

IGCSE • Edexcel • Biology

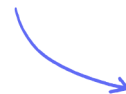
🕒 1 hour ❓ 6 questions

Paper 1 & Paper 2

Reproduction

Sexual & Asexual Reproduction: Differences / Gametes & Fertilisation / Adaptations for Pollination / The Process of Fertilisation in Plants / Practical: Conditions for Germination / Germinating Seeds / Asexual Plant Reproduction / Human Reproductive Systems / Roles of Oestrogen & Progesterone in the Menstrual Cycle / Roles of FSH & LH in the menstrual cycle / Role of the Placenta / Amniotic Fluid / Development of Secondary Sexual Characteristics

Scan here for your answers
or visit [savemyexams.com](https://www.savemyexams.com)



Total Marks

/70

1 (a) Cell division can be by meiosis or by mitosis.

(i) Where are cells dividing by meiosis found in a human?

(1)

- A** kidney
- B** penis
- C** skin
- D** testis

(ii) Which part of a flowering plant is usually used to demonstrate cells dividing by mitosis?

(1)

- A** anther
- B** cotyledon
- C** root tip
- D** xylem

(2 marks)

(b) The table lists features comparing the processes of meiosis and mitosis in human cells. Complete the table by giving the missing information.

| Feature | Meiosis | Mitosis |
|---|---------|-----------|
| Number of chromosomes in each original cell | 46 | |
| Number of daughter cells produced from each original cell | | 2 |
| Number of chromosomes in each daughter cell | | |
| Ploidy level of daughter cells produced | | diploid |
| Genetic differences in daughter cells | present | |
| Type of cell produced | | body cell |

.....

.....

.....

.....

.....

.....

(6 marks)

(c) Cell division can cause variation in offspring.

(i) Describe other causes of variation in offspring.

(3)

(ii) Scientists investigating a drug treatment use rats that are homozygous for many genes.

Suggest the advantages of using rats that are homozygous for many genes.

(2)



Head to www.savemyexams.com for more awesome resources

.....

.....

.....

.....

.....

(5 marks)

2 (a) All organisms carry out some form of reproduction such as asexual reproduction or sexual reproduction.

Describe how asexual reproduction differs from sexual reproduction.

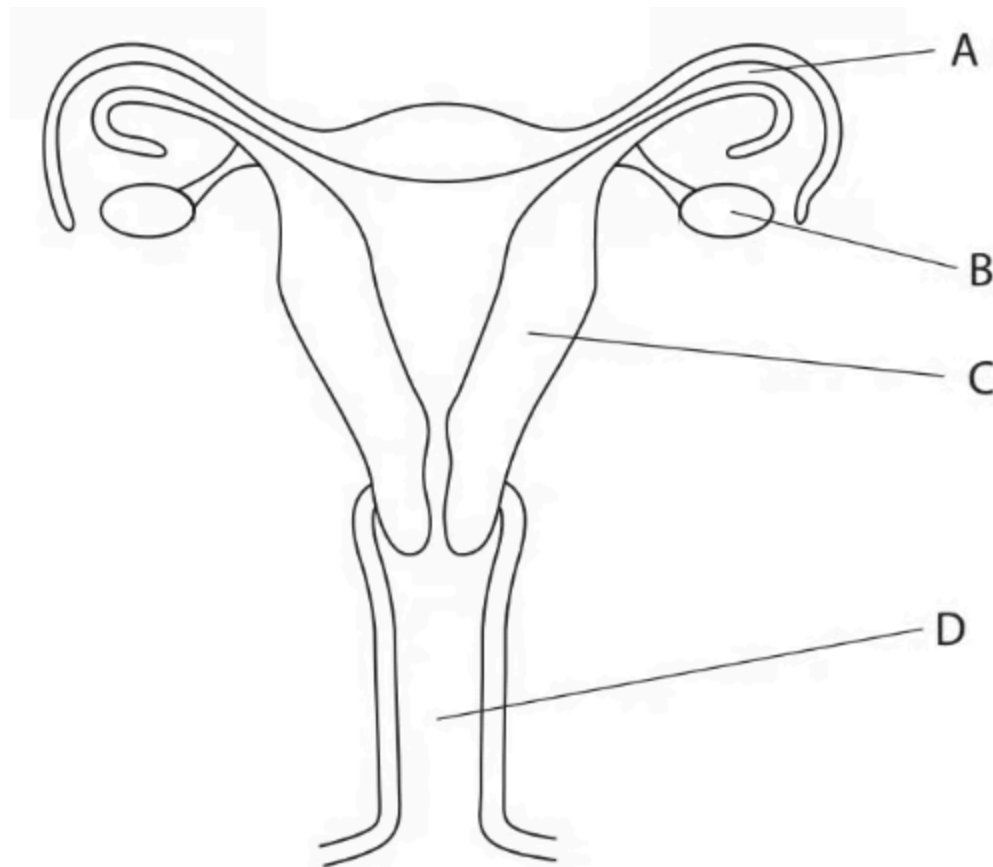
.....

