

OCR GCSE GATEWAY BIOLOGY A • J247

BIOLOGY



EXAM QUESTION PACK

B3.2 COORDINATION AND CONTROL: THE ENDOCRINE SYSTEM

SCORE

/100

PERCENTAGE

%

STEMUP

These questions belong to OCR, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by OCR. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with OCR and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. OCR has not endorsed, approved or been involved in the production of it. OCR and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

OCR publishes its past papers, mark schemes and examiner reports. Always check the current specification at ocr.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

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.

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]

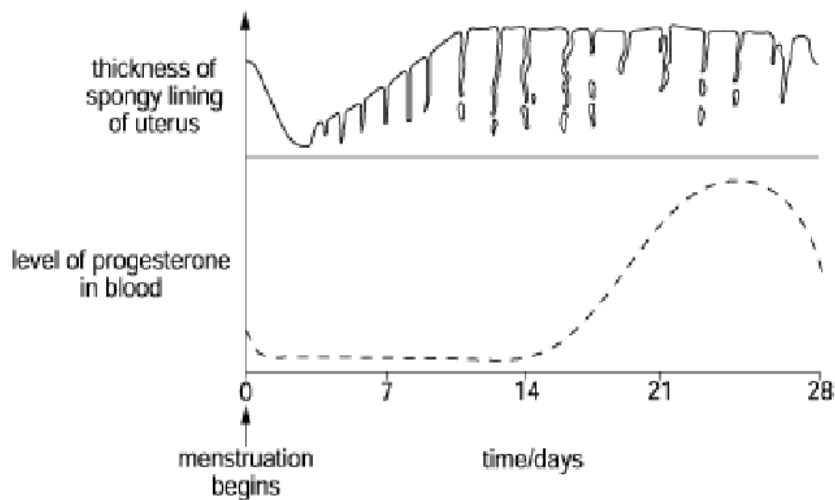
5 Which hormone is used to increase metabolic rate?

- 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]

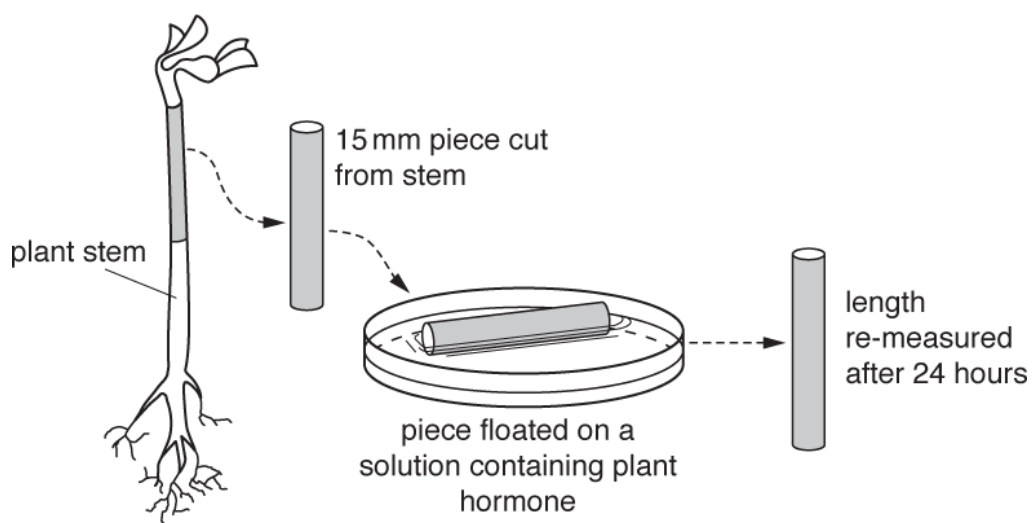
(ii) Describe how oestrogen and FSH interact during the menstrual cycle.

[2]

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

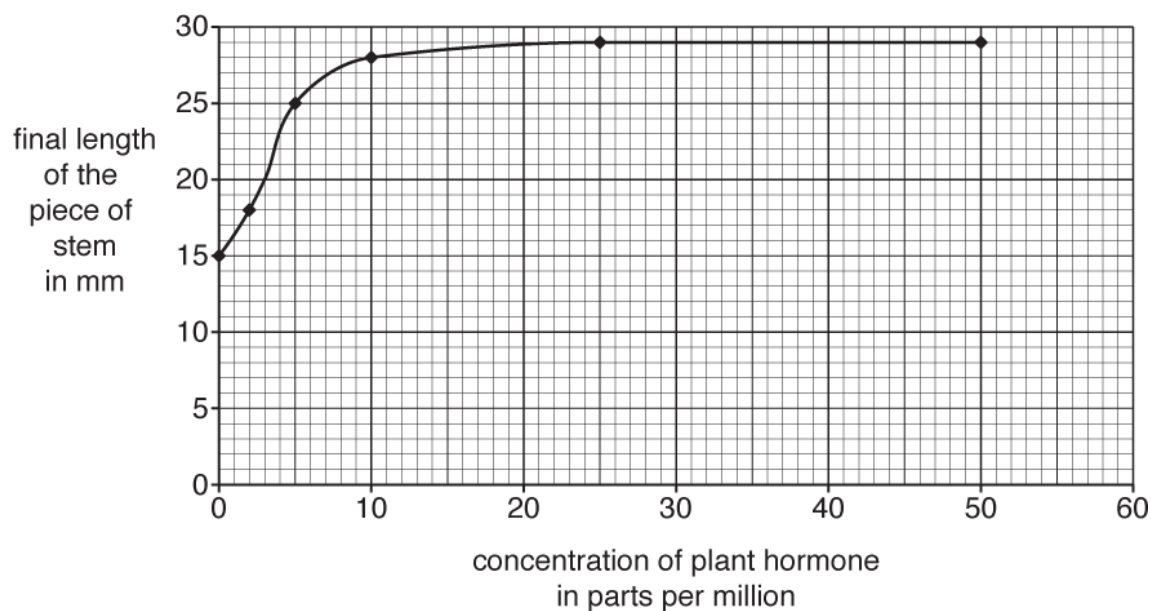
Students want to measure the effect of a plant hormone on the growth of plant stems.

