OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



EXAM QUESTION PACK

B3.2 COORDINATION AND CONTROL: THE ENDOCRINE SYSTEM

SCORE	PERCENTAGE
/100	%

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Gateway Biology A (9-1)

Coordination and control - the endocrine system

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **100**.
- The total number of marks may take into account some 'either/or' question choices.

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1 Which of these hormones is involved in the control of the menstrual cycle?

A insulin
B progesterone
C testosterone
D auxin

Your answer

[1]

2 The image below shows plant shoots growing towards sunlight.



What is this an example of?

A negative gravitropism
B negative phototropism
C positive gravitropism
D positive phototropism

Your answer

[1]

3 The image shows plant shoots growing towards sunlight.



What is this an example of?

A negative gravitropism
B negative phototropism
C positive gravitropism
D positive phototropism

Your answer ☐

[1]

4 Which hormone is used to ripen fruit?

A adrenaline
B auxin
C ethene
D gibberellin

Your answer ☐

[1]

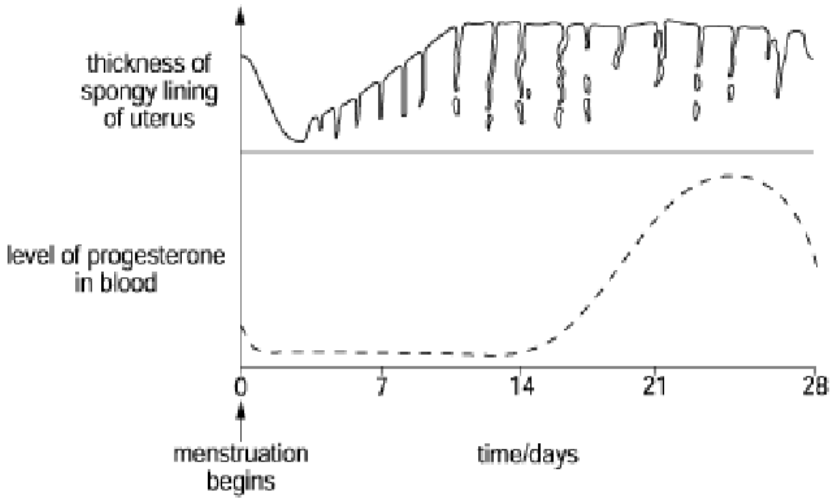
5 Which hormone is used to increase metabolic rate?

A insulin
B luteinising hormone
C testosterone
D thyroxine

Your answer ☐

[1]

6(a) The graph shows how the level of progesterone changes during the menstrual cycle.



(i) Draw another line on the lower graph to show how the level of oestrogen changes during the menstrual cycle.

[2]

(ii) Describe how oestrogen and FSH interact during the menstrual cycle.

---

[2]

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(b) * Endometriosis is a condition where the cells that normally line the uterus (womb) can move to other parts of the body.

During the menstrual cycle the cells that have moved can react in the normal way to the hormones controlling menstruation.

This can cause a number of problems including fatigue and pain.

Using the information from the graph as well as your own knowledge explain what happens to the cells that have moved and how doctors could treat the condition using sex hormones.

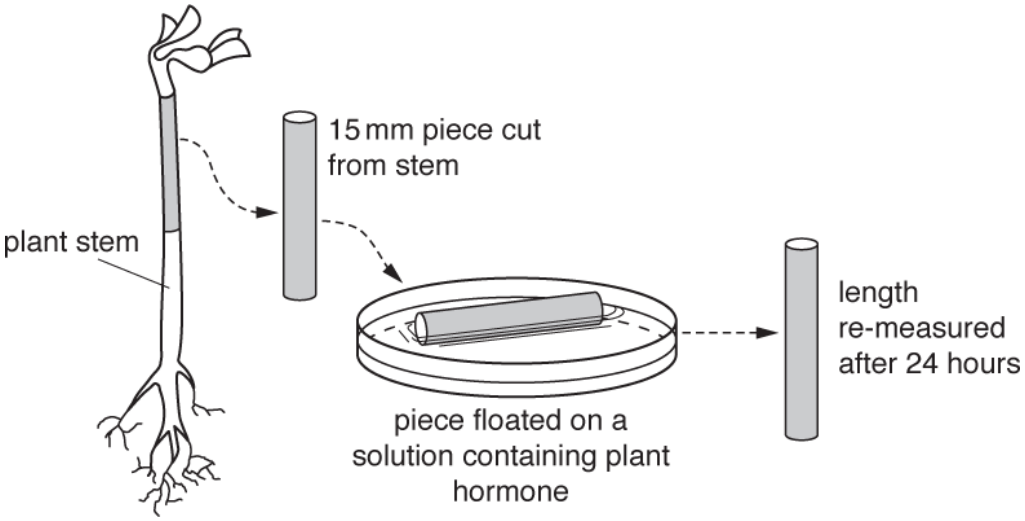
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[6]

