

A-Level Edexcel

BIOLOGY

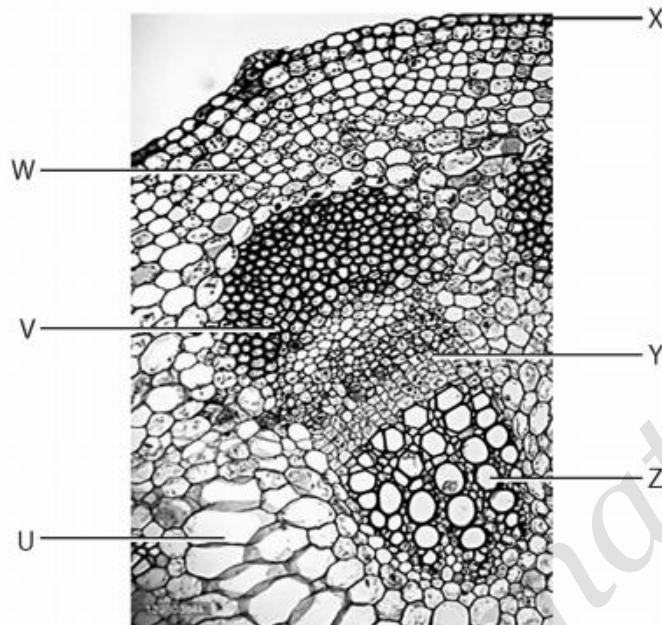
UNIT 2(IAL)
2019 — 2023

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1 - ((WBI11)/2(IAL)_Summer_2019_Q1) - Cells, Development, Biodiversity And Conservation

Mineral ions are transported by xylem vessels.

The photograph shows a section through part of the stem of a plant, as seen using a light microscope.



(a) (i) Which letter identifies a xylem vessel?

(1)

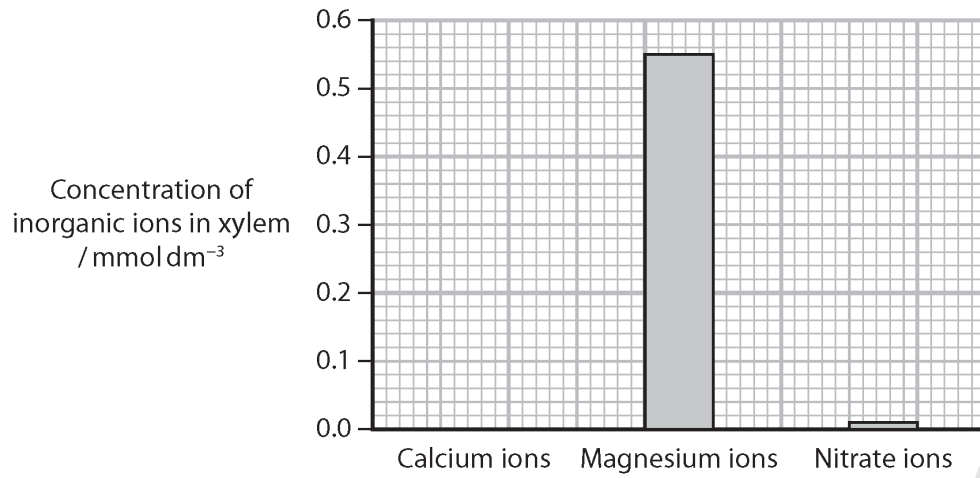
- A W
- B X
- C Y
- D Z

(ii) Which letter identifies a sclerenchyma fibre?

(1)

- A U
- B V
- C W
- D Z

(b) The graph shows the concentrations of three inorganic ions in the xylem of a plant.



(i) The concentration of calcium ions is $0.45 \text{ mmol dm}^{-3}$.

Plot this concentration on the graph.

(1)

(ii) Explain the importance of each of these ions to the plant.

