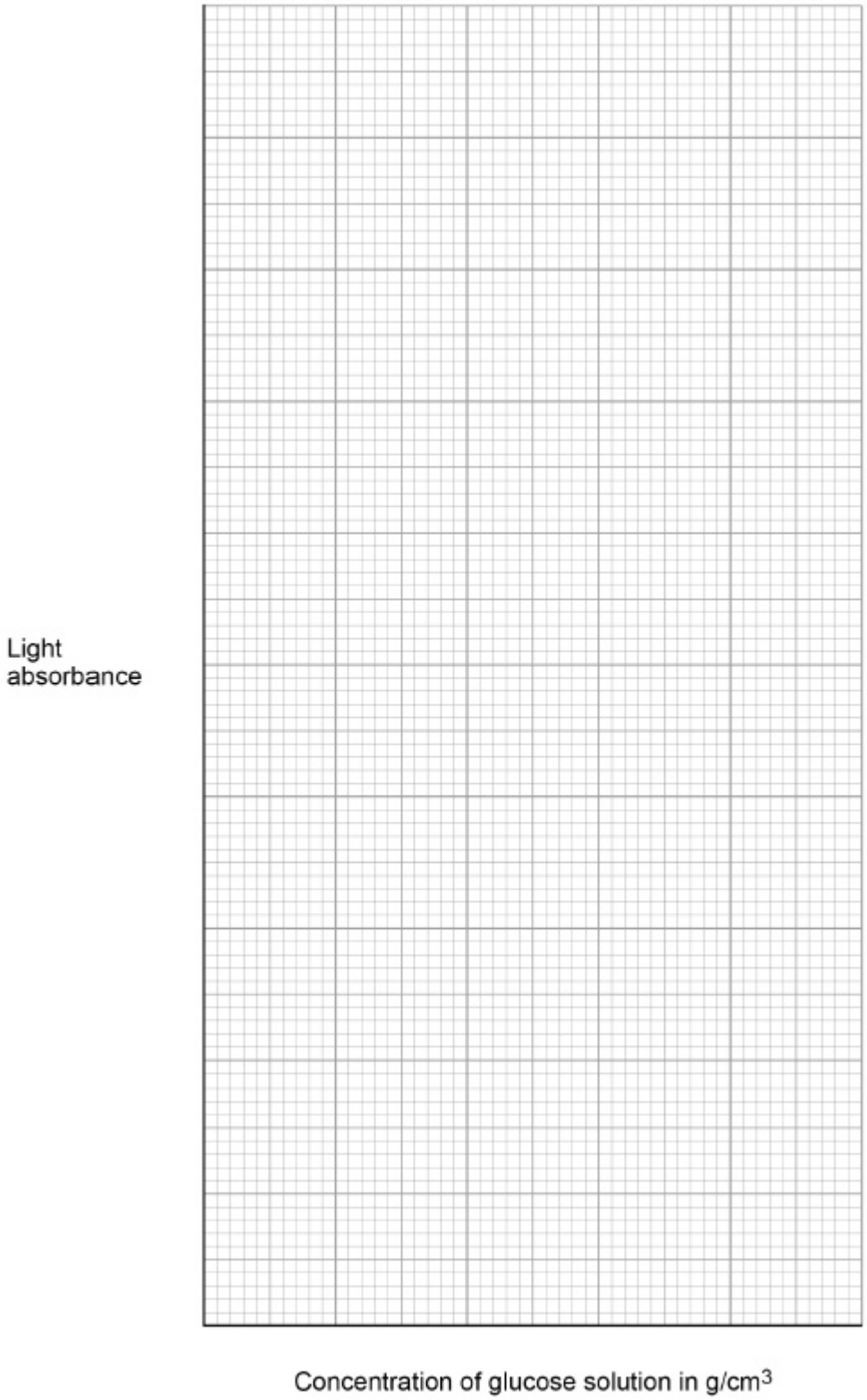
Concentration of glucose solution in g/cm^3	**Light absorbed in arbitrary units**
0.03	0.07
0.05	0.13
0.09	0.20
0.12	0.27
0.15	0.33

(a) Plot the data from **Table 1** on the grid.

You should:

- add suitable scales
- draw a line of best fit.

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(4)

(b) Explain why more light is absorbed when the concentration of glucose is higher.

_____

_____

_____

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(2)

The students repeated the method using two drinks instead of the glucose solutions.

Table 2 shows their results.

Table 2

Drink	Light absorbed in arbitrary units
X	0.25
Y	0.40

(c) Determine the concentration of glucose in drink **X**.

Use **Table 2** and your graph.

Concentration of glucose in drink **X** = _____ g/cm^3

(1)

(d) After a person consumes drink **Y** there is a change in blood glucose concentration.

Describe how the person's body will detect and respond to the change in blood glucose concentration.

(4)

(e) Recent research into diabetes suggests that blocking glucagon secretion can prevent high blood glucose levels.

Explain how blocking glucagon secretion could keep blood glucose levels in the normal range.

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_____

_____

_____

_____

(2)

A new treatment for people with Type 1 diabetes could be available in the future.

The new treatment involves using stem cells from an adult donor.

The stem cells are stimulated to become insulin secreting cells.

(f) Where in the donor's body could stem cells come from?

_____

(1)

(g) Suggest **three** possible advantages of using stem cells to treat diabetes compared with the use of insulin injections.

1. _____

_____

2. _____

_____

3. _____

_____

(3)

(h) Some people are worried about the use of stem cells to treat diabetes.

Suggest **two** possible disadvantages of using stem cells to treat diabetes compared with the use of insulin injections.

1. _____

_____

2. _____

_____

(2)

(Total 19 marks)

Q13.

Amylase is an enzyme that digests starch.

A student investigated the effect of pH on the activity of amylase.

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This is the method used.

1. Mix amylase solution and starch suspension in a boiling tube.

2. Put the boiling tube into a water bath at 25 °C.

3. Remove a drop of the mixture every 30 seconds and test it for the presence of starch.

4. Repeat the investigation at different pH values.

The table below shows the students' results.

pH	Time when no starch was detected in minutes
5.0	7.0
5.5	4.5
6.0	3.0
6.5	2.0
7.0	1.5
7.5	1.5
8.0	2.0

(a) The student concluded pH 7.25 was the optimum pH for the amylase enzyme.

This is **not** a valid conclusion.

Suggest **two** reasons why.

1. _____

_____

2. _____

_____

(2)

(b) The student did another investigation.

This is the method used.