.....

.....

(3 marks)

(b) The diagram shows the structure of the human female reproductive organs.



(i) What is the site of fertilisation?

(1)

- A
- B
- C
- D

(ii) Where does the fetus usually develop?

(1)

- A
- B
- C
- D

(iii) Describe the role of the hormones produced by structure B.

(4)

.....

.....

.....

.....

.....

.....

(6 marks)

(c) The male reproductive system in humans produces sperm in a liquid called semen.

The production of sperm changes with age.

A scientist investigates how age affects mean semen volume and sperm concentration in one ejaculation.

The table shows the results of the investigation.

| In one ejaculation | Age in years | | | | | | |
|--|--------------|-------|-------|-------|-------|-------|-------|
| | 16-30 | 31-33 | 34-36 | 37-39 | 40-43 | 44-47 | 48-72 |
| Mean semen volume in cm^3 | 3.45 | 3.44 | 3.35 | 3.30 | 3.22 | 2.92 | 2.49 |
| Mean sperm concentration in millions per cm^3 | 61.5 | 64.2 | 64.1 | 61.1 | 62.1 | 62.4 | 56.9 |
| Mean number of sperm released in millions | 212 | 221 | 215 | 202 | | 182 | 142 |

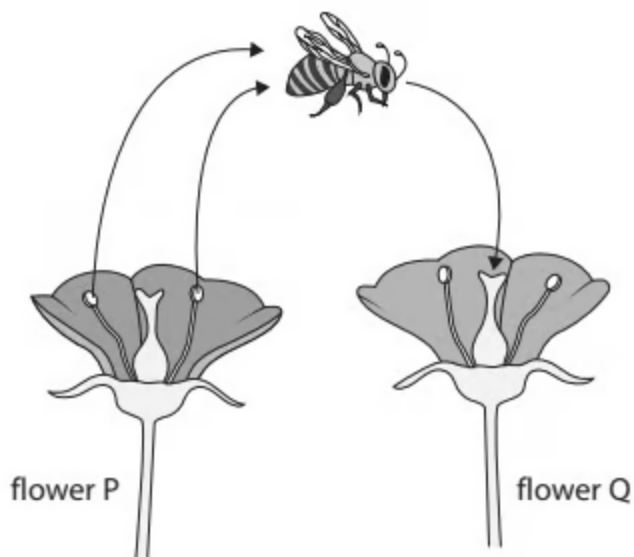
- (i) Calculate the mean number of sperm released in one ejaculation from men aged 40-43 (1)
- (ii) Explain why mean number of sperm released is a better measure of fertility than either mean semen volume or mean sperm concentration. (2)
- (iii) Calculate the percentage decrease in mean number of sperm between men aged 37-39 and men aged 48-72 (2)



Head to www.savemyexams.com for more awesome resources

(5 marks)

3 (a) The diagram shows an insect transferring pollen grains from flower P to flower Q.



