

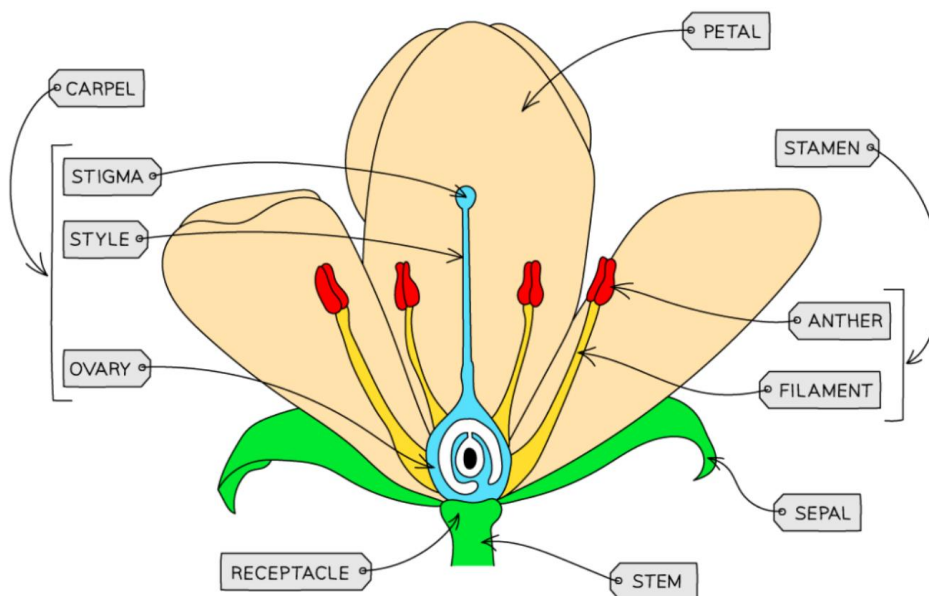
Model Answers: Hard

Q1

The correct answer is **D** because::

- Pollination has taken place as there are **pollen** grains on the tops of the **stigma** and a pollen tub has grown down the **style**.
- Fertilisation hasn't taken place as the **pollen tube** has not connected with the **ovum** and there is no pollen grain nucleus visible in the **ovary**.

This question needs you to study the diagram carefully. Make sure you take time to look through diagrams thoroughly.



Q2

The correct answer is **B** because **germination** is the start of the growth of a seed. Three essential factors are needed for successful germination:

- Water - allows the seed to swell and start growing, provides a solvent for essential nutrients to diffuse around the seed.
- Oxygen - allows for aerobic respiration to release the energy from stored sugars (needed to fuel growth).
- Warmth - germination increases as the temperature increases (up to an optimum temperature), the number of successful collisions between enzymes and substrates increases .

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|--------------------------|---|
| A is incorrect as | the temperature is too low for successful collisions between enzymes and their substrates . |
| C is incorrect as | there is no water for the stored sugars to dissolve in, and the temperature is too low. |
| D is incorrect as | there is no oxygen for aerobic respiration to release energy to fuel growth. |

Q3

The correct answer is **C** because:

- **Ovulation** happens after the LH surge which occurs around day 14 (if day 1 is the first day of a period in a new cycle).
- **Sperm** will survive in a woman's body for 2 -3 days so once the egg is released there may be sperm in the fallopian tube to fertilise the egg.

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|--------------------------|---|
| A is incorrect as | around this time the egg has not been released from the ovary. |
| B is incorrect as | there is no egg released (it will be maturing at this point) and any sperm present at this time are unlikely to survive until the egg is released roughly 4 days later. |
| D is incorrect as | the egg will have died by day 20 so there will be no egg for the sperm to fertilise. |

Q4

The correct answer is **C** because:

- The seedling is tall and green in this sample.
- This shows that the seedling had light as the leaves were photosynthesising.
- The temperature was high enough to allow for enzyme activity.

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|--------------------------|---|
| A is incorrect as | this sample is short and yellow, showing that it was not photosynthesising so grown in the dark and at low temperatures so had a reduced enzyme activity. This would be sample 3. |
| B is incorrect as | this sample is tall and yellow, showing it was grown in the dark but at a higher temperature. This would be sample 1. |
| D is incorrect as | this sample is short and green, showing that it had light but not a high enough temperature for optimum enzyme activity. This would be sample 4. |

Q5

The correct answer is **D** because:

- **Ovulation** takes place generally around day 14 of the menstrual cycle. This is when the lining of the uterus is at its thickest.
- **Progesterone** is produced by the corpus luteum to maintain the lining of the uterus if an egg is fertilised.

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|--------------------------|---|
| A is incorrect as | ovulation takes place at day 14 and 5 days from this would be day 19, the lining of the uterus doesn't get thinner until day 28. |
| B is incorrect as | the uterus lining is at its thickest before the release of progesterone from the ovary (oestrogen promotes thickening of the lining). The lining stays thick until the levels of progesterone fall. |
| C is incorrect as | there is a second increase of oestrogen around day 21 and the lining of the uterus doesn't change. |