

9.4 Reproduction in Plants

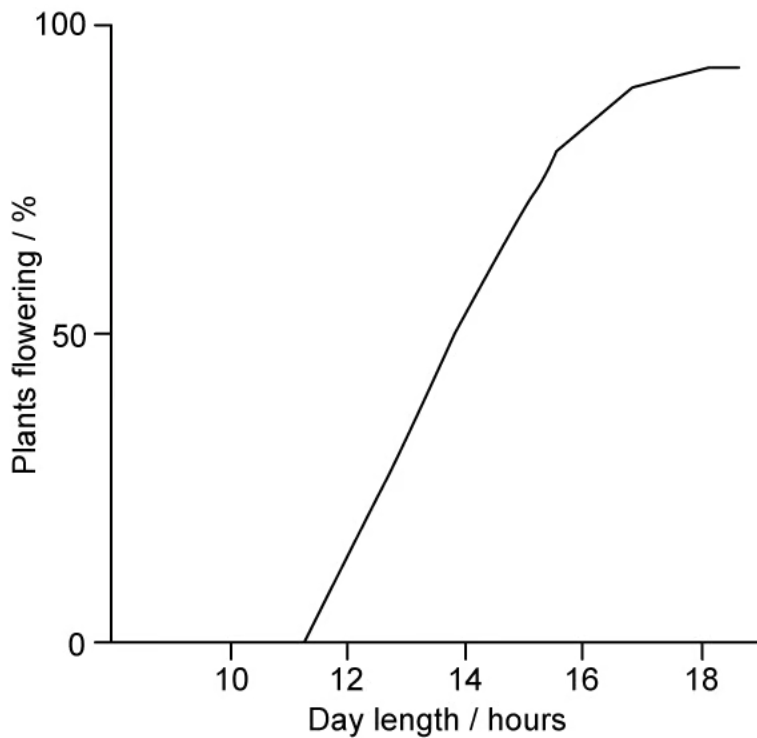
Question Paper

Course	DP IB Biology
Section	9. Plant Biology (HL Only)
Topic	9.4 Reproduction in Plants
Difficulty	Hard

Time allowed: 10
Score: /5
Percentage: /100

Question 1

The graph below shows plant flowering at different day lengths in a species of plant.



Which of the following provides the most accurate explanation of the data?

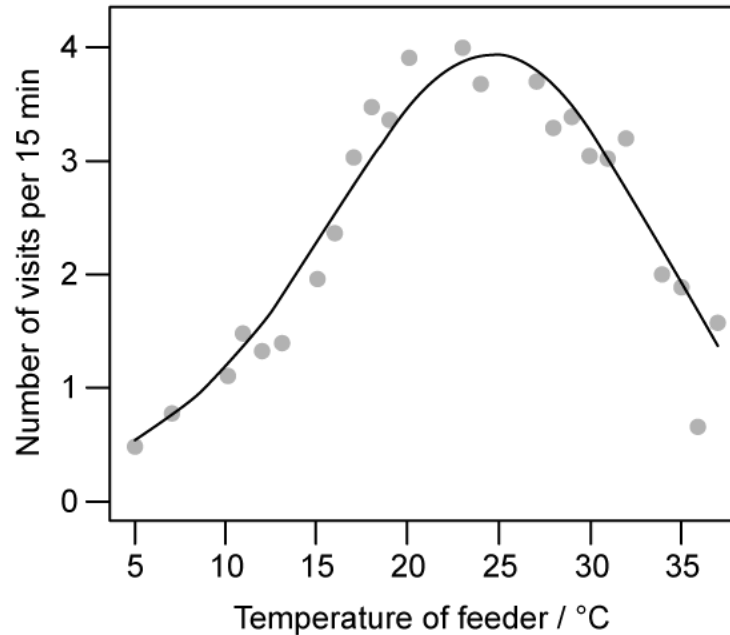
- A. This is a short day plant and high levels of P_{FR} that are generated when days are long activate flowering.
- B. This is a long day plant and high levels of P_R that are generated when days are long activate flowering.
- C. This is a long day plant and high levels of P_{FR} that are generated when days are long activate flowering.
- D. This is a long day plant and low levels of P_{FR} that are generated when days are short activate flowering.

[1 mark]

Question 2

Scientists investigated the effect of temperature on the activity of pollinators. Feeders containing a sucrose solution representing nectar were kept at different temperatures. These feeders were exposed to pollinators and the number of visits each feeder received was recorded.

The results are shown in the graph below.



Which of the following is a correct statement based on the results above?

- A. Pollinator visits per 15 mins increase as temperatures increase up to 25 °C and then visits decrease again.
- B. Global warming will cause a decrease in pollinator activity.
- C. At temperatures between 0 and 25 °C, there are always more pollinator visits at higher temperatures.
- D. Increased temperatures cause an increase in pollinator visits between 0 and 25 °C.