Which structure in flowers contains pollen grains?

- A** anther
- B** ovary
- C** petal
- D** sepal

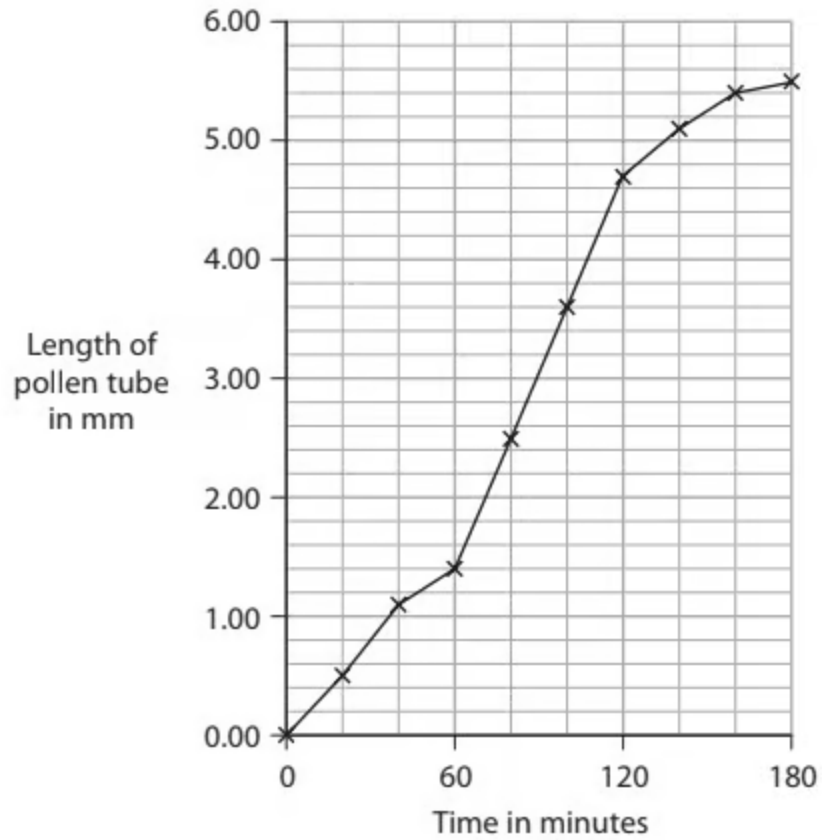
(1 mark)

(b) Pollen grains are deposited on the stigma and grow tubes down the style.

(i) Suggest how style tissue helps the tube to grow.

(2)

(ii) The graph shows the change in the length of a pollen tube over a 180 minute period.



Calculate the fastest rate of pollen tube growth in mm per minute.

(3)

(5 marks)

(c) A farmer grows apple trees.

The flowers on the apple trees must be pollinated by insects to produce an apple crop.

The farmer is concerned that the use of pesticides may affect the yield of apples.

Design an investigation to find out if pesticides reduce the yield of apples.

Include experimental details in your answer and write in full sentences.

(6 marks)

4 (a) **Separate: Biology Only**

The table gives information about some hormones involved in the menstrual cycle.

Complete the table by giving the missing information.

| Hormone | Name of structure that secretes hormone | Functions of hormone |
|--------------|---|---|
| FSH | _____ | 1. _____ 2. Stimulates oestrogen secretion |
| _____ | Pituitary | 1. _____ 2. Stimulates development of corpus luteum |
| _____ | Ovaries | 1. Repairs lining of the uterus 2. Stimulates LH secretion |
| Progesterone | _____ | 1. Maintains lining of the uterus 2. Inhibits LH |

.....

.....

.....

.....

.....

(6 marks)

(b) State what is meant by the term **menstruation**.

(1 mark)

(c) A girl starts to ovulate at the age of 12 years and continues to ovulate until she reaches the age of 51 years.