1. Put amylase solution and starch suspension into a boiling tube.

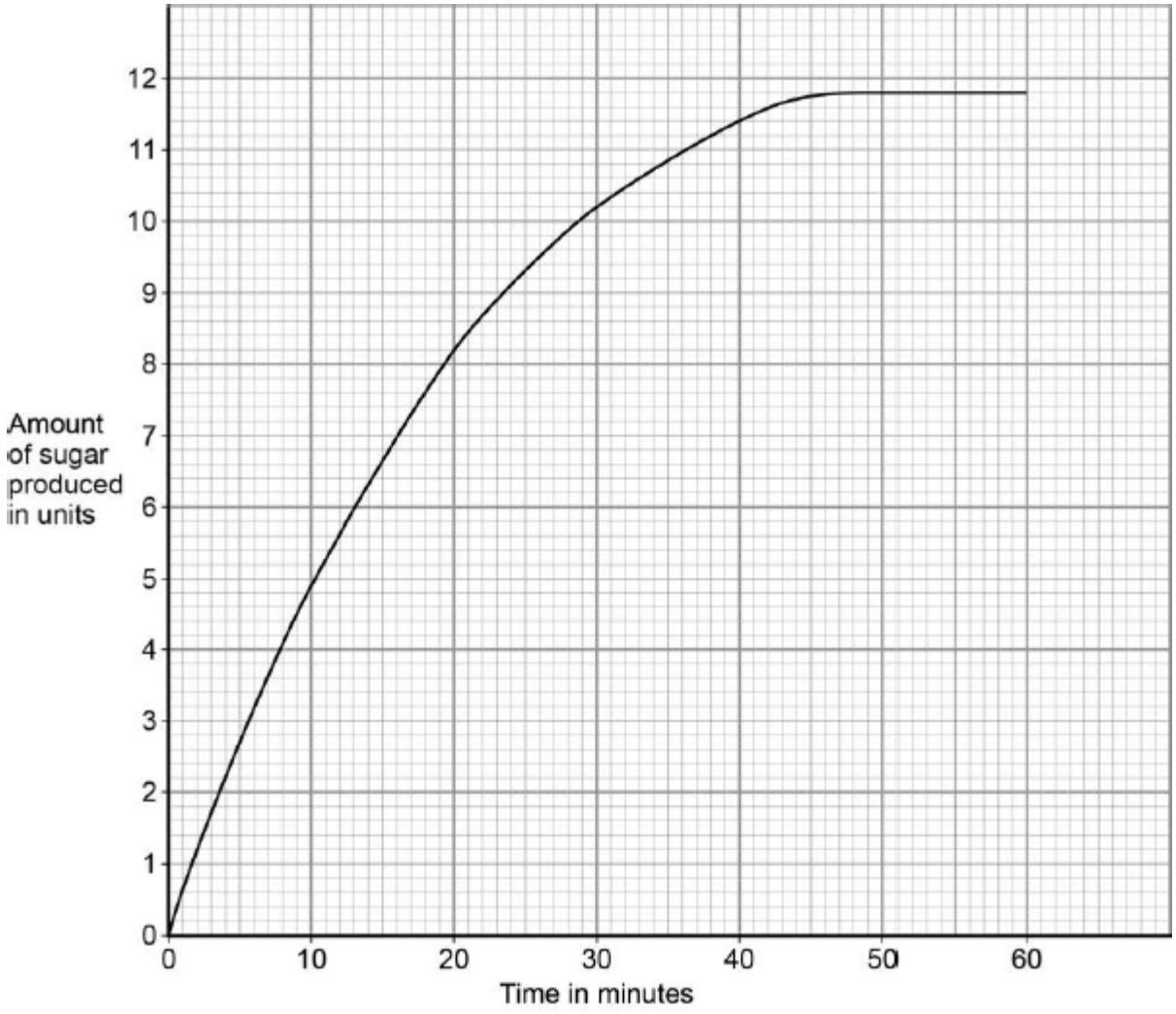
2. Make the pH 7.25.

3. Put the boiling tube into a water bath at 25 °C.

4. Measure the amount of sugar produced every 30 seconds.

The results are shown in the figure below.

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Calculate the mean rate of sugar produced per minute during the first 5 minutes.

_____

_____

Mean rate = _____ units per minute

(2)

(c) Iodine solution is added to a sample taken from the boiling tube after 10 minutes and 60 minutes.

Suggest what you would see in these samples.

After 10 minutes _____

_____

After 60 minutes _____

_____

(2)

(d) The scientist repeated the investigation at 37 °C.

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Draw a line on the figure above to show the results the scientist would get.

(2)

(e) The same investigation was done at 65 °C.

How would this affect the results?

Explain why.

_____

_____

_____

_____

_____

_____

_____

(3)

(Total 11 marks)

Q14.

A person with Type 1 diabetes does **not** produce enough of the hormone insulin.

(a) Where is the hormone insulin produced?

Tick **one** box.

Brain	☐
Pancreas	☐
Pituitary	☐
Thyroid	☐

(1)

(b) How does insulin travel around the body?

_____

_____

(1)