The diagram shows their method.



They repeated the experiment with different concentrations of plant hormones.

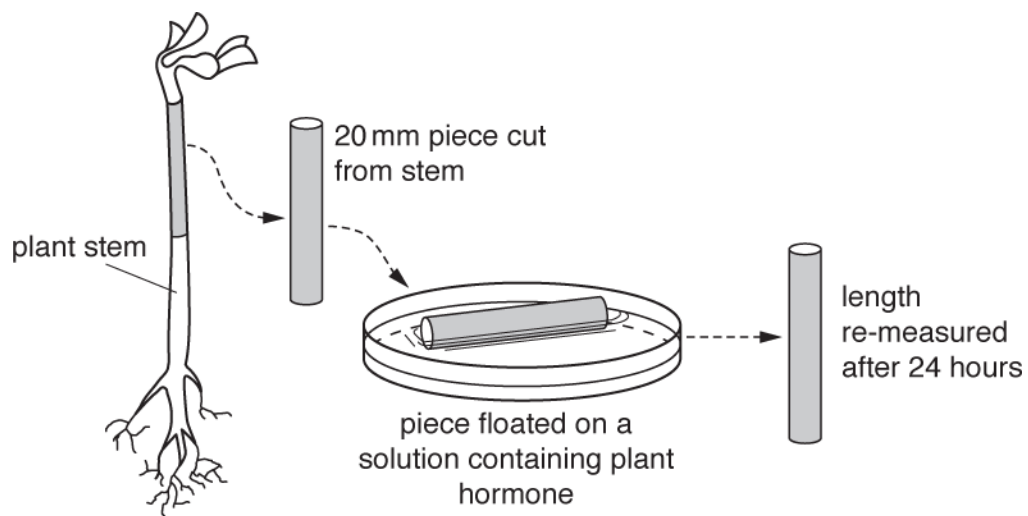
The graph shows their results.



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.

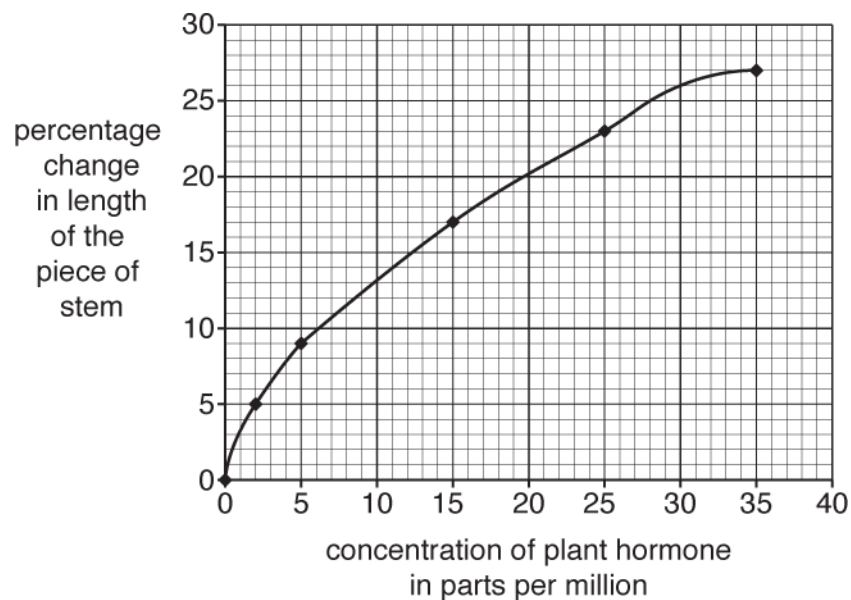
The diagram shows their method.



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.



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.



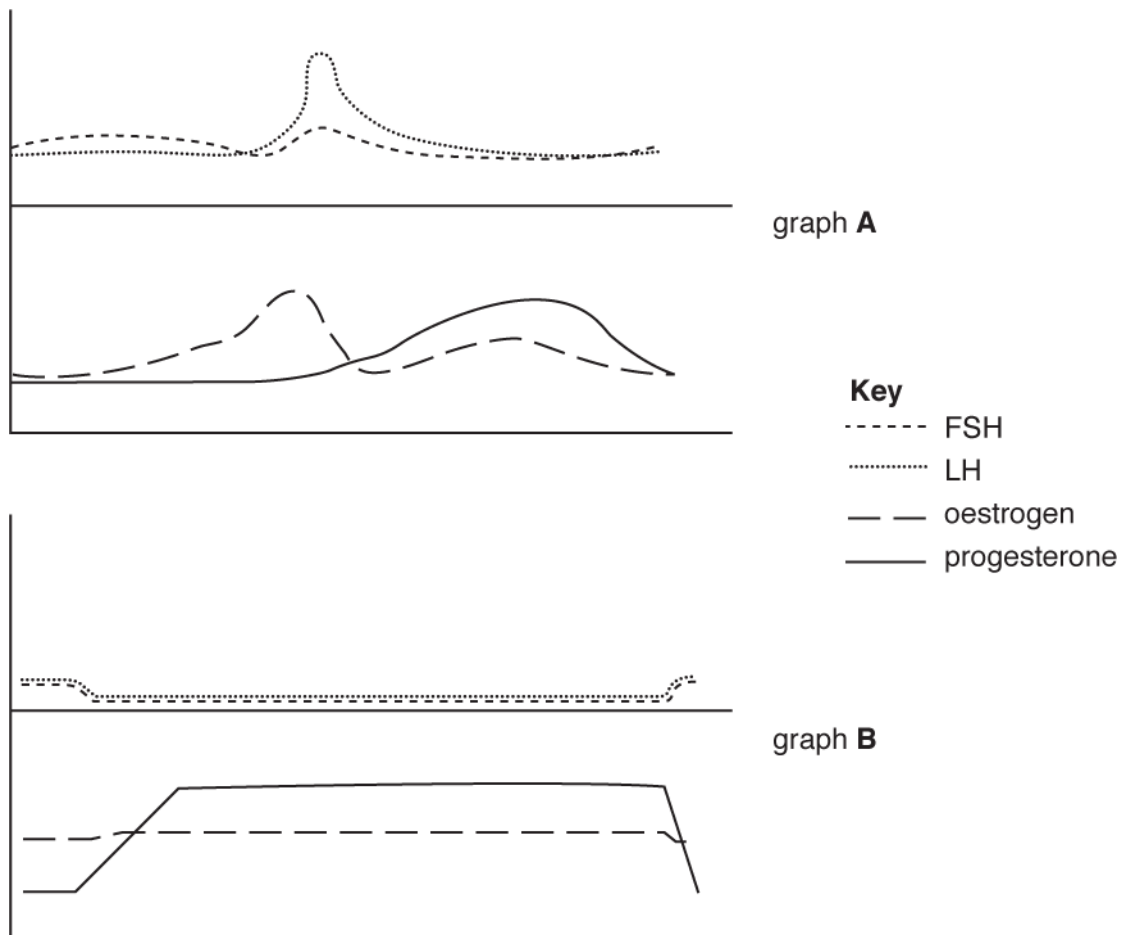
The quality of written communication will be assessed in your answer to this question.