(3)

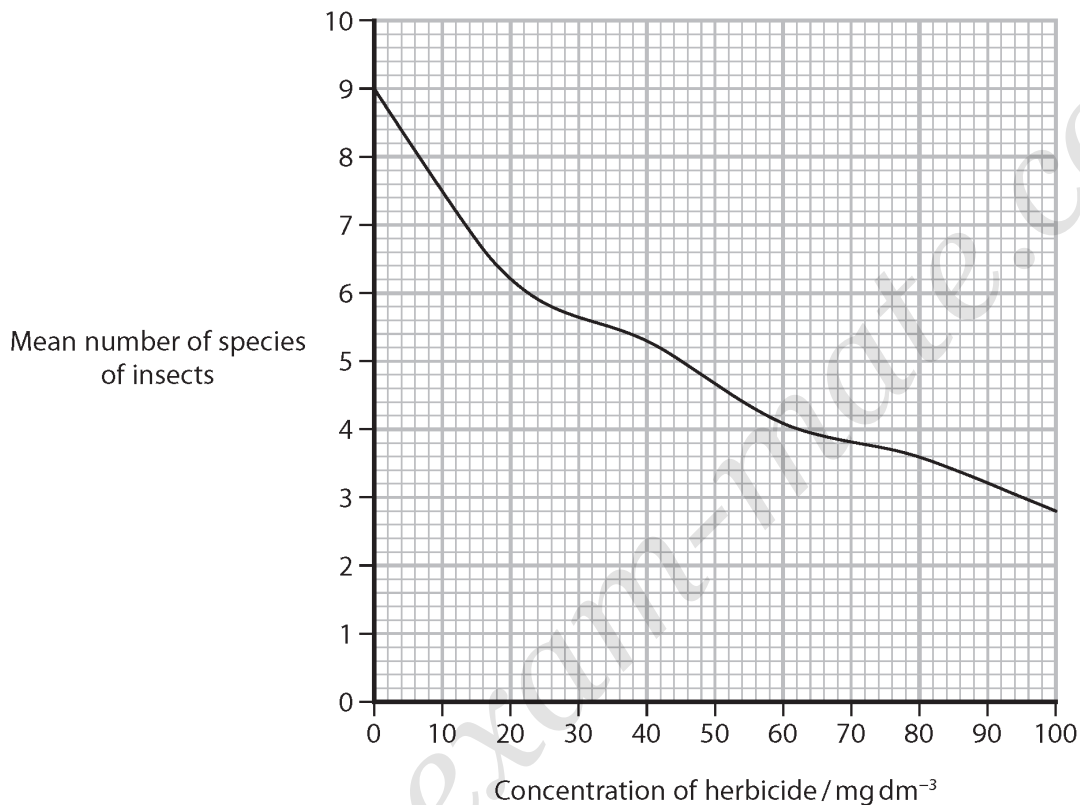
2 - ((WBI11)/2(IAL)_Summer_2019_Q2) - Cells, Development, Biodiversity And Conservation

Farmers sometimes spray herbicides on their fields. Herbicides kill plants that the farmer does not want to grow.

The effect of the concentration of herbicide on the number of species of insects in three fields was investigated.

The mean number of species for the three fields was calculated.

The graph shows the results of this investigation.



(a) State what is meant by the term species.

(1)

(b) Explain the relationship between the concentration of herbicide and the mean number of species of insects in the three fields.

Use the information in the graph to support your answer.

(4)

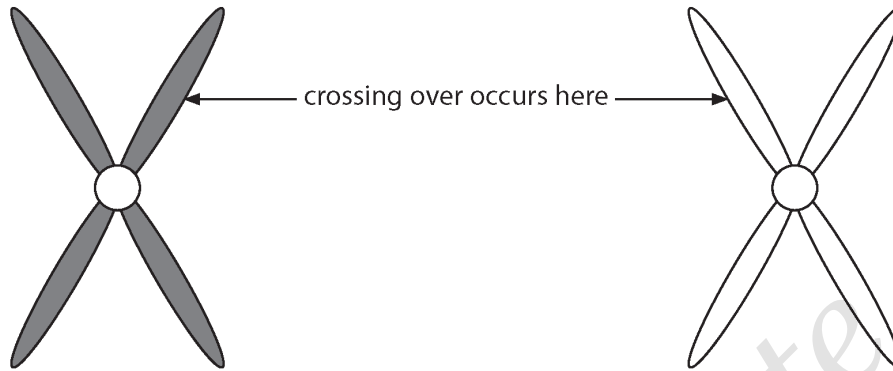
3 - ((WBI11)/2(IAL)_Summer_2019_Q3) - Cells, Development, Biodiversity And Conservation

Meiosis and mitosis are involved in cell division.