7 Growth in plants is controlled by chemicals called plant hormones.

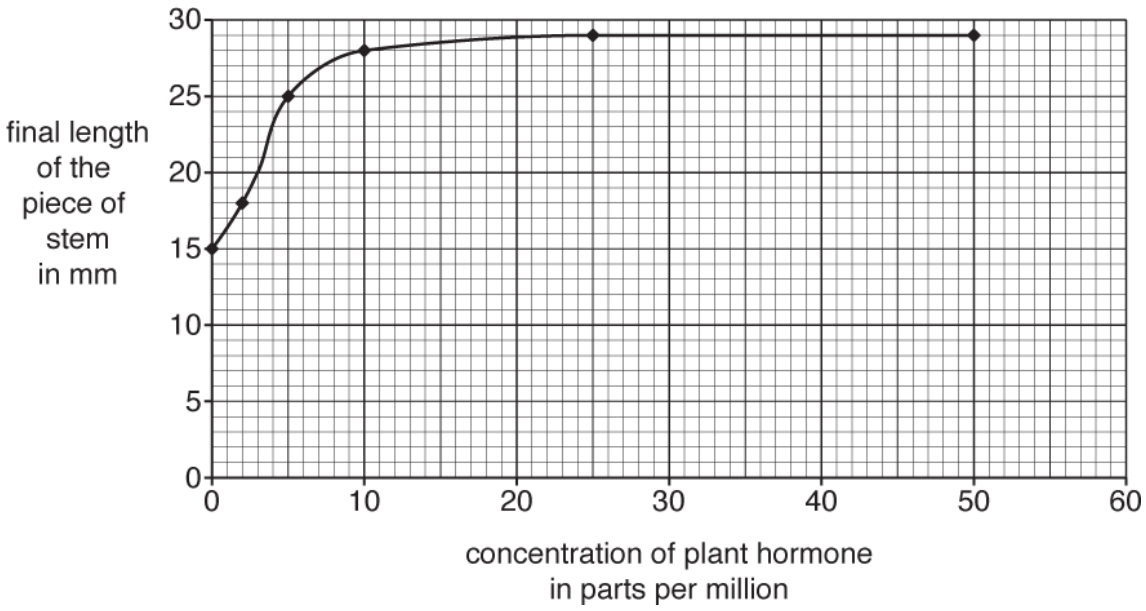
Students want to measure the effect of a plant hormone on the growth of plant stems.

The diagram shows their method.



They repeated the experiment with different concentrations of plant hormones.

The graph shows their results.



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The diagram shows a piece of stem that has been floating in plant hormone.

Describe what the graph shows about the effect of plant hormones on the stem.

Use a ruler and the graph to work out what concentration of plant hormone **this** piece of stem was floating in.

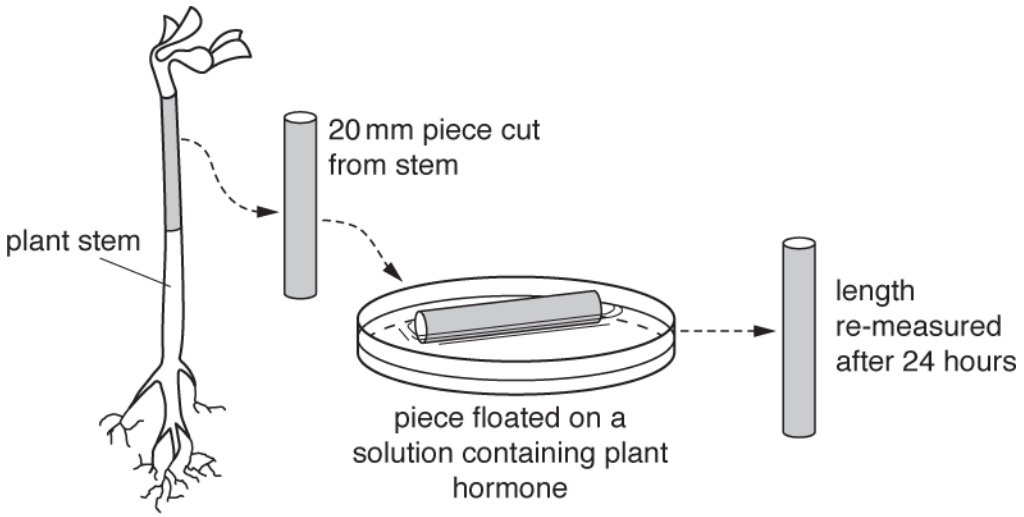
The quality of written communication will be assessed in your answer to this question.

[6]

8 Growth in plants is controlled by chemicals called plant hormones.

Students want to measure the effect of a plant hormone on the growth of plant stems.