[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.



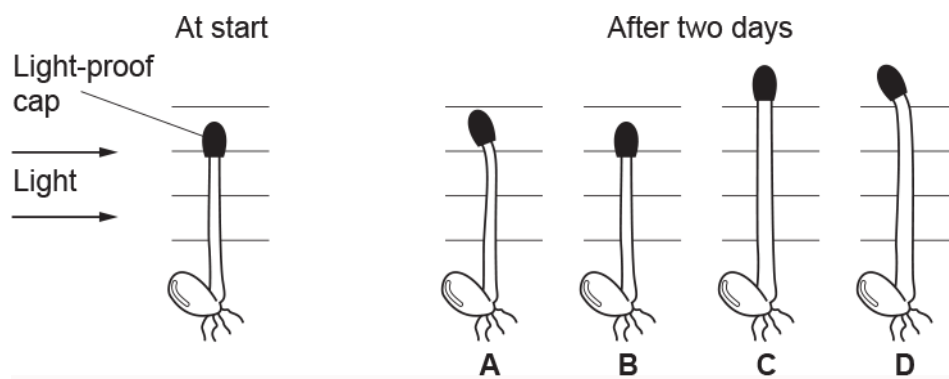
Compare the graphs and use them to explain how the contraceptive pill can reduce the chance of pregnancy occurring.



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

[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]

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.

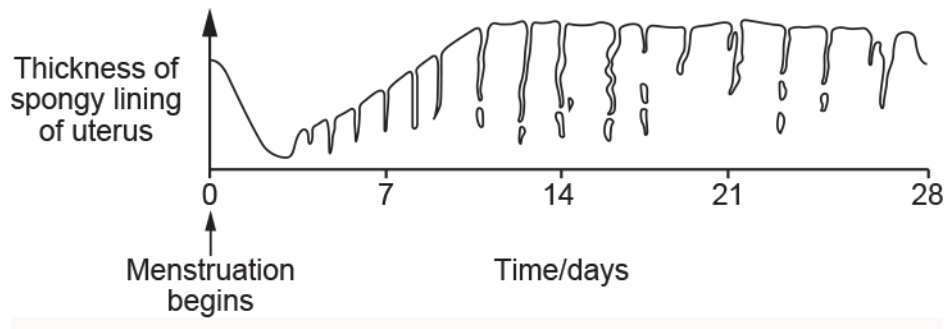
FSH causes an ----- releases the hormone FSH.

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]

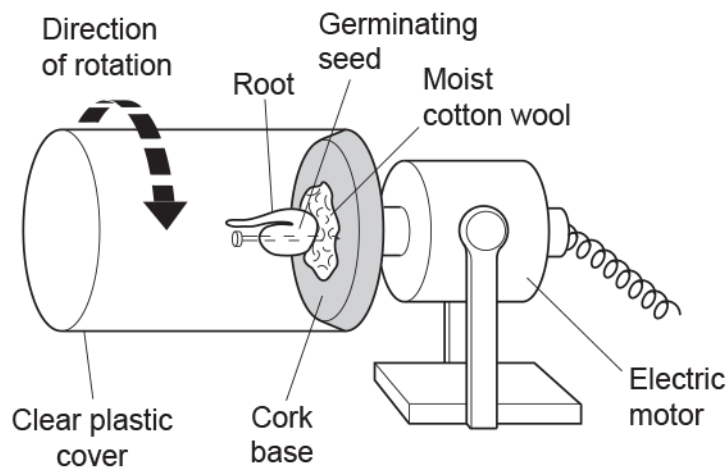
- (d) The table shows the effectiveness of some different forms of contraception.

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?

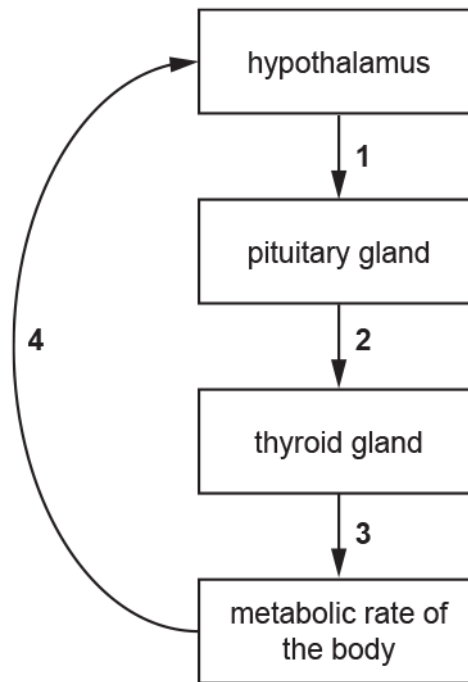
- A Negative gravitropism
- B Positive gravitropism
- C Negative phototropism
- D Positive phototropism

Your answer

[1]

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]

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)