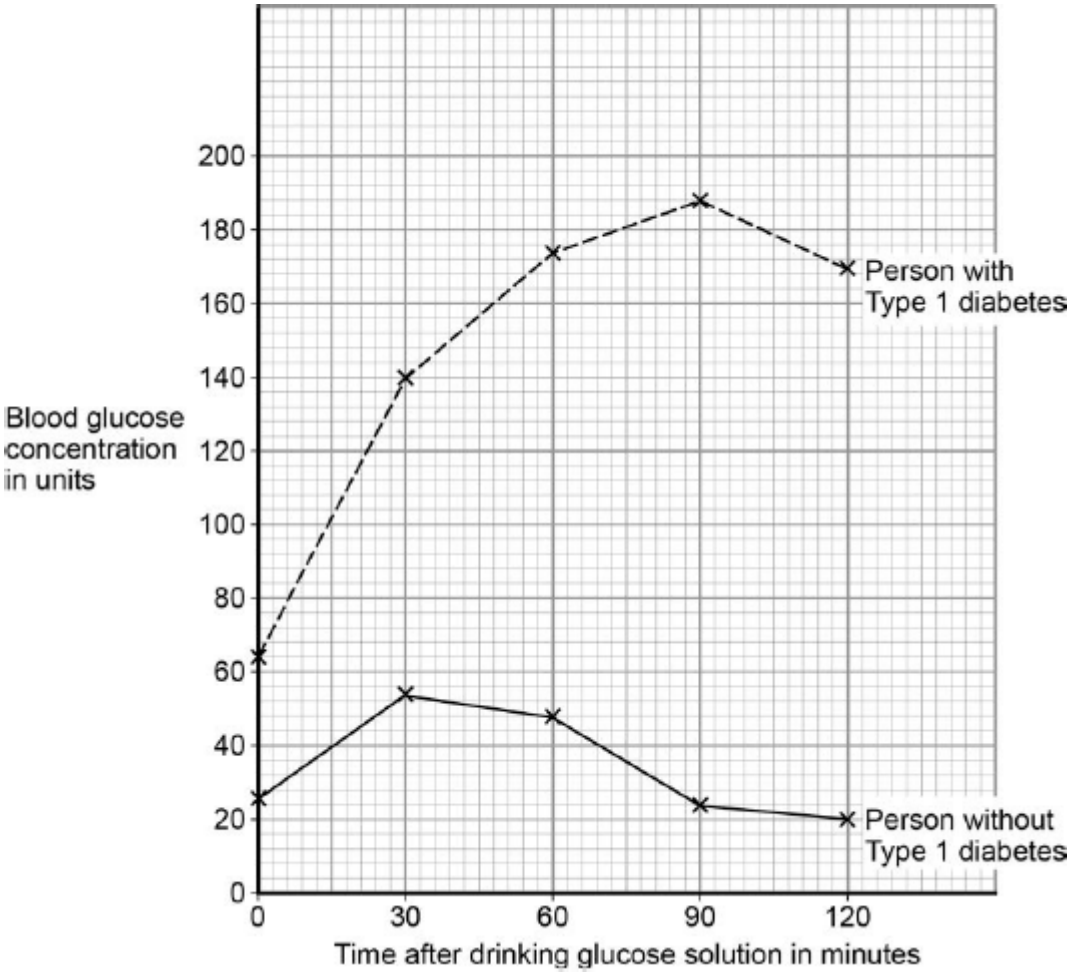
(c) The same concentration and volume of glucose solution was given to two people.

- Person with Type 1 diabetes.

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- Person without Type 1 diabetes.

The figure below shows how the blood glucose concentration of these two people changed after they each drank a glucose solution.



Look at the figure above.

Compare the blood glucose concentrations of the two people.

Include similarities and differences in your answer.

(4)

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(d) People with diabetes may be asked to control their diet.

Explain how this can help to reduce the risk of developing health problems.

_____

_____

_____

_____

_____

_____

(3)

(Total 9 marks)

Q15.

People with Type 1 diabetes cannot control the concentration of glucose in their blood.

This is because they do **not** produce the hormone insulin.

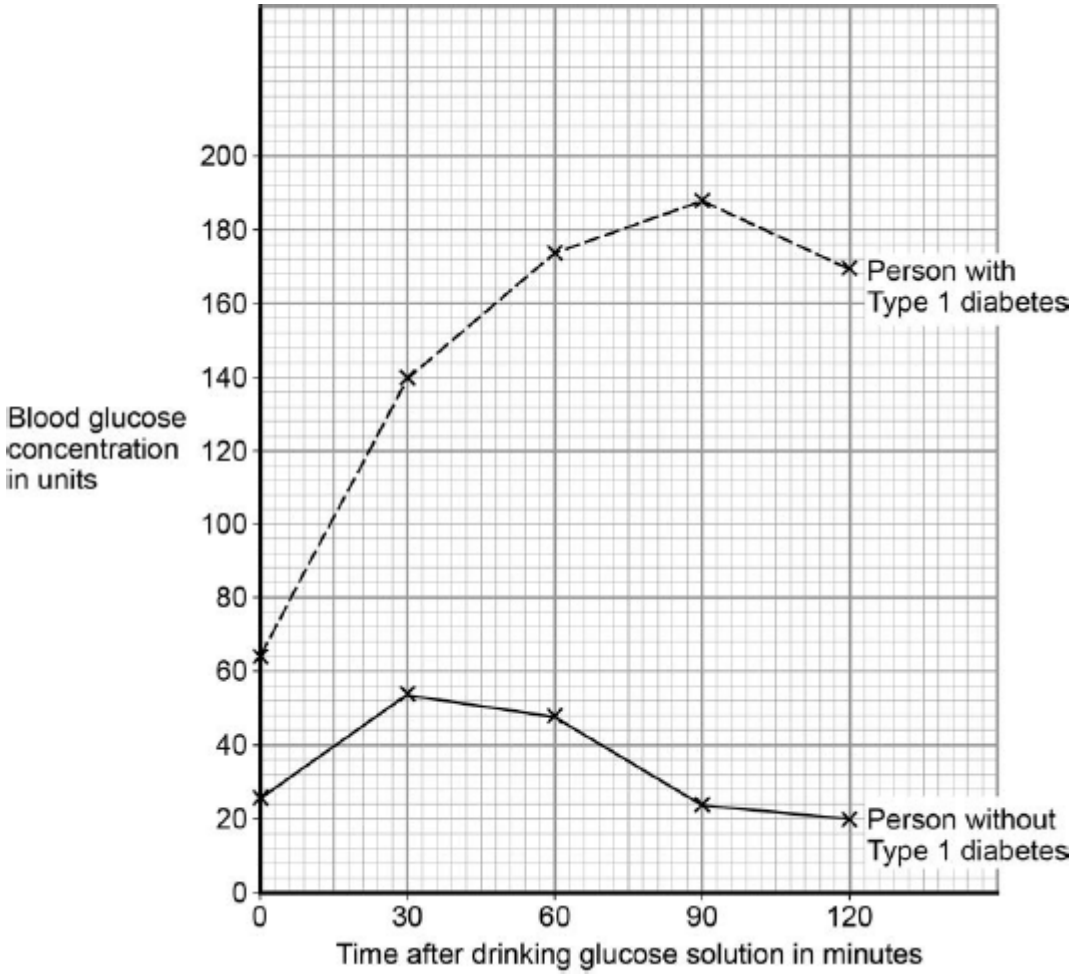
The same concentration and volume of glucose solution is given to two people.

- Person with Type 1 diabetes.
- Person without Type 1 diabetes.

Figure 1 shows how the blood glucose concentration of these people changes after they each drink a glucose solution.

Figure 1

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(a) The blood glucose concentration increases at a faster rate in the person with diabetes compared to the person without diabetes.

Calculate how much faster the rate of increase in blood glucose concentration is in the person with diabetes.

Give the rate of increase for the first 30 minutes after drinking the glucose solution.

Give your answer in units / h.

_____

_____

_____ Units / h

(2)

(b) The blood glucose concentration of the person without diabetes starts to change 30 minutes after drinking the glucose solution.

Explain why the blood glucose concentration changes.