(a) Meiosis produces gametes that are genetically different.

Crossing over is important to increase genetic variation.

The diagram shows one pair of homologous chromosomes during early meiosis.



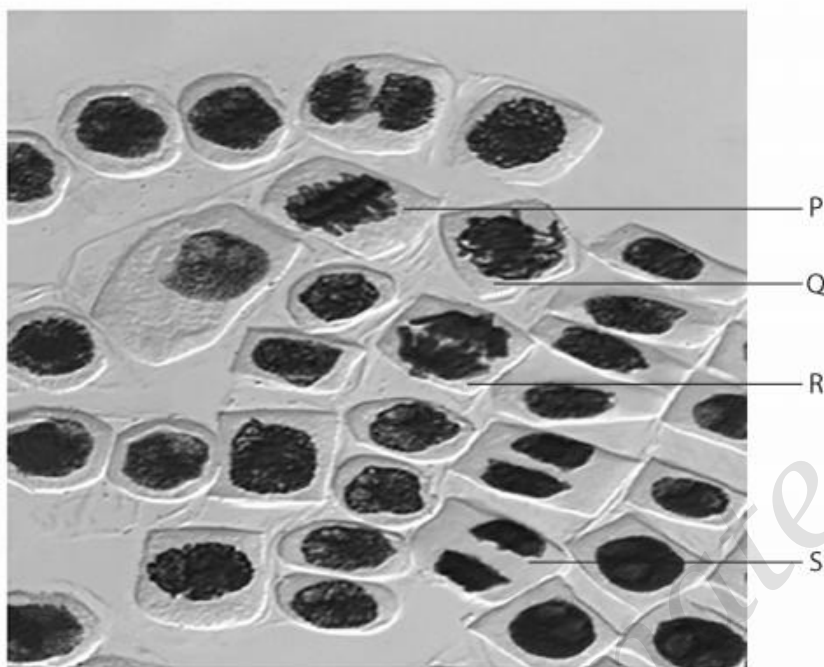
Complete the diagram below to show these chromosomes after crossing over has occurred.

(2)



(b) The photograph shows some cells undergoing mitosis.

Each labelled cell is in a different stage of mitosis.



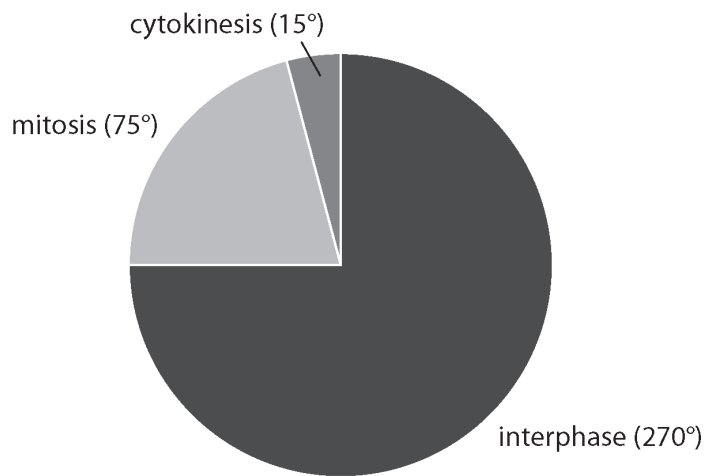
(i) Which cell is in prophase?

- A P
- B Q
- C R
- D S

(1)

(ii) In some embryo cells, interphase can last an average of nine hours.

The diagram shows the relative proportions of time spent in each part of the cell cycle.



Calculate how long cytokinesis would take in these embryo cells.

(1)

Answer hours

(iii) Calculate the total number of cells resulting from one cell dividing by mitosis eight times.