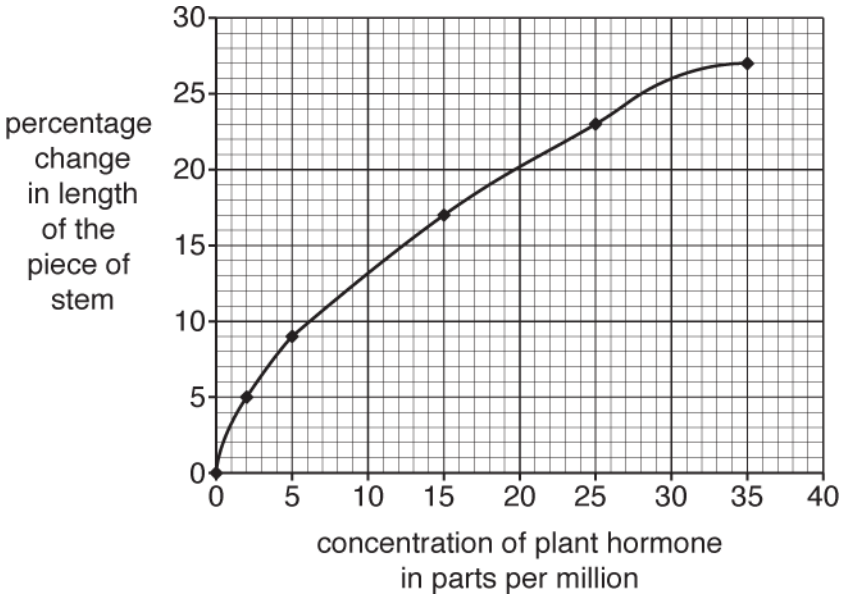
The diagram shows their method.



They repeated the experiment with different concentrations of plant hormones.

After 24 hours they worked out the percentage change in length of the stem.

The graph shows their results.



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The diagram shows a piece of stem that has been floating in a plant hormone solution.



Explain the effect of the plant hormone on the pieces of stem and work out the concentration of plant hormone that **this** piece of stem was floating in.

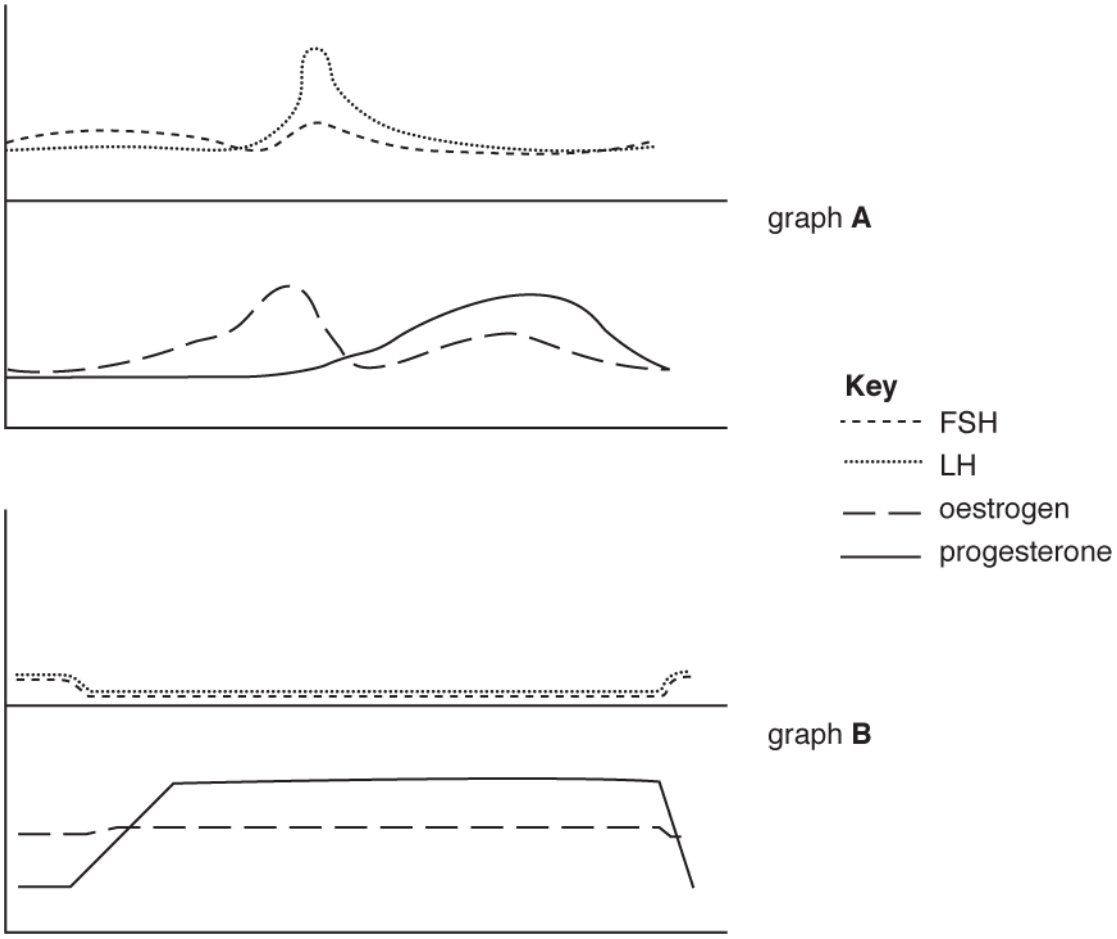
The quality of written communication will be assessed in your answer to this question.