_____

_____

_____

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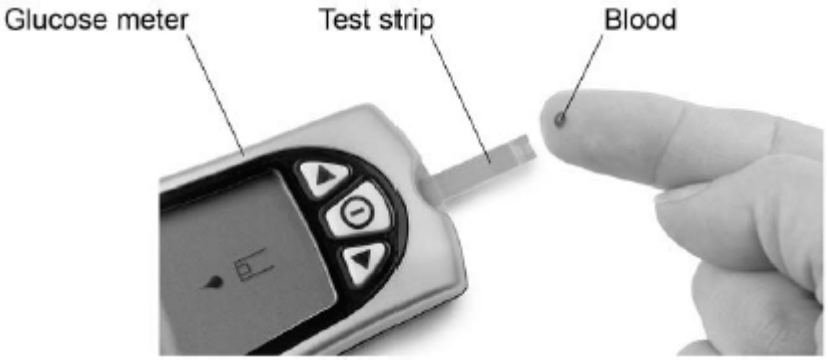
(2)

(c) People with diabetes should try to keep their blood glucose concentration within the same range as a person without diabetes.

Most people with Type 1 diabetes regularly check their blood glucose concentration using a meter, as shown in **Figure 2**.

The meter reading is used to estimate how much insulin they need to inject.

Figure 2

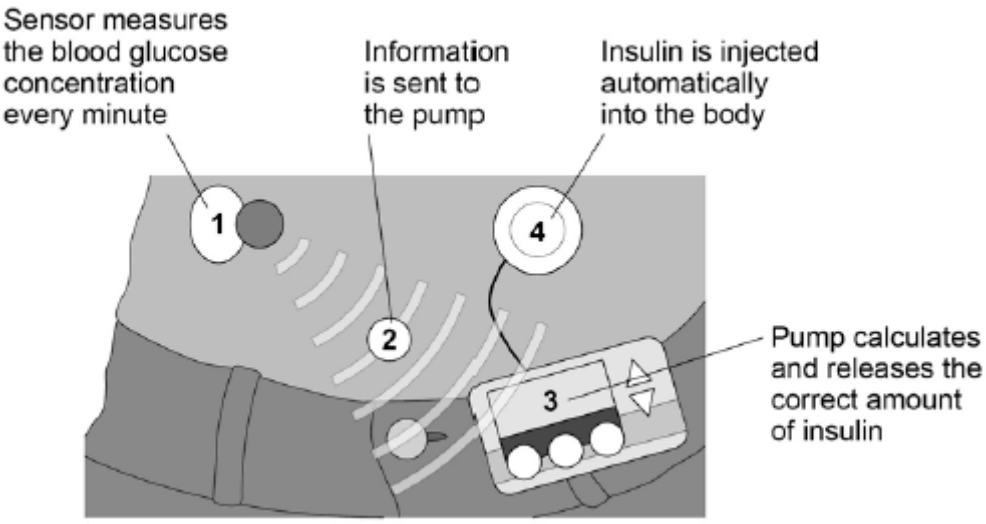


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Figure 3 shows a new system.

It is connected to the person all the time.

Figure 3



The new system:

- gives better control of blood glucose concentration
- reduces the number of times the glucose concentration falls too low.

Evaluate the two systems as methods for controlling blood glucose concentrations for people with Type 1 diabetes.

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Give a justified conclusion to your evaluation.

(4)

(d) How does the body respond if slightly too much insulin is injected into the body.

(5)

(Total 13 marks)

Q16.

Hormones are released from glands.

(a) Which gland produces hormones to control other glands in the endocrine system?

Tick **one** box.

Adrenal ☐

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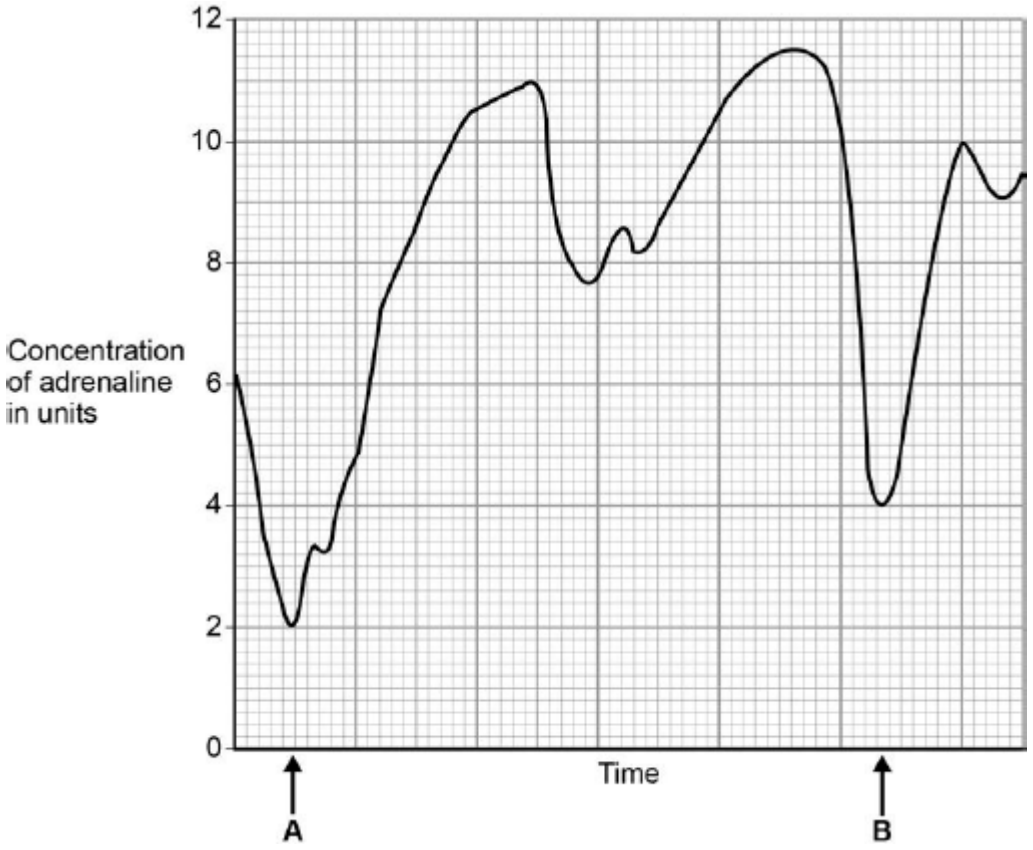
Ovary ☐

Pituitary ☐

Thyroid ☐

(1)

(b) The figure below shows the level of adrenaline in a man's bloodstream while he was watching a 12-minute film.