(1)

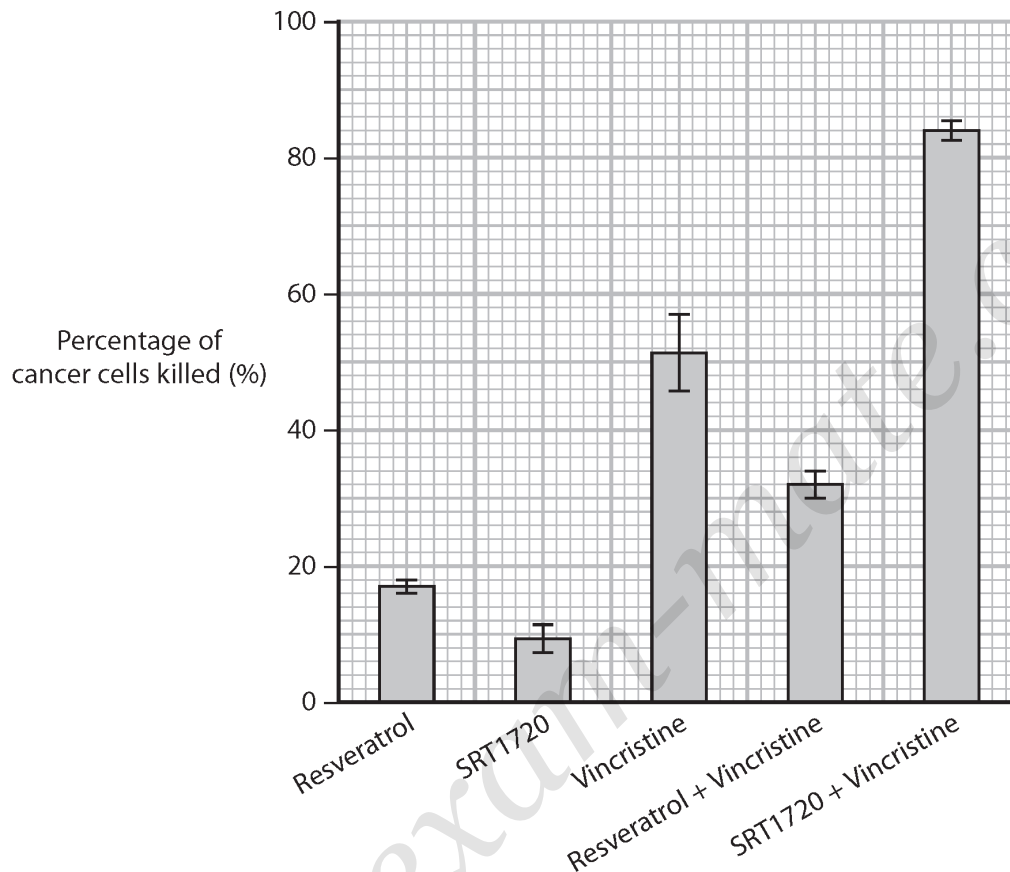
Answer

(c) Ewing's sarcoma is a type of cancer.

Resveratrol, SRT1720 and Vincristine are drugs used to kill cancer cells.

An investigation was carried out to determine the most effective treatment for patients with Ewing's sarcoma.

The graph shows the results of this investigation.



(i) Vincristine prevents spindle fibres from shortening during mitosis. This leads to the death of the cell.

At which stage of mitosis do the spindle fibres contract?

(1)

- A anaphase
- B metaphase
- C prophase
- D telophase

(ii) Evaluate the effectiveness of the three drugs used in this investigation.

Use the information in the graph to support your answer.

(4)

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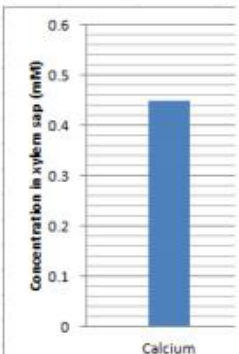
ANSWERS

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1 - ((WBI11)/2(IAL)_Summer_2019_Q1) - Cells, Development, Biodiversity And Conservation

Question Number	Answer	Mark
(a)(i)	The only correct answer is D Z <i>A is incorrect because it is not a xylem vessel</i> <i>B is incorrect because it is not a xylem vessel</i> <i>C is incorrect because it is not a xylem vessel</i>	(1)

Question Number	Answer	Mark
(a)(ii)	The only correct answer is B V <i>A is incorrect because it is not a sclerenchyma fibre</i> <i>C is incorrect because it is not a sclerenchyma fibre</i> <i>D is incorrect because it is a xylem vessel</i>	(1)

