PEARSON EDEXCEL A-LEVEL BIOLOGY B · 9BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 2: CELLS, VIRUSES AND REPRODUCTION OF LIVING THINGS

SEXUAL REPRODUCTION IN PLANTS

SCORE	PERCENTAGE
/30	%

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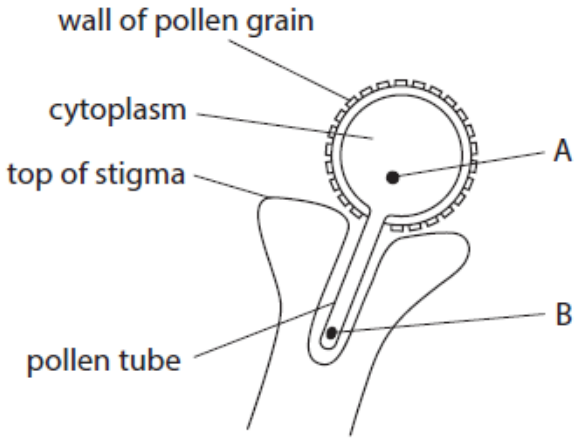
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Q1.

(i) The diagram shows a pollen grain that has begun to germinate after landing on the surface of the stigma of a flower.



Identify the structures labelled A and B.

(2)

A .....

B .....

(ii) Describe the process of double fertilisation in flowering plants.

(3)

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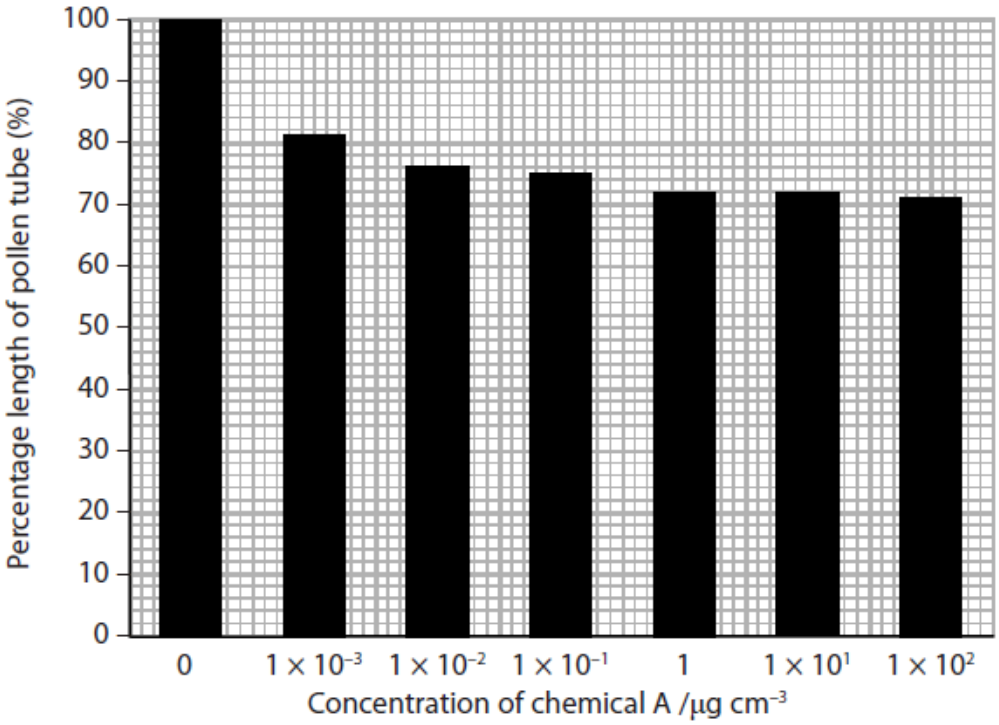
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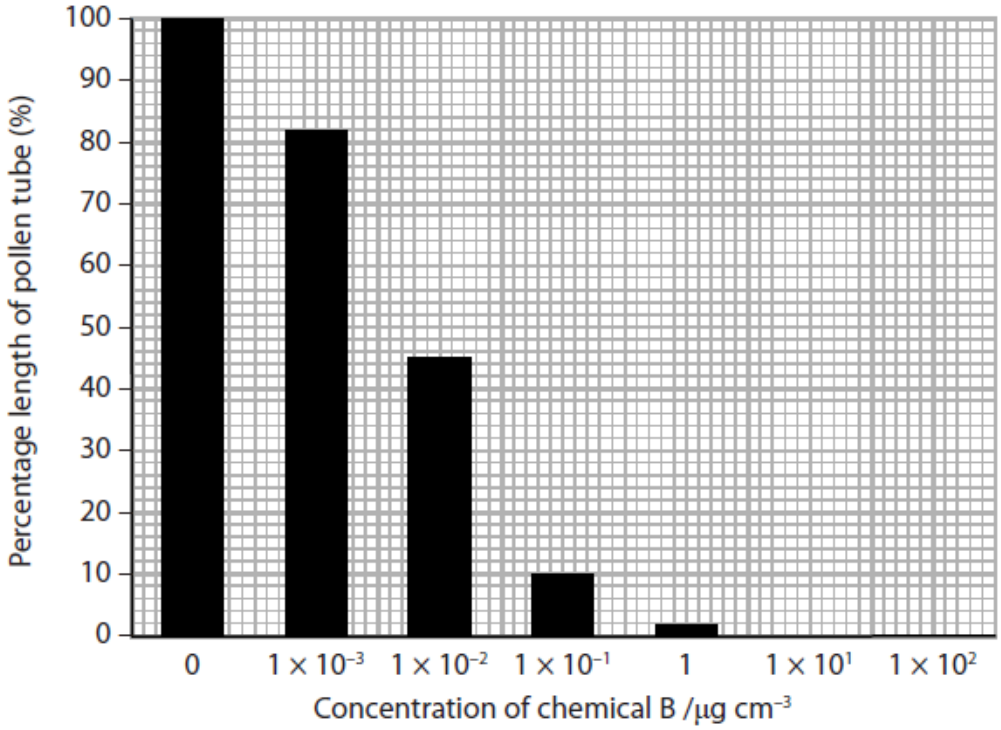
(Total for question = 5 marks)