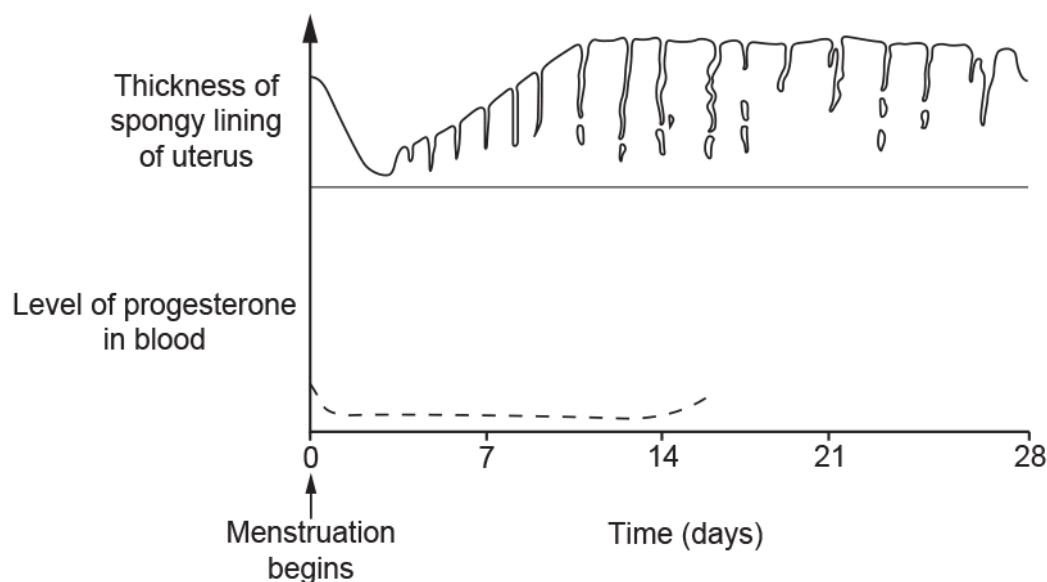
Adrenaline is an important hormone in the body. It helps to prepare the body for a 'fight or flight' response.

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

Explain why.

[2]

- (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]

(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]

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	☐

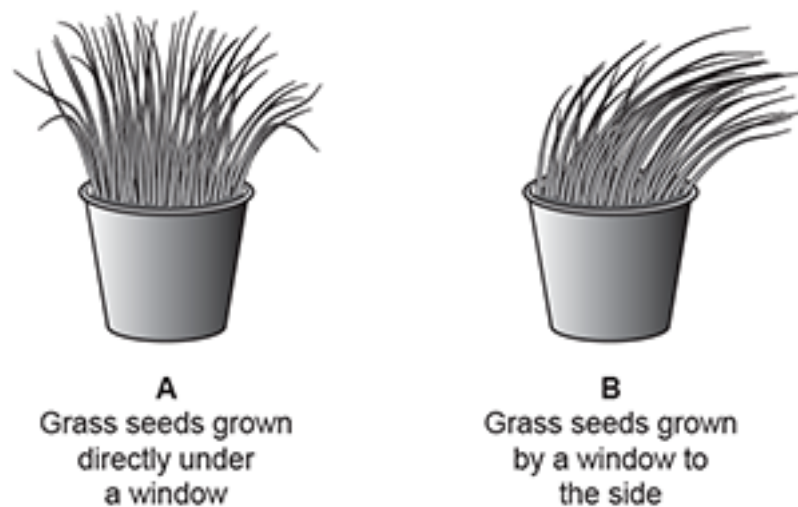
[3]

(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.

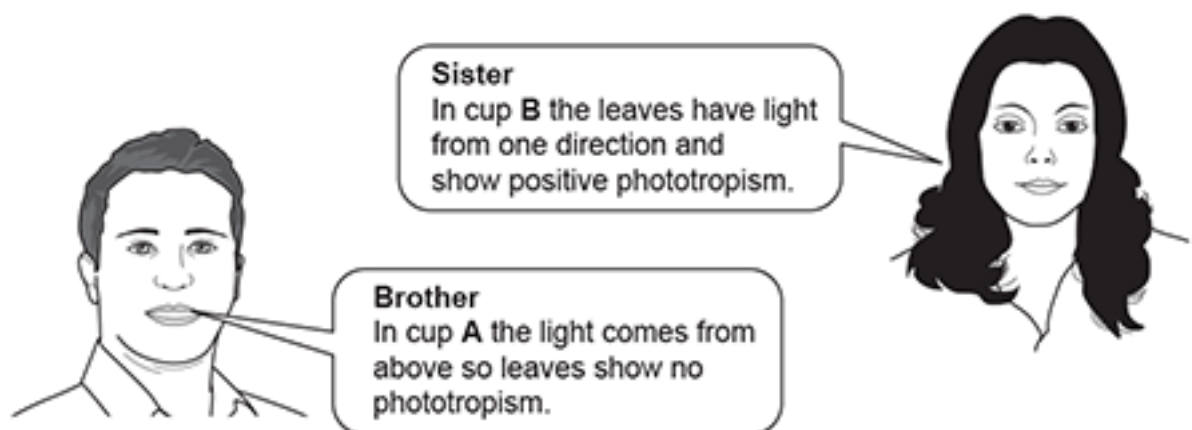
The grass seeds in cup **B** are grown by a window to the side.

Look at the results.



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

They make different conclusions.



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

----- [2]

(ii) Name the hormone that causes phototropism.

----- [1]

(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  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]

(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]

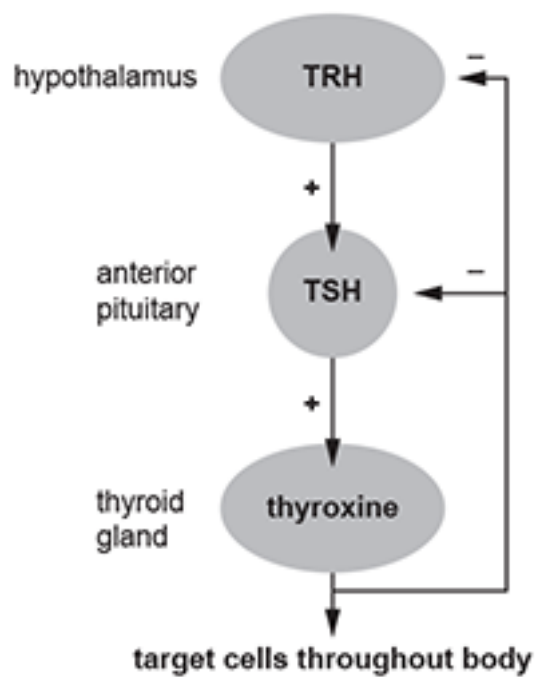
18 Why are plant hormones used to cause parthenocarpic fruit development?