Calculate the percentage increase in adrenaline after point **B**.

_____

_____

_____

_____

Percentage increase in adrenaline = _____

(2)

(c) Suggest why the percentage increase in adrenaline after point **B** is different from the percentage increase after point **A**.

_____

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_____

_____

_____

(2)

(d) Adrenaline causes changes in the body to prepare for a 'fight or flight' response.

What changes in the man's body are caused by adrenaline?

_____

_____

_____

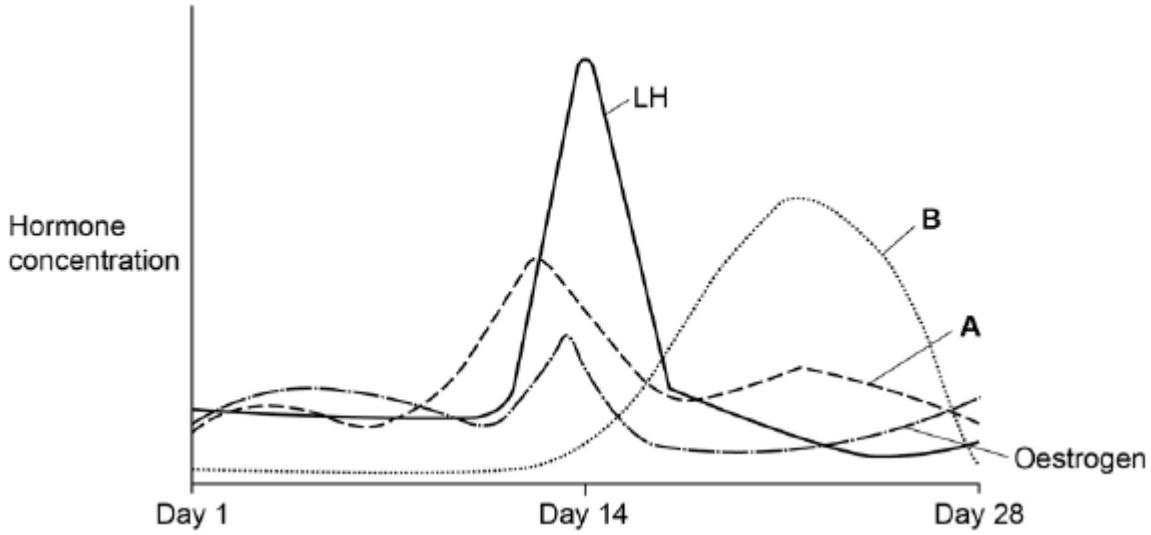
_____

(2)

(Total 7 marks)

Q17.

The figure below shows how the concentrations of the reproductive hormones in the blood of a woman change over 28 days.



(a) Name hormones **A** and **B**.

A _____

B _____

(2)

(b) Use information from the figure above to explain what happens on Day 14.

_____

_____

_____

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(2)

(c) In Vitro Fertilisation (IVF) treatment can be used to help women become pregnant.

IVF uses some of the hormones shown in the figure above.

Explain why IVF increases the chance of some women becoming pregnant.

(6)

(Total 10 marks)

Q18.

Blood sugar levels in the body are controlled by insulin.

(a) How does insulin travel around the body?

(1)

(b) The table below shows the blood sugar levels for two people after eating a meal.

Time after eating in hours	Blood sugar levels in mg per 100 cm^3 of blood	
	Person A	Person B
0	70	130
1	150	230
2	90	185
3	80	165
4	75	140

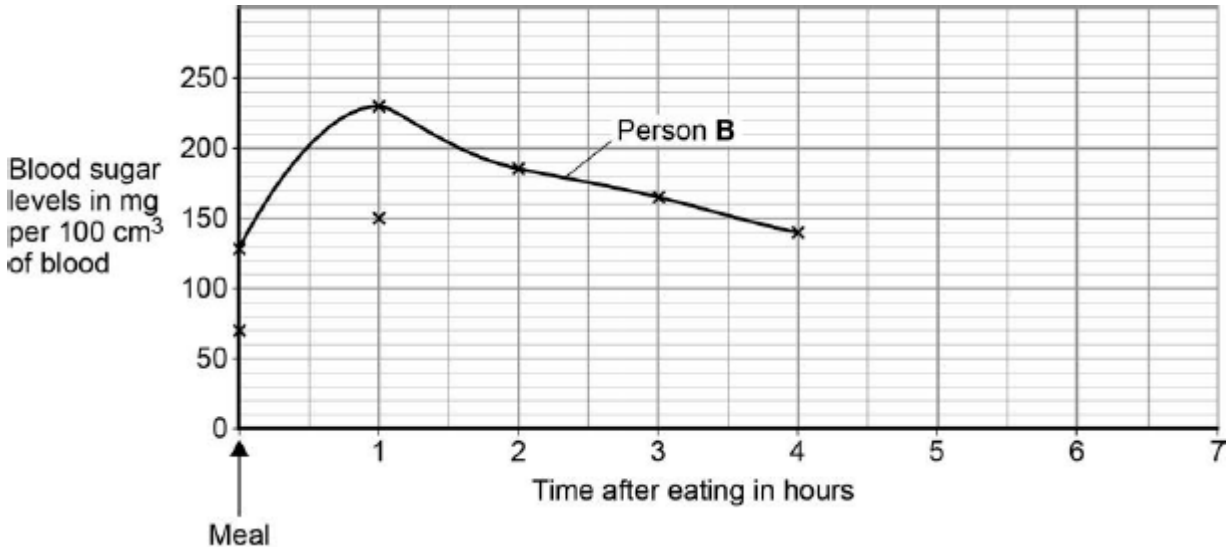
Use data from the table above to complete the graph in the figure below.

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Plot the points for person **A**.

The first two points have been plotted for you.

Draw a line through all the points.



(3)

(c) How long after the meal is person **B**'s insulin production at its peak?

_____

_____

(1)

(d) What is the greatest **decrease** in the blood sugar level of person **B** in an hour?

_____

_____

_____

Decrease = _____ mg per 100 cm^3

(2)

(e) Estimate how long after eating the meal it will take for person **B**'s blood sugar level to return to the level before the meal.

Show your working on the figure above.

_____

_____

(2)

(Total 9 marks)

Q19.

The rate of chemical reactions can be changed by changing the conditions.

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(a) Methane burns in oxygen to produce carbon dioxide and water.

The activation energy for the reaction is 2648 kJ / mol.