Question Number	Answer	Additional guidance	Mark
(b)(i)	An answer showing: 	Plotted top of the bar must not touch a printed grid line above or below 0.45 IGNORE the width of the bar	(1)

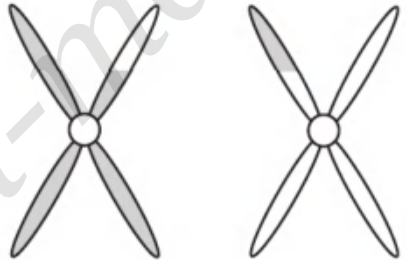
Question Number	Answer	Additional guidance	Mark
(b)(ii)	An explanation that includes the following points: <ul style="list-style-type: none"> calcium ions to make calcium pectate to {hold cells together / increase cell wall stability / form middle lamella} (1) magnesium ions to make chlorophyll so {photosynthesis can occur / light energy can be absorbed / glucose can be made} (1) nitrates are needed to make {amino acids / proteins / polypeptides / DNA / RNA / nucleic acid} (1) 	Accept calcium ions to make calcium pectate to increase cell wall strength Ignore make cell walls Ignore chloroplasts Accept 'sugars'	(3)

2 - ((WBI11)/2(IAL)_Summer_2019_Q2) - Cells, Development, Biodiversity And Conservation

Question Number	Answer	Additional guidance	Mark
(a)	<ul style="list-style-type: none"> (a group of) organisms that are capable of ((inter)breeding / mating / reproducing) and producing fertile offspring (1) 	Do not accept inbreeding Accept 'offspring capable of producing offspring' as equivalent to fertile	(1)

Question Number	Answer	Additional guidance	Mark
(b)	<p>An explanation that includes four of the following points:</p> <ul style="list-style-type: none"> as the concentration of herbicide increases the (mean) number of (insect) species decreases (1) increase of 100 mg dm^{-3} results in a decrease of {6.2 species /68.9%} (1) use of herbicides results in {fewer plant species / reduced plant diversity / reduced food supply (for insects)} (1) {(therefore) some insects (species) {leave habitat / die (from lack of food)} (1) {(fewer plant species results in) fewer habitats for insects (1) 	<p>Ignore converse statement Accept negative correlation</p> <p>Accept other correct reductions</p> <p>Ignore herbicides kill insects</p> <p>Accept reduced shelter for insects</p>	(4)

3 - ((WBI11)/2(IAL)_Summer_2019_Q3) - Cells, Development, Biodiversity And Conservation

Question Number	Answer	Additional guidance	Mark
(a)	<p>An answer in which:</p> <ul style="list-style-type: none"> crossing over section shaded correctly (1) non crossing over sections shaded correctly (1) 		(2)

Question Number	Answer	Mark
(b)(i)	<p>The only correct answer is B Q</p> <p>A is incorrect because that cell is in metaphase</p> <p>C is incorrect because that cell is in anaphase</p> <p>D is incorrect because that cell is in telophase</p>	(1)

Question Number	Answer	Additional guidance	Mark
(b)(ii)	0.5 / half / ½ (hour)	ALLOW answer 30 minutes if clear	(1)

Question Number	Answer	Additional guidance	Mark
(b)(iii)	256		(1)

Question Number	Answer	Mark
(c)(i)	<p>The only correct answer is A anaphase</p> <p><i>B is incorrect because spindle fibres do not shorten in metaphase</i></p> <p><i>C is incorrect because spindle fibres do not shorten in prophase</i></p> <p><i>D is incorrect because spindle fibres do not shorten in telophase</i></p>	(1)

Question Number	Answer	Additional guidance	Mark
(c)(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> Vincristine is the most effective and SRT1720 is the least effective (when given on their own) (1) Resveratrol reduces the effectiveness of Vincristine / Vincristine increases the effectiveness of Resveratrol (1) SRT1720 increases the effectiveness of Vincristine / Vincristine and SRT1720 is the most effective treatment (tested) (1) comment on variability of data (1) 	<p>Accept description of correct order (V>R>SRT) Ignore drug combinations</p> <p>Accept Resveratrol and Vincristine more effective than Resveratrol by itself / Resveratrol and Vincristine less effective than Vincristine by itself</p> <p>e.g. {range / SD / error} bars do not overlap / size of error bars</p>	(4)