- 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.



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

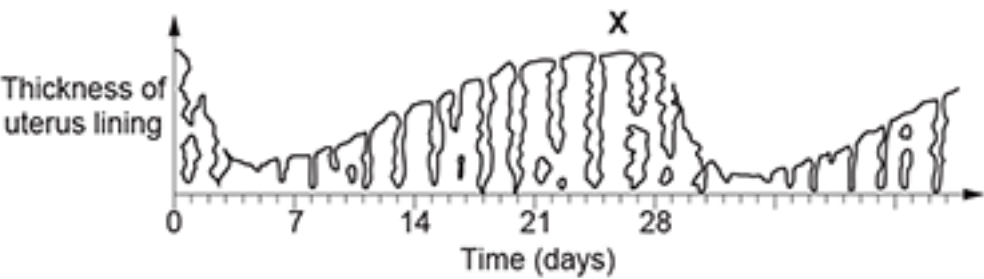
Once the cells of the body have the required amount of energy what will happen to the levels of the three hormones in the blood?

- 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]

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]

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.

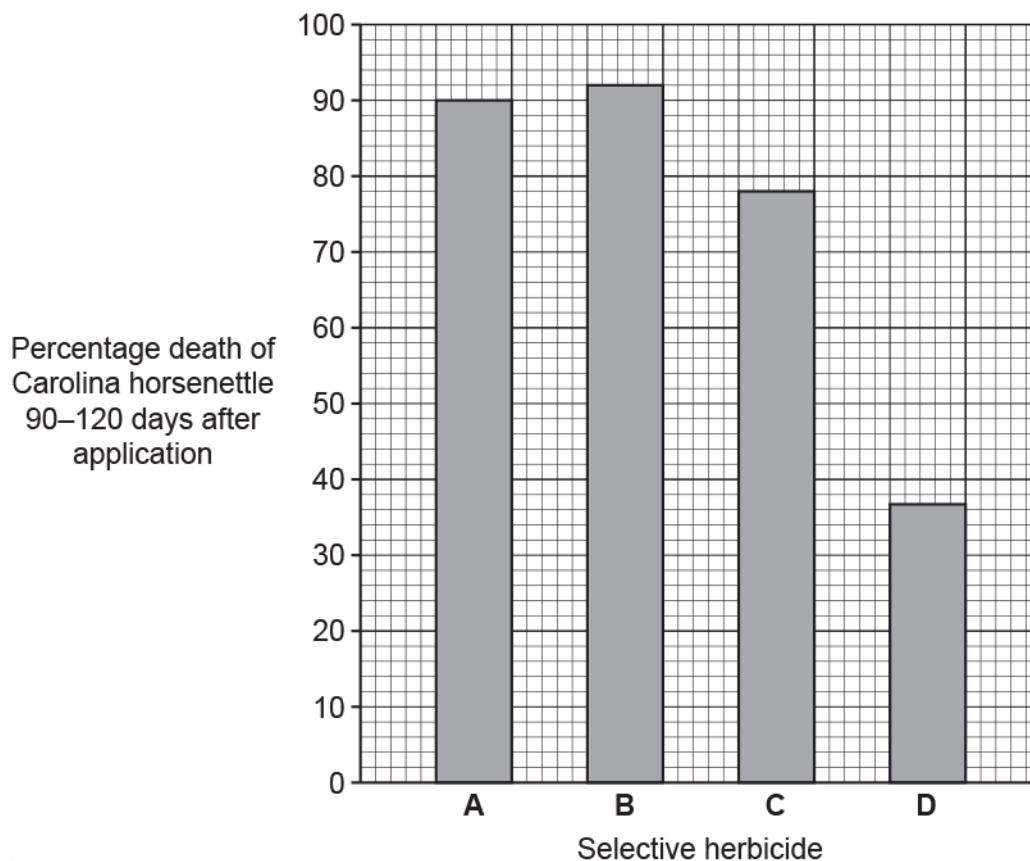


Fig. 20.1

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.

[4]

(b)

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

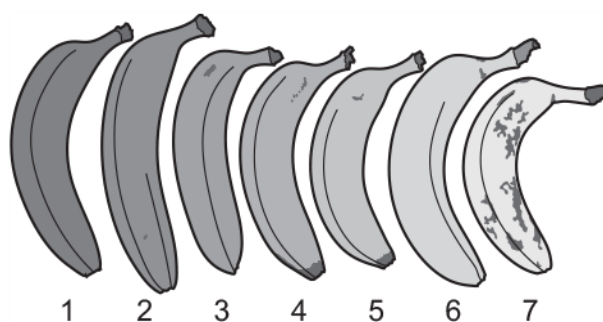
[1]

- (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.

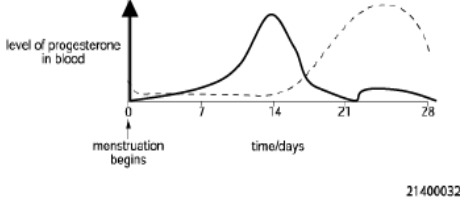


Explain how this could help develop his experiment.