Q2.

In flowering plants, pollen grains grow pollen tubes that are involved in fertilisation, producing a zygote and endosperm.

A scientist investigated the effects of chemical A and chemical B on pollen tube growth.
Chemical A prevents transcription.
Chemical B prevents translation.
Pollen grains were treated with different concentrations of these two chemicals.
The lengths of the pollen tubes they produced were compared with a control group of pollen grains.
The lengths of the pollen tubes were measured and expressed as a percentage of the control group.
The results are shown in the graphs.





(i) The mean length of the pollen tubes in the control group was 7.5 mm.

Calculate the mean length of the pollen tubes after adding 0.010 µg cm^{-3} of chemical A.

(2)

Answer .....

(ii) Analyse the data to comment on the effects of chemical A and chemical B on the roles of transcription and translation in pollen tube growth.

(4)

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(Total for question = 6 marks)

Q3.

Fritillaria delavayi is a small plant (height 7 cm), that grows on rocky slopes on mountains in China.

The image shows *Fritillaria delavayi*.



For at least 2 000 years, this plant has been collected and used in Chinese medicine.
It is not known to be eaten by animals.

In less accessible regions, where few humans go, the plants are bright green with bright yellow flowers.

In locations where bulbs are collected in high numbers, most plants have greyish-brown leaves and flowers.

Scientists believe that the greyish-brown plants are the same species as the brightly-coloured plants.

(i) Describe how scientists can use gel electrophoresis to show that these plants belong to the same species.

(4)

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(ii) Explain why the features of the brightly-coloured plants enable them to grow successfully in the areas where they are not collected by humans.

(2)

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(Total for question = 6 marks)

Q4.

In flowering plants, pollen grains grow pollen tubes that are involved in fertilisation, producing a zygote and endosperm.

(i) Which row of the table shows the correct description for these nuclei?