[6]

9 The diagram shows the hormone levels in the blood during the menstrual cycle.

Graph **A** represents a normal menstrual cycle.

Graph **B** represents a cycle if the woman is taking contraceptive pills.



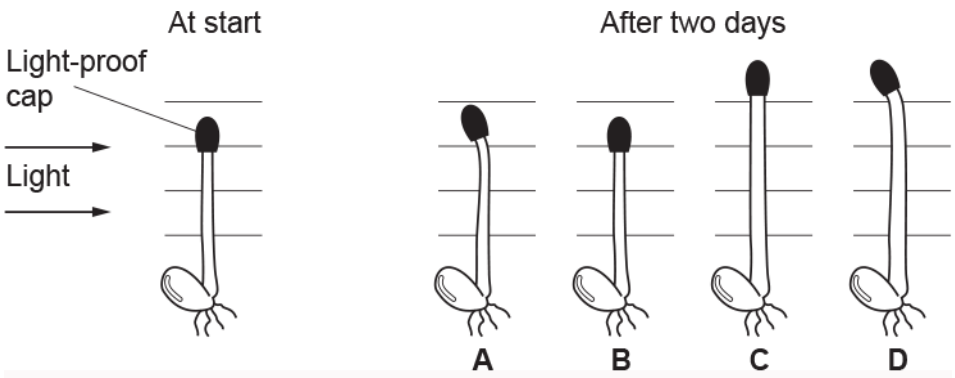
Compare the graphs and use them to explain how the contraceptive pill can reduce the chance of pregnancy occurring.

The quality of written communication will be assessed in your answer to this question.

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[6]

10 Seedlings were grown with a light-proof cap over the tip. The seedlings had light from one direction only.



Which diagram shows the correct growth of the seedling after two days in these conditions?

Your answer [1]

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11 Plant roots respond to gravity by growing downwards.

What is this response called?

A Negative gravitropism

B Negative phototropism

C Positive gravitropism

D Positive phototropism

Your answer ☐ [1]

12(a)

How are hormones transported around the body?

---

[1]

(b) Finish these sentences to explain what is happening in the body of a female during the menstrual cycle.

The pituitary gland in the ---------- releases the hormone FSH.

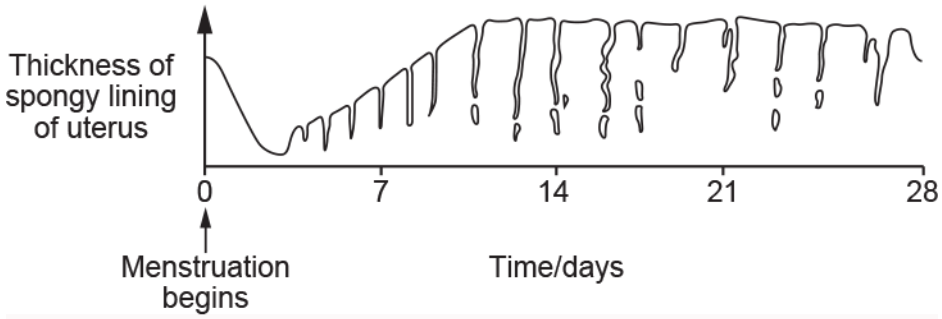
FSH causes an ---------- releases the hormone FSH.

FSH also causes the follicle to release the hormone ---------- .

After ovulation, the empty follicle releases another hormone called ---------- .

[4]

(c) The diagram shows how the lining of the uterus changes during the menstrual cycle.



(a) Mark on the diagram with the letter **E** the most likely point when ovulation occurs. **[1]**

(b) If a fertilised egg is **not** present, a change happens to the uterus lining after 28 days.

How does the uterus lining change?

---

[1]

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(d) The table shows the effectiveness of some different forms of contraception.