[2]

END OF QUESTION PAPER

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
1			B	1	
			Total	1	
2			D	1	
			Total	1	
3			D	1	
			Total	1	
4			C	1	
			Total	1	
5			D	1	
			Total	1	
6	a	i			before / around day 14
		i	line rises and falls (1)	1	
		i	peaks before progesterone (1)	1	
		ii	FSH stimulates oestrogen production (1)	1	
		ii	oestrogen inhibits FSH production (1)	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
	b		* Please refer to the marking instructions point 10 for guidance on how to mark this question. Level 3 (5–6 marks) An explanation as to how the effects of endometriosis could be relieved by treatment with progesterone. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i> Level 2 (3–4 marks) An explanation of the effects of the levels of oestrogen and progesterone levels and their effect on the endometrial cells outside the uterus. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i> Level 1 (1–2 marks) Draws a simple explanation of how the hormones affect the endometrial cells. <i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</i> 0 marks <i>No response or no response worthy of credit.</i>	6	AO3.1b: Analysis of the information and evaluation of the effect of the treatment • To stop the cells building up oestrogen levels should be kept low • Cell build up can be reduced by keeping progesterone levels high • Progesterone can be given as a (contraceptive) pill to maintain high levels of progesterone • Progesterone mimics pregnancy and halts the menstrual cycle AO2.1: Applying knowledge of hormone levels to endometriosis / endometrial cells • An explanation that when oestrogen levels are high the levels of progesterone are low • An explanation that the (endometrial) cells outside the uterus would build up and breakdown as normal • An explanation that during the breakdown stage the cells would not be able to leave the body in the normal way AO1.1: Demonstrate knowledge and understanding of the female sex hormones and menstruation • A simple explanation of the effect of oestrogen on the cells of the womb during menstruation from the graph e.g. builds up the cell lining of the uterus • A simple explanation of the effect of progesterone on the cells of the womb during menstruation from the graph e.g. maintains the cell lining of the uterus
			Total	10	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
7			[Level 3] Answer gives a full description of the effect of plant hormone and correctly works out the concentration of the plant hormone solution. (5 – 6 marks) [Level 2] Answer includes a correct statement about the effect of plant hormone and correctly measures the stem. or gives a full description of the effect of plant hormone or correctly works out the concentration of the plant hormone solution. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] Answer includes a correct statement about the effect of plant hormone or correctly measures the stem. (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	This question is targeted up to grade E Indicative scientific points about the effect of plant hormone may include: • The plant hormone causes the stem to get longer • Increasing concentration of hormone causes greater elongation • At higher concentrations any increase in concentration has not further effect on growth • Reference to maximum percentage concentration or length Indicative scientific points about the piece include: • The length is 20mm • This would be caused by a concentration of 3 parts per million allow concentration in range 2.5 – 3.5 ppm Use the L1, L2, L3 annotations in Scoris; do not use ticks.
			Total	6	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
8			[Level 3] gives an explanation of the effect of plant hormone AND correctly works out the concentration of the plant hormone solution. (5 – 6 marks) [Level 2] correctly works out the concentration of the plant hormone solution OR gives an explanation of the effect of plant hormone AND makes a partial attempt at working out the concentration of the plant hormone solution Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] gives an explanation of the effect of plant hormone OR makes a partial attempt at working out the concentration of the plant hormone solution (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	This question is targeted up to grade A* Indicative scientific points about explaining the effect of plant hormone may include: • The plant hormone causes growth / stem gets longer / stem now 25mm • This is due to promoting cell elongation • as concentration of hormone increases so does % change in length Indicative scientific points about the piece include: • Calculation to show that this is a 5mm increase • This corresponds to a 25% (increase) • This must have been caused by a plant hormone concentration of 28 (parts per million) Use the L1, L2, L3 annotations in Scoris; do not use ticks.
			Total	6	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
9	[Level 3] Makes more than two comparison between the two graphs AND explains in detail how the pill prevents pregnancy Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] Makes at least two comparison between the two graphs AND attempts to explains in detail how the pill prevents pregnancy Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] Makes at least one comparisons between the two graphs and one simple explanation of how pill works OR Attempts to explains in detail how the pill prevents pregnancy Quality of written communication impedes communication of the science at this level. (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	This question is targeted at grades up to A* Indicative scientific points that may be included detailed explanation - the pill prevents the release of FSH - FSH needed for egg development / no egg development as no or low levels of FSH - the pill or lack of FSH prevents the release of LH - LH controls ovulation / no ovulation as no or low levels of LH - idea that oestrogen peak needed for ovulation / as there is no oestrogen peak there is no ovulation ignore reference to uterus wall if no other explanation for FSH and LH identified then allow FSH and LH are needed for egg development and ovulation as a single detailed explanation simple explanation - pill mimics pregnancy - pill prevents ovulation / no egg develops/ no egg released comparing the graphs - FSH constant in graph B / peaks in A - FSH levels low or no FSH in graph B / high in graph A - LH constant in graph B / peaks in A - LH levels low or no LH in graph B / high in graph A progesterone rises remains high then falls in B / fluctuates in A /progesterone level in B constant / varies in A /progesterone levels high in graph B / low in A oestrogen constant in B / fluctuates in A / oestrogen no peak in B / has (two) peaks in A allow pill for graph B and 'normal' for graph A Use the L1, L2, L3 annotations in Scoris; do not use ticks.

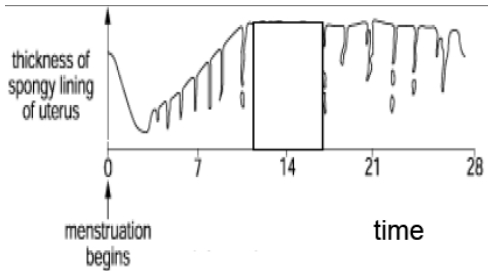
Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
			Total	6	
10			C ✓	1 (AO 2.2)	<u>Examiner's Comments</u> The question assessed understanding of results from practical experiments on phototropism and the way light affects the tip of a growing shoot. Most candidates made a choice between A and D. Clearly there is a misconception that plants will show phototropic responses even when the tip is covered. Alternatively, they may have misunderstood the purpose of the light-proof cap. This could be used as a focus when teaching about phototropism.
			Total	1	
11			C ✓	1 (AO 1.1)	
			Total	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
12	a		in the blood(stream)✓	1 (AO 1.1)	<u>Examiner's Comments</u> The question assessed AO1.1 recall of hormone transport. Although candidates generally answered this successfully, some did not gain marks because their response was a specific blood cell either red or, in some cases, white. Clear misunderstanding was demonstrated by candidates whose response referred to the nervous system.
	b		brain✓ egg✓ oestrogen✓ progesterone✓	4 (AO 4 x 1.1)	ALLOW estrogen <u>Examiner's Comments</u> Here AO1.1 recall was assessed for the role of hormones in the menstrual cycle. Most candidates gained one mark for the egg. Some also identified the brain and some got all four marks. However, occasionally candidates unfortunately got the two hormones the wrong way around.