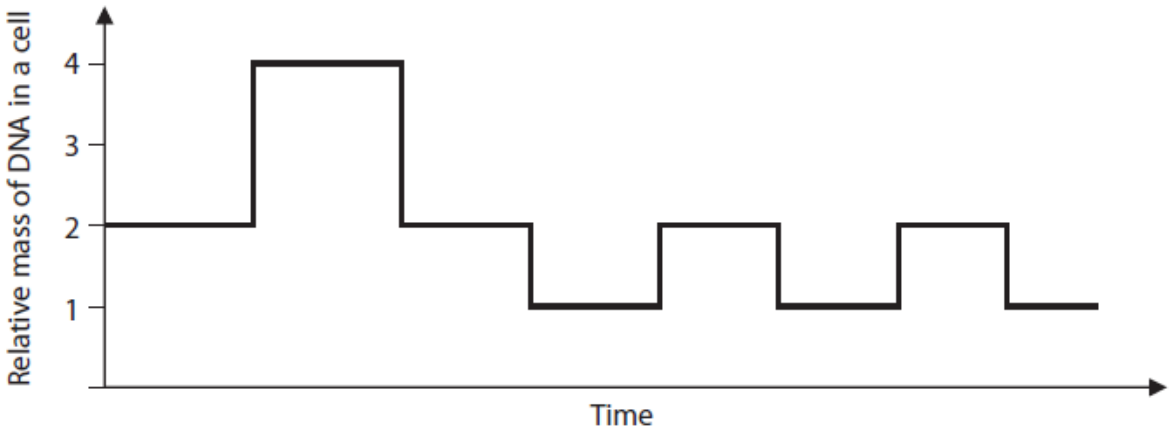
(1)

	Zygote nucleus	Endosperm nucleus	Pollen tube nucleus
☒ **A**	diploid	diploid	haploid
☒ **B**	diploid	triploid	haploid
☒ **C**	diploid	triploid	diploid
☒ **D**	haploid	triploid	diploid

(ii) The production of plant cell gametes involves both mitosis and meiosis.

The graph shows the DNA content of a cell during the production of a pollen grain.

(1)



The order of nuclear divisions shown in the graph is

☒ **A** meiosis, mitosis, mitosis

☒ **B** meiosis, mitosis, meiosis

☒ **C** mitosis, meiosis, meiosis

☒ **D** mitosis, mitosis, meiosis

(Total for question = 2 marks)

Q5.

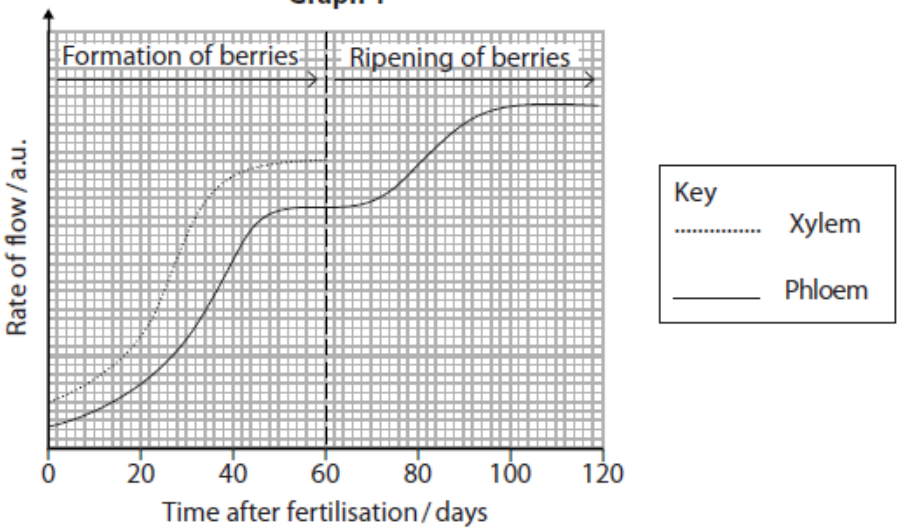
Xylem and phloem are involved in transport in plants.

* Double fertilisation in some plants leads to the development of fruits, such as berries.

In an investigation, the rate of flow in xylem during the formation of berries was measured. The rate of flow in the phloem during the formation and ripening of the berries was also measured.

The results are shown in graph 1.