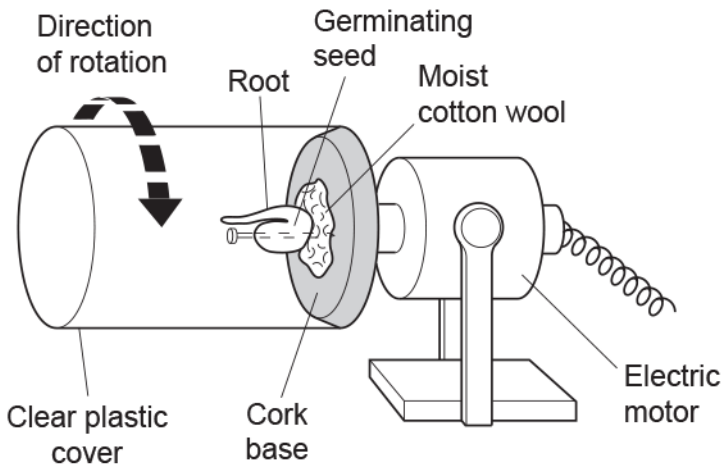
Form of contraception	Percentage pregnancies per year (%)
Hormonal	
Injection	<1
Patch	<1
Pill	2
Non-hormonal	
Diaphragm	6
Male condom	2
Male sterilisation	<1

Suggest explanations for the differences in the effectiveness of the methods of contraception and explain why the pill is a popular method.

---

[6]

13 The diagram shows apparatus used in experiments on tropisms.



When the apparatus rotates, the root grows horizontally.

Which tropism is **not** showing its usual effect on the root?

A Negative gravitropism

B Positive gravitropism

C Negative phototropism

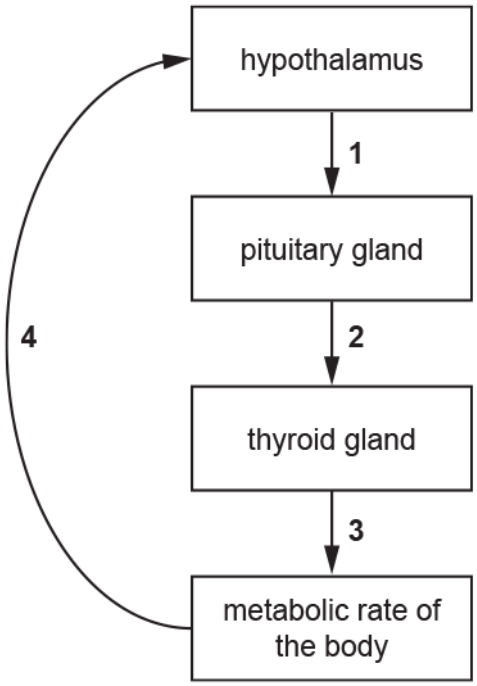
D Positive phototropism

Your answer [ ] [1]

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14 The level of thyroxine in the body is controlled by negative feedback.

The diagram shows how this takes place.



Which numbers on the diagram represent the hormones TSH and thyroxine?

A 2 = thyroxine 3 = TSH

B 1 = TSH 3 = thyroxine

C 3 = TSH 3 = thyroxine

D 2 = TSH 3 = thyroxine

Your answer [1]

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15 Which hormone is important in the fruit ripening process in plants?

A Ethene

B Gibberellin

C Progesterone

D Thyroxine

Your answer [1]

16(a)

Adrenaline is an important hormone in the body. It helps to prepare the body for a 'fight or flight' response.

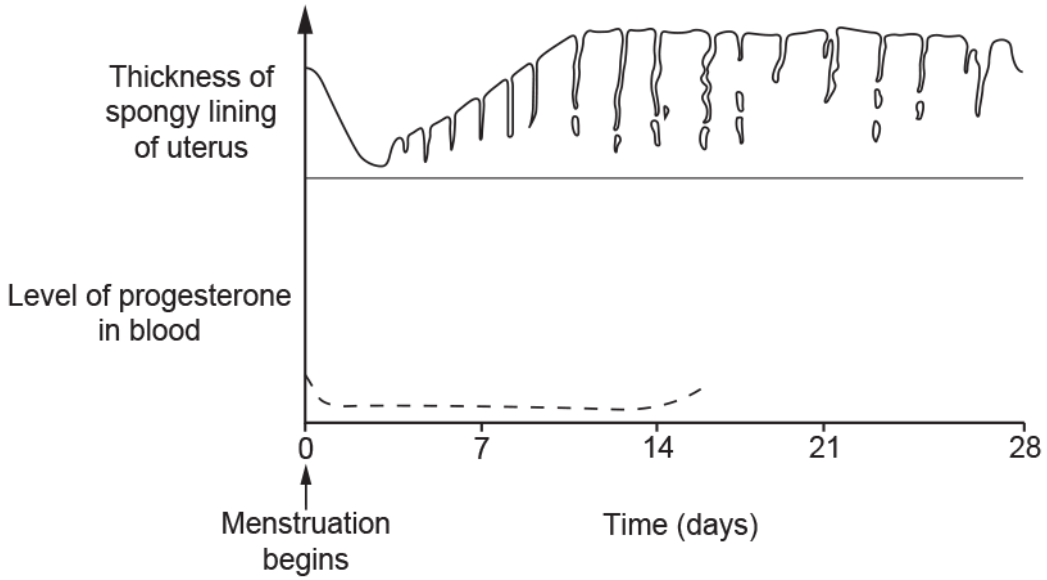
Sports injuries which involve cuts and bleeding are often treated with a dilute solution of adrenaline.