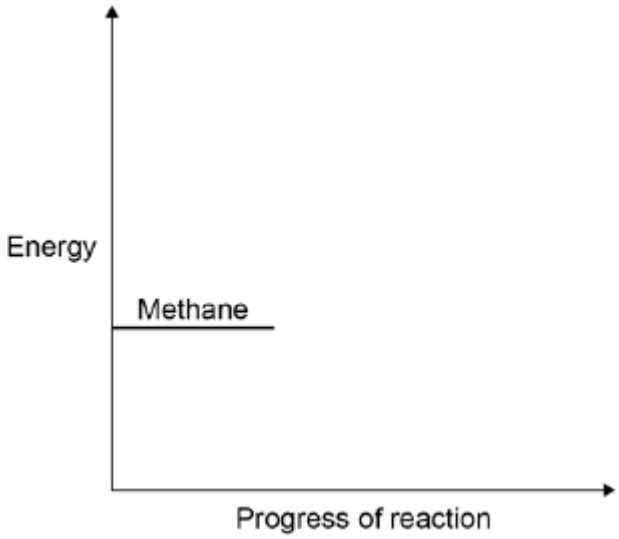
The reaction gives out 818 kJ / mol of energy.

The figure below shows the reaction profile for this reaction.

Complete the reaction profile.

Draw arrows to represent:

- the activation energy
- the energy given out.



(4)

(b) What percentage of the activation energy is the energy given out?

_____

(1)

(c) Calcium carbonate decomposes when it is heated:

The decomposition of calcium carbonate is an endothermic reaction.

How would the reaction profile for decomposition of calcium carbonate be different from the reaction profile of methane burning in oxygen?

_____

(1)

(d) Catalysts are used in chemical reactions in industry.

Give **two** properties of catalysts.

For each property, explain why it makes the catalyst useful in industry.

_____

_____

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_____

_____

_____

_____

_____

_____

(4)

(e) Enzymes are biological catalysts.

What type of molecule is an enzyme?

Tick **one** box.

Carbohydrate	☐
Hydrocarbon	☐
Lipid	☐
Protein	☐

(1)

(f) If enzymes are denatured they stop working.

Give **two** ways an enzyme can be denatured.

1. _____

2. _____

(2)

(g) An enzyme called lactase catalyses the reaction that breaks down lactose to smaller molecules.

One model used to explain how enzymes affect reactions is called the lock and key model.

Use the lock and key model to explain why lactase cannot be used to speed up **all** chemical reactions.

_____

_____

_____

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_____

_____

_____

(3)

(Total 16 marks)

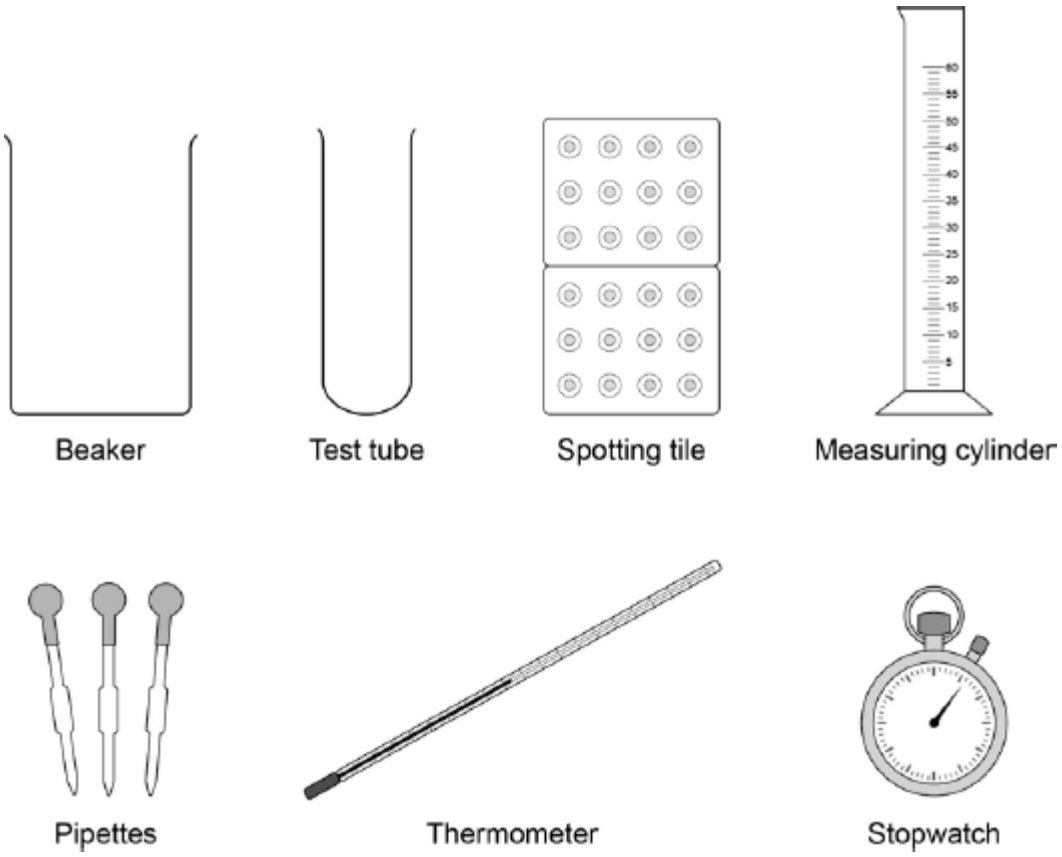
Q20.

Amylase catalyses the breakdown of starch into sugars.

A student investigated the effect of amylase on the reaction at different temperatures.

Figure 1 shows the apparatus the student used.

Figure 1



This is the method used.

1. Put starch suspension into a test tube.

2. Add amylase solution.

3. Put the test tube in a beaker of water at 15 °C.

4. Remove a small sample of the mixture every 30 seconds and put in a spotting tile.

5. Test the sample for starch.

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6. Time how long it takes to break down all of the starch in the mixture.

7. Repeat steps 1–5 at 20 °C, 25 °C and 30 °C.

8. Repeat for each temperature twice more.

The table below shows the student's results.

	Time taken until there was no starch in the sample in minutes			
Temperature in °C	**Test 1**	**Test 2**	**Test 3**	**Mean**
15	6.1	9.4	10.0	8.5
20	4.8	5.0	4.6	4.8
25	3.0	2.5	3.0	3.2
30	1.5	2.0	2.0	

(a) One of the results in the table above is anomalous.

Draw a ring around the anomalous result.

(1)

(b) Calculate the mean for 30 °C.