Graph 1



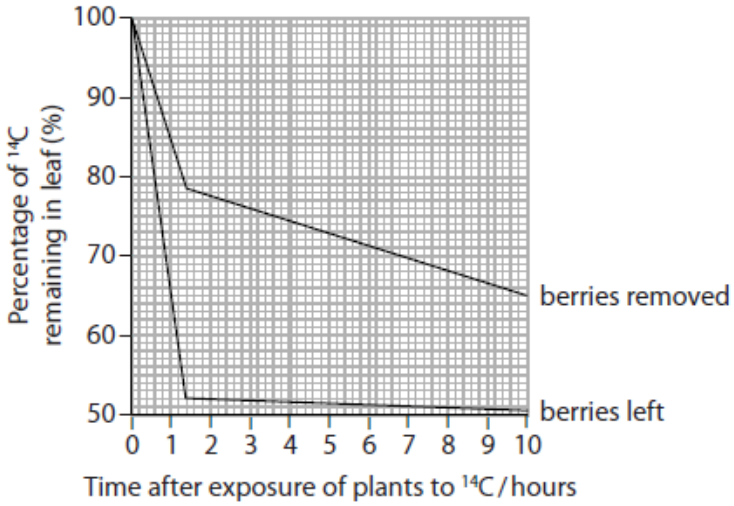
In a second investigation, two plants with berries were exposed to radioactive carbon dioxide (^{14}C).

After exposure to ^{14}C, the berries were removed from one plant and left on the second plant.

The percentage of ^{14}C remaining in the leaves of each plant was determined during the next 10 hours.

The results are shown in graph 2.

Graph 2



Analyse the data to explain the role of double fertilisation, xylem and phloem in the development of the berries.

(6)

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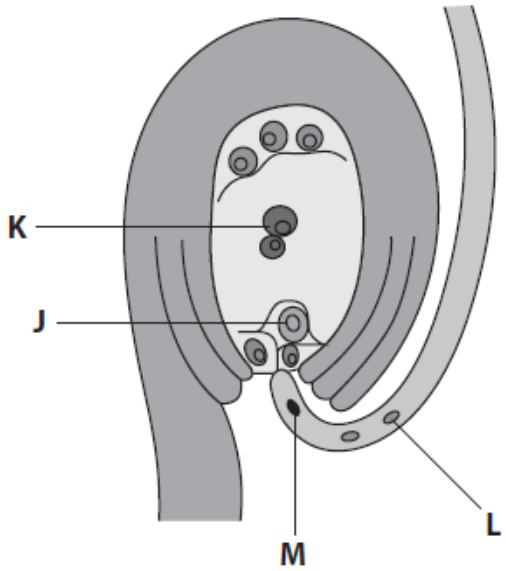
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(Total for question = 6 marks)

Q6.

The diagram shows a pollen tube entering the embryo sac of a flowering plant.



Complete the table to give the name of each labelled structure and the number of sets of chromosomes that each structure contains.

(4)

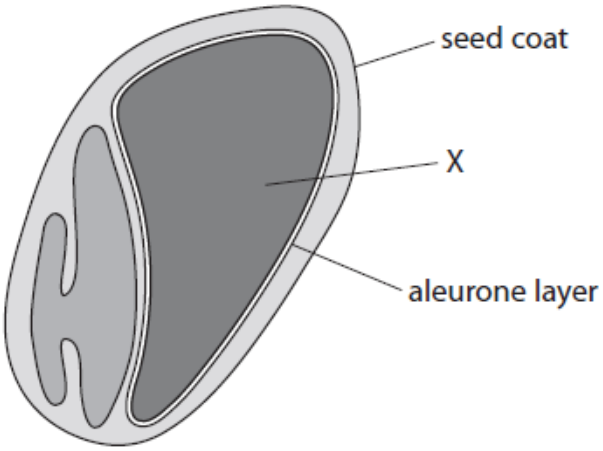
Structure	Name of structure	Number of sets of chromosomes
J		
K		
L		
M		

(Total for question = 4 marks)

Q7.

Gibberellin stimulates cells in the aleurone layer of cereal grains, such as barley, to produce the enzyme amylase.

The diagram shows the location of the aleurone layer in a barley grain.



The part labelled X contains triploid cells.

Name the part labelled X.

(1)

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