[1 mark]

Question 3

The following steps describe the role of gibberellin in seed germination.

- I. Maltose is converted into sucrose and glucose for transport in the germinating seed.
- II. Several genes are expressed that code for a series of enzymes.
- III. Gibberellin is produced, influencing growth and enzyme production in the embryo.
- IV. These products are used to produce ATP and to build up the tissues of the growing plant.
- V. Amylase breaks down insoluble starch within the food stores of the germinating seed.

Which of the following represents the correct sequence of these steps?

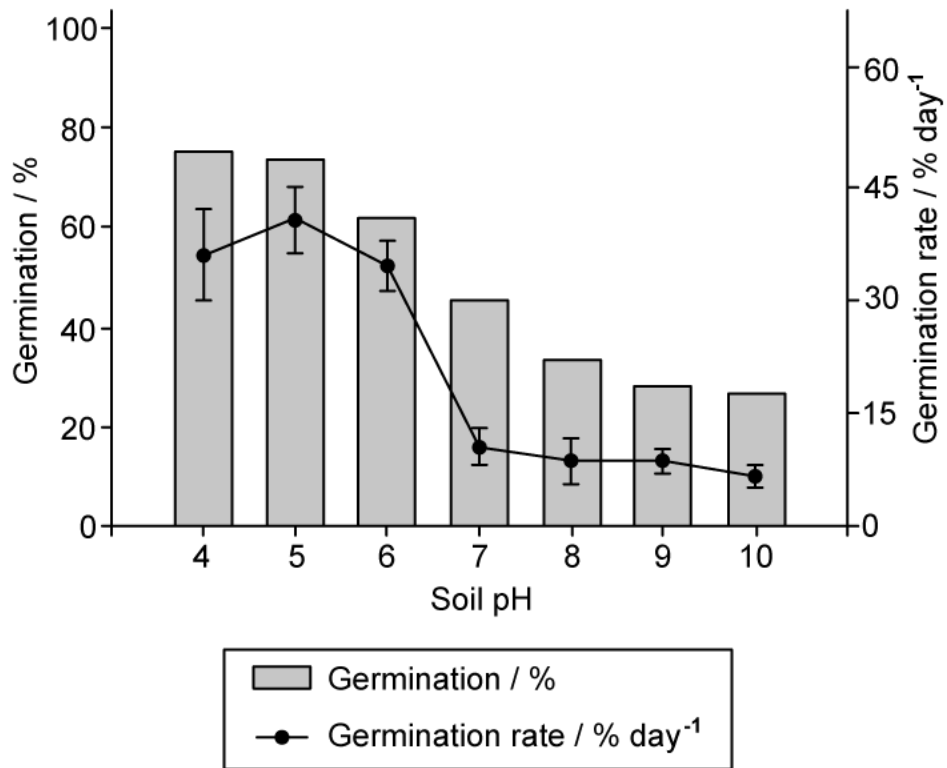
- A. III → II → V → I → IV
- B. II → III → V → I → IV
- C. II → V → I → IV → III
- D. V → I → IV → II → III

[1 mark]

Question 4

An investigation was carried out into the effect of pH on the germination of seeds of a species of plant. Scientists calculated the number of germinated seeds as a percentage of the total number of seeds planted at each soil pH value. To determine the germination rate the germination percentage for each pH value was divided by the number of days over which newly germinated seeds were observed during the investigation. Note that the error bars for germination rate show standard deviation.

The results of the investigation is shown in the graph below.



Which of the following provides the most accurate conclusion for this investigation.

- A. This plant species germinates more successfully in alkaline soil, with most seeds germinating at a pH value of 4.
- B. This plant species germinates more successfully in acidic soil, with most seeds germinating at a pH of 5.
- C. This plant species does not have a high rate of germination in alkaline soil, with a significant decrease in the percentage of seeds that germinated daily above a pH value of 7.
- D. This plant species showed the highest germination success in acidic soils, with most seeds germinating at a pH of 4.

[1 mark]

Question 5

Which of the following statements relating to phytochrome in flowering plants are **not** correct?

- I. P_{FR} is converted to P_R when it absorbs red light of wavelength 660 nm.
- II. P_{FR} will gradually convert back into P_R in the absence of sunlight.
- III. During the day levels of P_{FR} will increase and levels of P_R will decrease due to the absorption of light with a wavelength of 730 nm.
- IV. In short day plants the conversion of P_{FR} to P_R means that too few P_{FR} receptors are occupied at the end of a long night to inhibit flowering.
- V. Phytochrome is a pigment found in leaves that can switch between the active form P_R and the inactive form P_{FR} .

- A. I, IV, and V only.
- B. II, IV, and V only.
- C. I, III, and V only.
- D. I, III, and IV only.

[1 mark]