_____

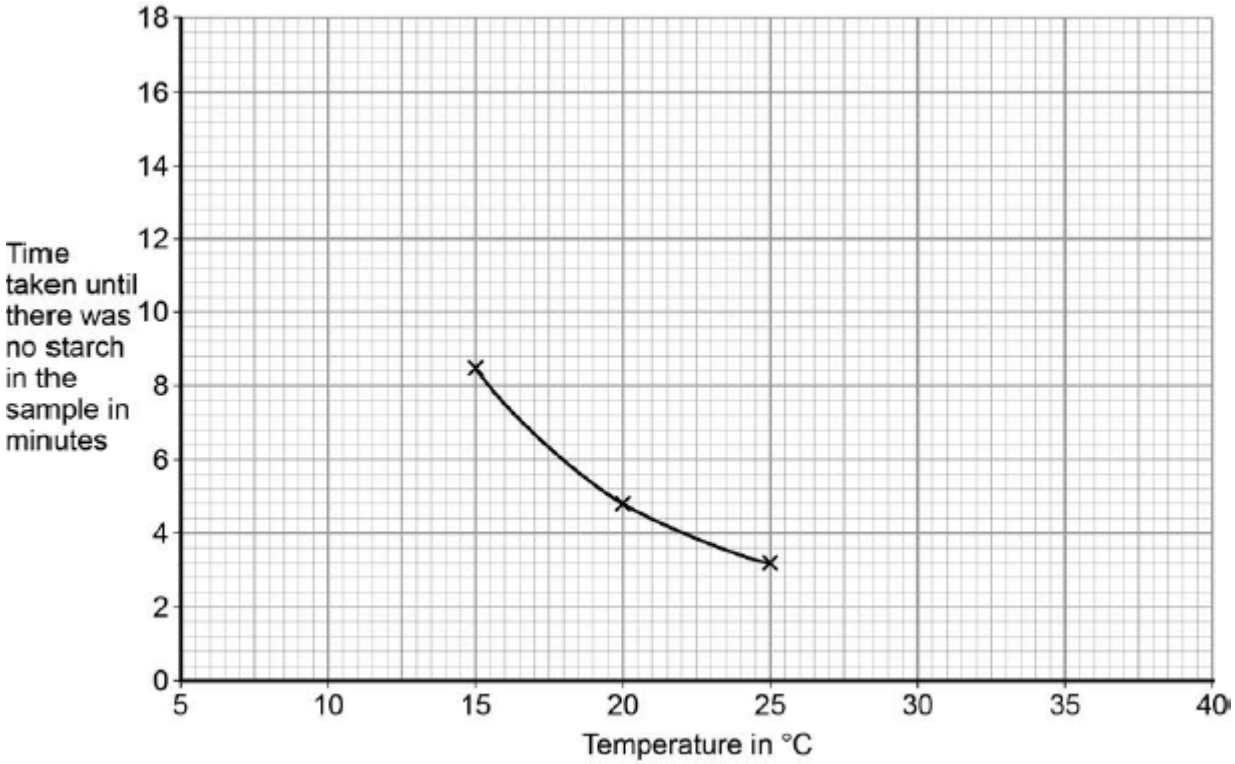
_____

(1)

(c) **Figure 2** shows a graph of the student's results.

Figure 2

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Use the graph to predict how long it would take to break down all of the starch at 10 °C.

Time = _____ minutes

(1)

(d) The student tested samples of the mixture for starch every 30 seconds.

In each test she added one drop of iodine to the sample in the spotting tile.

Predict the colour of the samples from the 20 °C test at 4.0 minutes and 7.0 minutes.

Colour at 4.0 minutes _____

Colour at 7.0 minutes _____

(2)

(e) The student did a fourth test at 30 °C.

In this test the starch did not break down, even after 45 minutes.

Why did the amylase not break down the starch in this test?

Tick **one** box.

The amylase solution and the starch suspension were mixed before the start of the experiment. ☐

The amylase solution had been prepared with water at 95 °C. ☐

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The amylase solution had been prepared with water at 20 °C. ☐

The amylase solution had been stored in the fridge. ☐

(1)

(f) The student made the following conclusion about the optimum temperature for amylase to work at.

'Amylase works fastest at 40 °C'

Her teacher said that this is **not** a valid conclusion from her results.

Describe how the student could change her method to give results that would improve the validity of her conclusion.

(6)

(Total 12 marks)

Q76.

A couple wanted to have a baby, but after several years of trying the woman did not become pregnant. Their doctor suggested IVF treatment.

(a) Describe the main stages in IVF treatment.

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_____

_____

_____

_____

_____

(4)

(b) As women get older they become less fertile. Eventually the ovaries stop releasing eggs, so a woman cannot become pregnant.

IVF treatment means it is now possible for women in their 50s and 60s to have children, but not everyone thinks this is a good idea.

Suggest reasons for **and** against women in their 50s and 60s having IVF treatment to have children.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

Q77.

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 _____ .

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

This chemical substance is called _____ .

(Total 4 marks)

Q78.

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**.

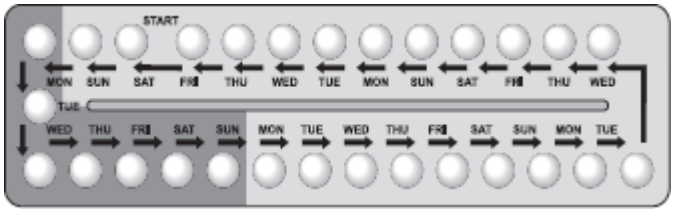
List A **Hormone**	**List B** **Information**
	Used in some contraceptive pills
FSH	
	Causes the womb lining to break down
LH	
	Stimulates the release of an egg from the ovary
Progesterone	
	Stimulates eggs to mature in the ovaries

(Total 3 marks)

Q79.

Hormones can be used to control human fertility.

Many women take the oral contraceptive pill so they do not become pregnant.



(a) Name **two** hormones used in contraceptive pills.

1. _____

2. _____

(2)

(b) Explain how these hormones stop a woman from becoming pregnant.

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_____

_____

_____

_____

(2)

(Total 4 marks)

Q80.

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

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)

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(Total 5 marks)

Q81.

Total cholesterol in the blood contains 'good' and 'bad' cholesterol.
High levels of 'bad' cholesterol increase the risk of heart disease.
High levels of 'good' cholesterol reduce the risk of heart disease.

Scientists have suggested that chemicals called polyphenols in dark chocolate may help people with Type 2 diabetes.
Polyphenols may reduce high levels of 'bad' cholesterol in the blood.

The scientists investigated the effect of polyphenols on levels of cholesterol in the blood.