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
	c	i	letter E marked on day 14✓	1 (AO 2.1)	 21400032 tolerance area inside white box Examiner's Comments Candidates had to apply their knowledge to the diagram. Many candidates gained credit within the tolerance limits. However, there were many no responses, and this is something that candidates should avoid on this type of question.  Examination technique should encourage them to put the letter somewhere on the diagram, even if they are not sure of the correct response.
		ii	lining breaks down / is shed✓	1 (AO 1.1)	ALLOW menstruation / a period occurs ALLOW unthickens/thickness reduces/gets thinner/decreases Examiner's Comments This AO1.1 question assessed recall of events during the menstrual cycle. Candidates generally answered this question successfully.

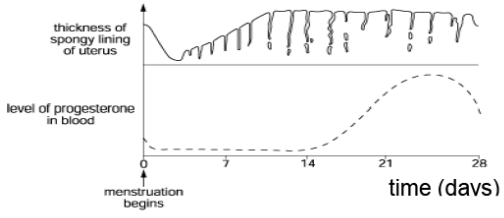
Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
	d	mark scheme for guidance on how to mark this question. Level 3 (5–6 marks) Applies knowledge of hormonal and one non-hormonal method of contraception. AND Interprets data to explain more than one difference in effectiveness between hormonal and non-hormonal contraceptives. AND Makes at least one judgement to explain why the pill is a popular method of contraception. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i> Level 2 (3–4 marks) Any two of: Applies knowledge of hormonal and one non-hormonal method of contraception. OR Interprets data to explain one difference in effectiveness between hormonal and non-hormonal contraceptives. OR Makes at least one judgement to explain why the pill is a popular method of contraception. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i> Level 1 (1–2 marks) Applies knowledge of at least one hormonal and one non-hormonal method of contraception. OR Interprets data to explain at least one difference in effectiveness between hormonal and non-hormonal contraceptives. OR Makes at least one judgement to explain why the pill is a popular method of contraception.	6 (AO 2 x 2.1) (AO 2 x 3.1a) (AO 2 x 3.2a)	AO2.1 Apply knowledge and understanding of methods of contraception. • Sterilisation prevents the release of sperm • Hormonal methods prevent ovulation • Diaphragm / condom prevent sperm meeting egg / are barrier methods AO3.1a Analyse information and ideas to interpret the data to explain differences between effectiveness of contraceptives. • hormonal methods more reliable than non-hormonal barrier methods • due to (named) hormonal methods being easy to use/less awkward in use • (named) non-hormonal barrier methods less reliable as awkward in use • non-hormonal methods show more variation in reliability AO3.2a Analyse information and ideas to make judgements to explain why the pill is a popular method. • pill is easier to use than the patch/injectable so preferable to the safer injection • much more reliable than condom/diaphragm but easier to reverse decision than sterilisation <u>Examiner's Comments</u> This Level of Response question assessed application, AO2, and analysing information, interpreting and forming judgements, AO3. To be successful in this question it was important that candidates gave a balanced response that covered all assessment objectives. Candidates were able to demonstrate some understanding of the types of contraception. Many were able to justify the use of the pill as a hormonal method that was relatively easy to use compared to other forms of

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
			<i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i> 0 marks <i>No response or no response worthy of credit.</i>		hormonal contraception. Some candidates understood how hormonal methods worked and others knew the action of non-hormonal barrier methods, but it was very rare to see candidates who described the action of both hormonal and non-hormonal methods. The most common error in interpreting the data in the table was to assume the one with the highest number was the most reliable. Where candidates were awarded Level 2, this was usually because they had analysed and interpreted the data in the table and used this to form a judgement as to why the pill was a popular method of contraception.
			Total	13	
13			B ✓	1 (AO 1.2)	
			Total	1	
14			D ✓	1 (AO 2.1)	
			Total	1	
15			A ✓	1 (AO 1.1)	
			Total	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
16	a		adrenaline reduces blood flow to the skin ✓ less blood lost (during time to clot/receive medical treatment) ✓	3 (AO 1.1) (AO 2.1)	ALLOW causes vasoconstriction in skin IGNORE stops bleeding <u>Examiner's Comments</u> Very few candidates appreciated that adrenaline would reduce the blood flow to the skin. Many assumed that it would simply increase heart rate and that this would somehow make the blood more likely to clot at the wound.
	b	i	corpus luteum / (empty) follicle / yellow body ✓	1 (AO 1.1)	<u>Examiner's Comments</u> There were a number of correct references to corpus luteum, yellow body or empty follicle.
		ii	smooth curve drawn rising and falling ✓ fall must start on day 21 or after ✓	2 (AO 2 × 1.1)	 if no fall in progesterone then award 0 marks <u>Examiner's Comments</u> Most candidates correctly appreciated that the line should increase, plateau and then fall.
	c	i	First check answer on answer line If answer = 19.98 (mm) award 3 marks 20 - 0.025 ✓ but 19.975 (mm) ✓ 19.98 (mm) ✓	3 (AO 2 × 2.2) (AO 1.2)	<u>Examiner's Comments</u> The manipulation of standard form was often correct in this question.