Explain why.

[2]

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(b) The graph shows how the lining of the uterus changes during the menstrual cycle and also shows the level of progesterone in the blood.



(i) Where in the ovary is progesterone produced?

---

[1]

(ii) Draw a line to continue the graph to show the levels of progesterone until day 28 (assume that an egg has not been fertilised).

[2]

(c)

(i) An egg develops in a follicle before ovulation. The follicle has a diameter of 25×10^{-3} mm at the start. This follicle grows to 20 mm in diameter just before the egg is released.

Calculate the increase in size of the diameter of the follicle.

Give your answer to **2** decimal places.

Answer = ---------- mm **[3]**

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(ii) The failure of a follicle to increase in size can result in less production of oestrogen.

Explain what effect this may have on the uterus.

[1]

(iii) Explain how hormones can be used to treat infertility in women.

[3]

(iv) Infertility can also be caused by problems in the male.

Plasmin is a protease enzyme important in sperm movement.

Explain how changes to the structure of DNA could result in the plasmin enzyme being faulty.

[2]

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17(a) Plant hormones are involved in controlling some processes in plants.

Which processes in plants are controlled by plant hormones?

Tick (✓) **three** boxes.

- [ ] Flower opening
- [ ] Germination
- [ ] Photosynthesis
- [ ] Pollination
- [ ] Respiration
- [ ] Shedding of leaves

[3]

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(b) A child sets up an experiment to grow grass seeds in a plastic cup.

The grass seeds in cup **A** are grown directly under a window.
The grass seeds in cup **B** are grown by a window to the side.

Look at the results.

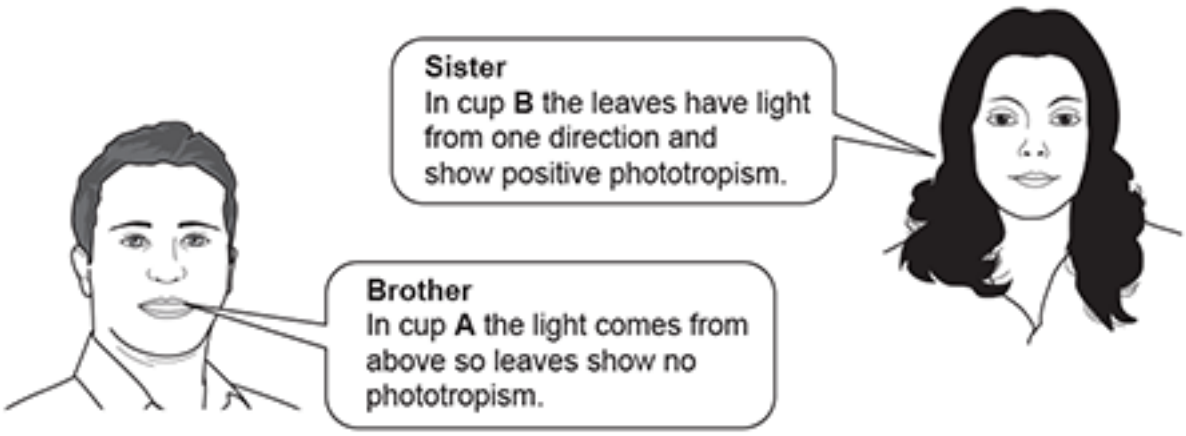


A
Grass seeds grown directly under a window

B
Grass seeds grown by a window to the side

The child's older brother and sister try to explain what has caused the results.

They make different conclusions.



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(i) Explain why the sister has given the better conclusion.

---

[2]

(ii) Name the hormone that causes phototropism.

---

[1]

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(c)

(i) Different hormones control the human menstrual cycle.

Complete the sentences to describe how the menstrual cycle is controlled.

Use words from the list.

Each word can be used once, more than once, or not at all.

fetus **follicle** **FSH** **oestrogen** **progesterone**

The hormone released by the pituitary gland is called ..... .

This hormone acts on the ovary and causes the growth of a ..... .

The hormone that maintains the lining of the uterus is called ..... .

[3]

(ii) The table shows the concentration of oestrogen in the blood during the first 7 days of the menstrual cycle.

Time in days	Oestrogen (mg/100 cm^3 of blood)
1	20
2	20.5
3	25
4	27.5
5	30
6	32.5
7	34

Put a ring around the days below which show a steady increase in the concentration of oestrogen.