- 7 men and 5 women with Type 2 diabetes had the levels of cholesterol in their blood measured.
- They all ate 45 g of dark chocolate every day for 16 weeks.
- 6 of the people ate dark chocolate that contained polyphenols. The other 6 people ate dark chocolate that did not contain polyphenols.
- All 12 people were allowed to eat and drink anything else they wanted, but **no more** chocolate.
- The levels of cholesterol in their blood were measured again after 16 weeks.

The results showed that for the people who ate dark chocolate with polyphenols:

- there were decreases in total cholesterol and 'bad' cholesterol
- there was an increase in 'good' cholesterol.

A newspaper headline reported the research and wrote:
'Research shows that diabetics should eat dark chocolate.'

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Was the newspaper's statement justified?

Include in your answer evidence that supports the newspaper's statement and evidence that does **not** support the newspaper's statement.

Remember to give a conclusion to your answer.

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_____

_____

_____

_____

_____

_____

_____

_____

(Total 6 marks)

Q82.

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

(a) Name the **two** hormones in a fertility drug.

1. _____

2. _____

(2)

(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) What is the relationship between the age of women and the success of IVF treatment?

_____

_____

(1)

(ii) Use information from the table to give **one** ethical problem with IVF.

_____

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_____

(1)

(Total 4 marks)

Q83.

Hormones can be used to control a woman's fertility.

(a) The first birth control pills contained only oestrogen.

Name another hormone now used in modern birth control pills.

_____

Give an advantage of using this hormone.

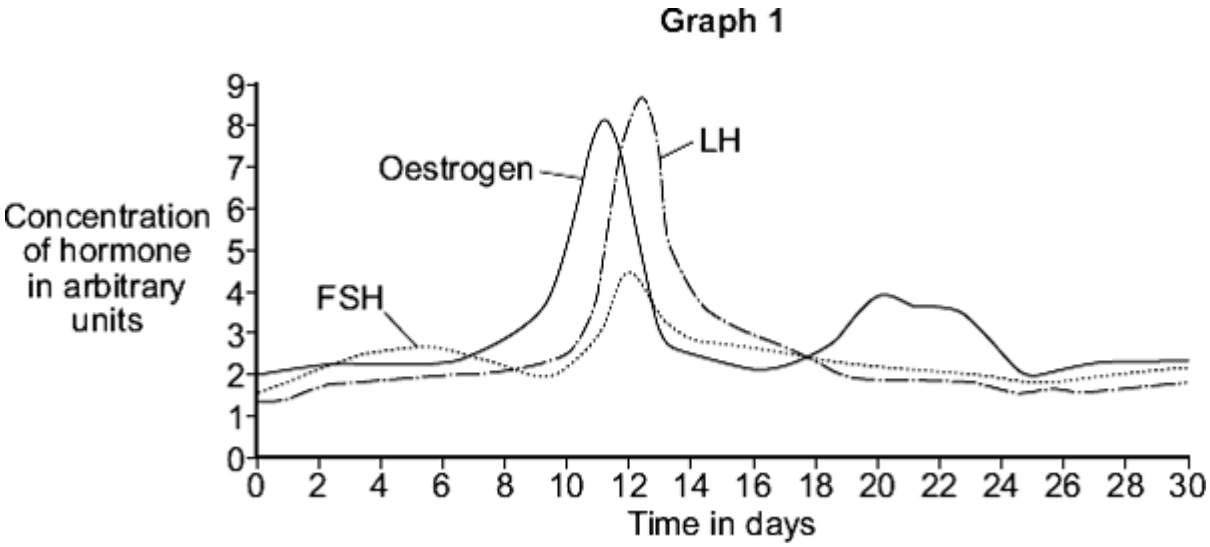
_____

_____

(2)

(b) Hormones control a woman's menstrual cycle.

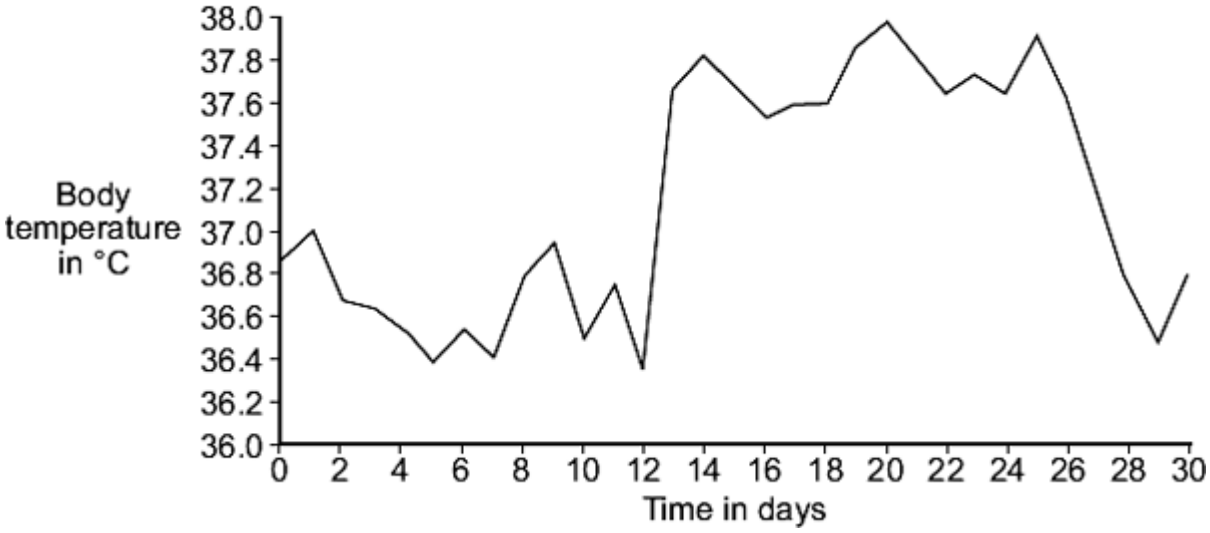
Graph 1 shows how the concentrations of hormones change during one menstrual cycle.



Graph 2 shows how a woman's body temperature changes during one menstrual cycle.

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Graph 2



How could a woman use body temperature measurements to find the best time of the month to have sexual intercourse to get pregnant?

Use information from **Graph 1 and Graph 2** to explain your answer.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 6 marks)

Q84.

Hormones regulate the functions of many organs.

Complete the following sentences.

(a) Hormones control the monthly release of an egg from

the woman's _____ .

(1)

(b) Hormones also control the thickness of the lining of her _____ .

(1)

(c) Hormones given to women to stimulate the release of eggs

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are called _____ drugs.

(1)

(d) How are hormones transported around the body?

_____

_____

(1)

(Total 4 marks)

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