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
		ii	lining is not repaired correctly✓	1 (AO 1.1)	ALLOW lining will not thicken / not build up IGNORE lining will not be maintained / will become thinner <u>Examiner's Comments</u> There was some confusion in the answers between the roles of progesterone and oestrogen. Common incorrect answers referred to the breaking down of the uterus lining.
		iii	Any three from: gonadotrophins used✓ FSH and LH used✓ FSH lead to ripening of follicle✓ and LH causes ovulation✓ human chorionic gonadotrophin✓ causes egg/ovum to mature inside follicle✓	3 (AO 3 × 1.1)	ALLOW stimulate egg production/development <u>Examiner's Comments</u> Candidates often gave the hormones that might be given to women to treat infertility, i.e. LH and FSH but did not specifically link them to their function. This is illustrated in exemplar 7, which would only gain one mark for naming the two hormones. Exemplar 7 (iii) Explain how <u>hormones can be used to treat infertility in women</u>. Drugs with <u>menstrual hormones</u> in - eg. FSH and LH ✓ complete negative feedback to produce more oestrogen and increase the number of eggs matured & developed. [3]

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
		iv	order of bases is changed (in gene)✓ order of amino acids changed in protein / change in shape of the enzyme✓	2 (AO 1.1) (AO 2.1)	ALLOW nucleotides ALLOW mutation in base sequence ALLOW different amino acids in protein IGNORE codes for wrong amino acid to be made <u>Examiner's Comments</u> Many candidates correctly linked changes in the DNA base sequence to alterations in the amino acids in the protein or the shape of the protein molecule.
			Total	14	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
17	a		flower opening ✓ germination ✓ shedding of leaves ✓	3 (AO 1.1)	<u>Examiner's Comments</u> This AO1.1 question rarely scored full marks. Often candidates scored 1 or sometimes 2 marks but there was no obvious pattern to which ones they got correct.
	b	i	plant B has grown in the direction of/towards the light source ✓ tropic response is positive ✓	2 (AO 3.1a)	ALLOW in plant A it is still showing phototropism to the light source above IGNORE movement ALLOW positive phototropism is correct <u>Examiner's Comments</u> This AO3.1 question did see most candidates score at least 1 mark. This was identifying that the sister had said it was 'positive'. Candidates sometimes did not gain credit on the first marking point because they did not give any indication it was growth of the plant to the light source.
		ii	auxin ✓	1 (AO 1.1)	ALLOW IAA/indole acetic acid <u>Examiner's Comments</u> Again, this AO1.1 recall question was reasonably well answered, although there was some confusion with some candidates putting insulin.
	c	i	FSH ✓ follicle ✓ progesterone ✓	3 (AO 1.1)	<u>Examiner's Comments</u> This AO1.1 recall question discriminated well, and a full range of responses were seen. The most common correct response where only 1 mark was scored was progesterone. Fetus rather than follicle was seen quite often.

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
		ii	Days 3 – 6 ✓	1 (AO 2.2)	<u>Examiner's Comments</u> This AO2.2 question testing mathematical skills did gain credit with higher ability candidates. The most common incorrect answer was 4-7 days.
	d		Any three from: mitosis ✓ DNA replicates ✓ chromosomes separate ✓ cells divide into two new cells ✓ cells grow ✓	3 (AO 1.1)	ALLOW chromosomes are copied ALLOW DNA duplicates/doubles ALLOW (identical) daughter cells produced each with own copy of chromosomes ALLOW cell splits into two <u>Examiner's Comments</u> A large number of candidates found this AO1.1 question about cell division challenging and did not identify it as asking about how new cells are made, so did not make the link to cell division. Many described how the menstrual cycle was controlled by hormones and how they affected the thickness of the lining. There were some very good responses from those candidates that recognised this was about cell division but some mentioned meiosis rather than mitosis.
			Total	13	
18			C	1 (AO 1.1)	
			Total	1	
19			B	1 (AO 2.1)	<u>Examiner's Comments</u> Many candidates chose distractors C or D as their answers.
			Total	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
20	a	i	progesterone ✓	1 (AO 2.1)	
		ii	any two from oestrogen / FSH / LH ✓	1 (AO 1.1)	
	b		Any four from: treatment contains oestrogen / progesterone / both oestrogen and progesterone ✓ inhibits LH ✓ prevents ovulation ✓ inhibits FSH ✓ prevents egg maturing ✓ thickens mucus ✓	4 (AO 1.1)	ALLOW inhibits LH which controls ovulation = 2 marks ALLOW inhibits FSH which matures eggs = 2 marks ALLOW produces mucus <u>Examiner's Comments</u> A small number of candidates confused fertility treatment with contraception and so referred to the use of FSH or LH. However, the majority could correctly explain why oestrogen and/or progesterone were used.
	c		gibberellins breaks seed dormancy / elongation of shoots ✓ ethene stimulates fruit ripening ✓	2 (AO 1.1)	ALLOW stimulates flowering / fruit development / fruit growth / seed formation / germination / growth of shoots DO NOT ALLOW fruit ripening ALLOW dropping of leaves/fruit / stimulates fruit maturation <u>Examiner's Comments</u> Many answers correctly referred to the action of gibberellins in breaking seed dormancy and the action of ethene in controlling fruit ripening. A number of marks were lost through inaccurate answers such as the 'control of plant ripening'.
			Total	8	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
21			B ✓	1 (AO2.1)	
			Total	1	
22			B ✓	1 (AO2.1)	
			Total	1	
23			B ✓	1 (AO2.1)	
			Total	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
24	a	i	Any two from: contains (plant) hormones ✓ causes excessive/rapid cell elongation/growth ✓ only affects broadleaved plants ✓	2 (AO2 x 1.1)	ALLOW auxins IGNORE just plants grow faster ALLOW effects some plants/weeds and not others/the crop
		ii	B because B causes highest percentage death of horsenettle ✓ A/C do not kill other broadleaved plants/weeds / A/C not suitable as field contains other weeds / A/C only kills horsenettle ✓ D does not kill roots / much less effective at killing horsenettle ✓ Spring treatment because buds just growing and flowering yet to happen ✓	4 (AO3.1b)	No mark for B on its own. NEED a choice of B or D to score any marks Mark first choice Need reference to both buds and flowering ALLOW D for three marks if B is not chosen first: because D kills more species of weeds ✓ D much cheaper than B ✓ spring treatment because buds just growing and flowering yet to happen ✓
	b	i	breaks seed dormancy / elongation of shoots ✓	1 (AO1.1)	ALLOW (stimulates) flowering/ fruit development / fruit growth / seed formation / germination / growth of shoots / seedless fruits DO NOT ALLOW fruit ripening / seed growth
		ii	Idea that the ripeness colour scale can be used for comparison ✓ idea that a numerical estimate/quantitative measure for level of ripeness is better / idea that it gives multiple measures and not just two/ripe or unripe / removes objectivity / allows reproducibility ✓	2 (AO2 x 3.3a)	ALLOW can be used to choose from a selection of ripeness levels

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
			Total	9	