Days 1–4 **Days 2–5** **Days 3–6** **Days 4–7**

[1]

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(d) The lining of the uterus is shed during menstruation.

New cells are needed to replace the lining of the uterus.

Describe the processes that occur to make these new cells.

[3]

18 Why are plant hormones used to cause parthenocarpic fruit development?

A To delay dormancy
B To selectively kill weeds
C To produce seedless fruit
D To shed leaves

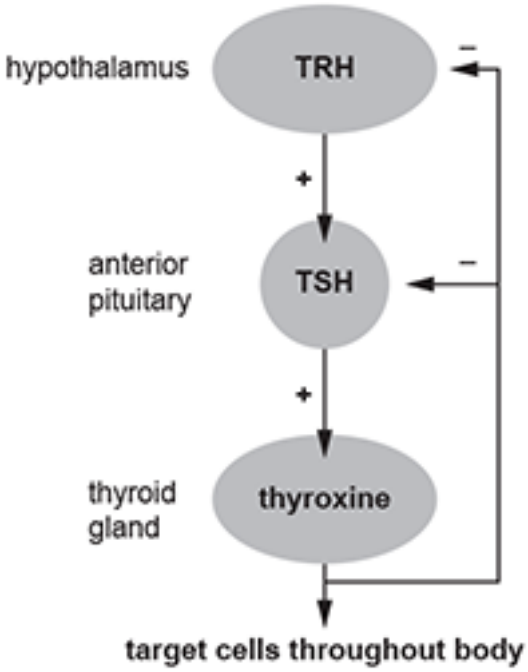
Your answer [1]

19 Thyroxine is a hormone controlled by negative feedback.

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There is an **increase** in the metabolic rate of the body until the cells of the body have the required amount of energy.

Once the cells of the body have the required amount of energy what will happen to the levels of the three hormones in the blood?

A all three will increase
B all three will decrease
C TRH and TSH will increase and thyroxine will decrease
D TRH and TSH will decrease and thyroxine will increase

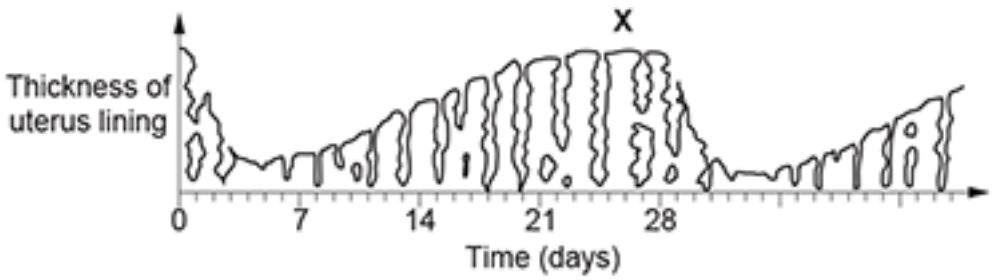
Your answer ☐ **[1]**

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20(a) Look at the diagram. It shows changes to the uterus lining during the menstrual cycle.



(i) Which hormone would peak at point **X**?

---------- [1]

(ii) Name **two** hormones that peak immediately before ovulation.

1 ----------

2 ---------- [1]

(b) Explain how hormones can be used by women for contraception.

---

[4]

(c) Plant development is controlled by hormones.

Describe **one** effect of gibberellins and **one** effect of ethene on plant development.

gibberellins _____

_____

ethene _____

_____ [2]

21 When a woman reaches the age of about 50, eggs are released less often from her ovaries.
To try and correct this, her body increases the production of one hormone.

Which hormone is this?

A Adrenaline
B FSH
C Progesterone
D Testosterone

Your answer ☐ [1]

22 Plants growing in swamps have special roots that grow **upwards** through waterlogged soil to get oxygen from air.

What type of response do these roots show?

A Negative germination
B Negative gravitropism
C Positive germination
D Positive gravitropism

Your answer ☐ [1]

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23 A side effect of some antibiotics is to inhibit the release of thyroxine into the blood.

What will these antibiotics do to levels of TSH and TRH?

A Both decrease
B Both increase
C Both stay the same
D TSH increases and TRH decreases

Your answer ☐ [1]

24(a) Carolina horsenettle is a weed that grows in crop fields in the USA.

New horsenettle shoots develop from buds on roots in spring. The shoots die in the autumn but the roots remain alive under the ground.

Effective weed control involves stopping seed production and killing the root system.

Selective herbicides are used to control Carolina horsenettle.

The best time to apply selective herbicide is when the horsenettle is actively growing between the bud and flower stage.

(i) Describe how a selective herbicide works.

---

[2]

(ii) **Fig. 20.1** and **Table 20.1** show information about four different herbicides **A, B, C** and **D**.

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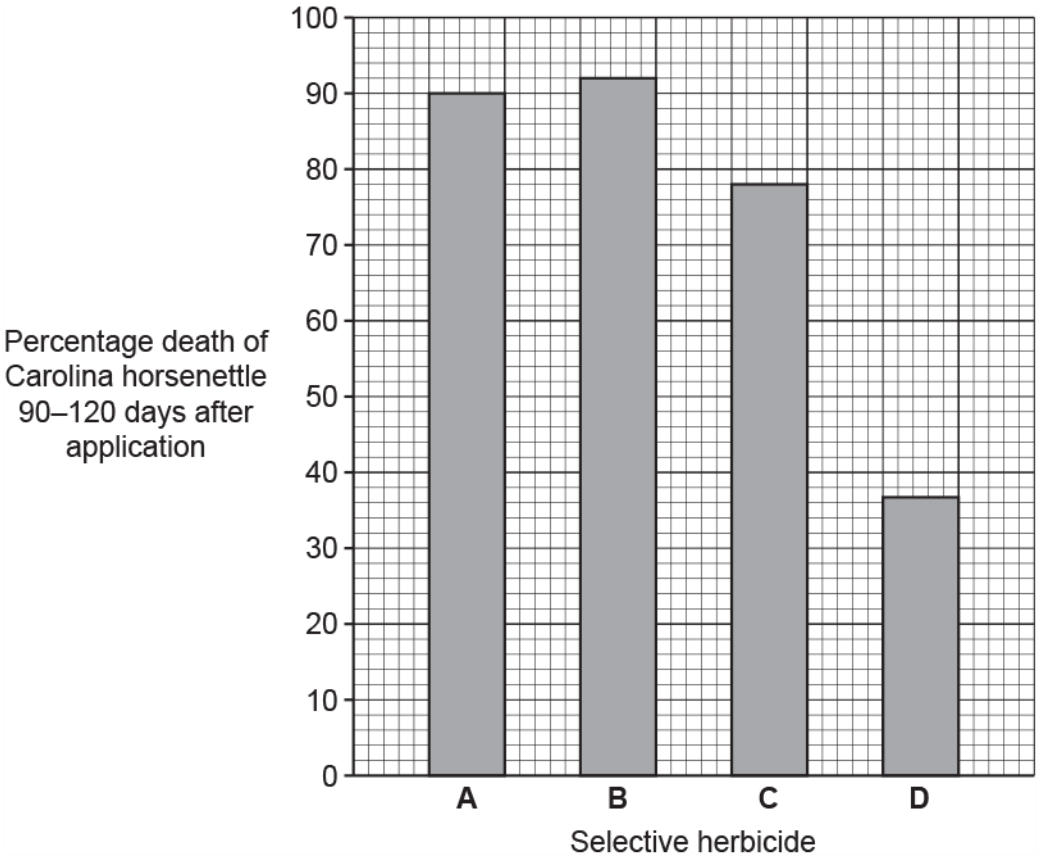


Fig. 20.1

Selective herbicide	A	B	C	D
Effect on Carolina horsenettle	prevents seeds and roots of plants growing	prevents seeds and roots of plants growing	prevents seeds and roots of plants growing	prevents shoot growth and fruiting but minimal damage to roots
What plants herbicide works on	Carolina horsenettle	Carolina horsenettle and several other broad-leaved plant species	Carolina horsenettle	Carolina horsenettle and most other broad-leaved plant species
Cost of herbicide	medium	high	medium	low

Table 20.1

Carolina horsenettle is growing in a field with a crop and other broad-leaved weeds.
Evaluate the information on selective herbicides **A, B, C** and **D**.

Which selective herbicide would be best to use and when it should be applied?
Explain your decision.

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[4]

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(b)

(i) Describe **one** effect that gibberellin hormones have on plants.

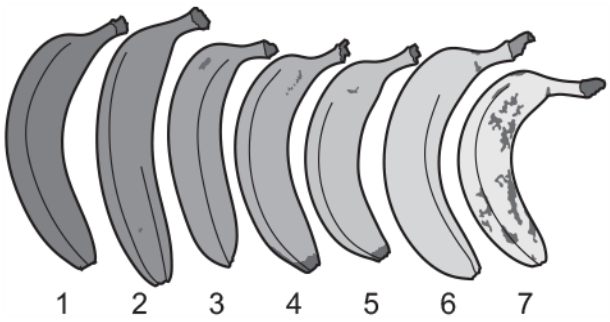
[1]

(ii) A student investigates ripening in bananas.

The student keeps bananas in different conditions. After 1 week he decides if each banana was **ripe** or **not ripe**.

The results were difficult to interpret so he planned to develop the experiment.

He found a picture that he thought he could use.



Explain how this could help develop his experiment.

[2]

END OF QUESTION PAPER

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