[Assume her menstrual cycle is 28 days and she releases one egg per cycle.]

Estimate the maximum number of eggs she could release in her lifetime.

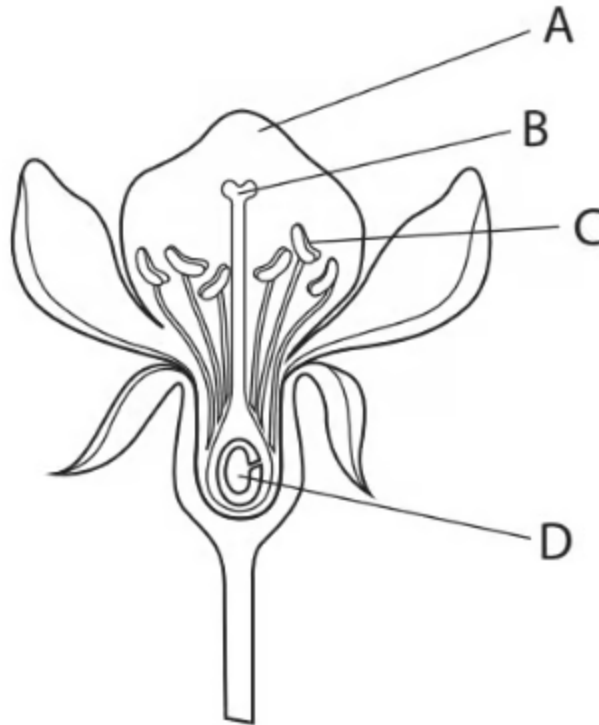
Give your answer to two significant figures.

(3 marks)

(d) Give a reason why a female does not produce as many offspring as the number of eggs she releases.

(1 mark)

5 (a) Flowers are involved in plant reproduction. The diagram shows a section through a flower with parts labelled A, B, C and D.



(i) Which part of the flower makes pollen grains?

(1)

- A**
- B**
- C**
- D**

(ii) What part of the flower is the stigma?

(1)

- A
- B
- C
- D

(2 marks)

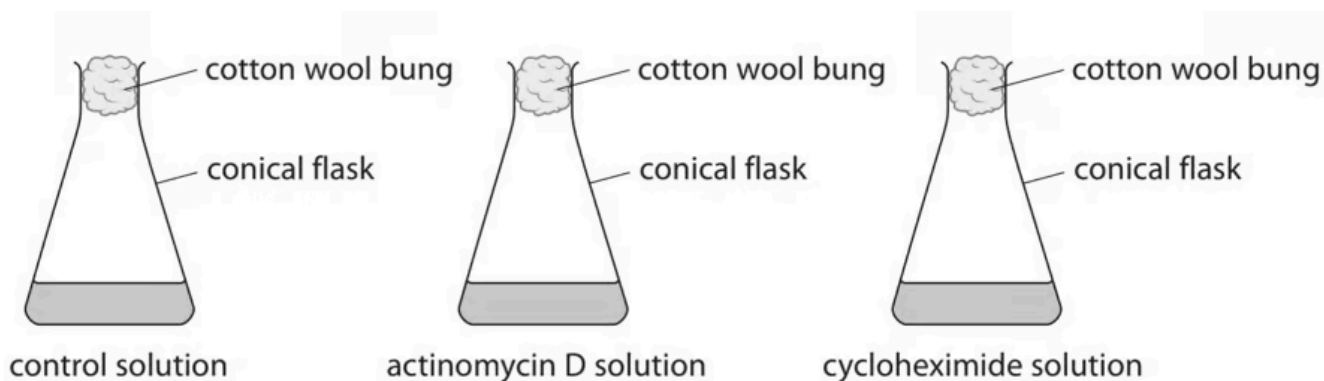
(b) After a pollen grain lands on the stigma of a flower, a pollen tube grows.

Explain the role of the pollen tube.

(3 marks)

(c) Separate: Biology Only

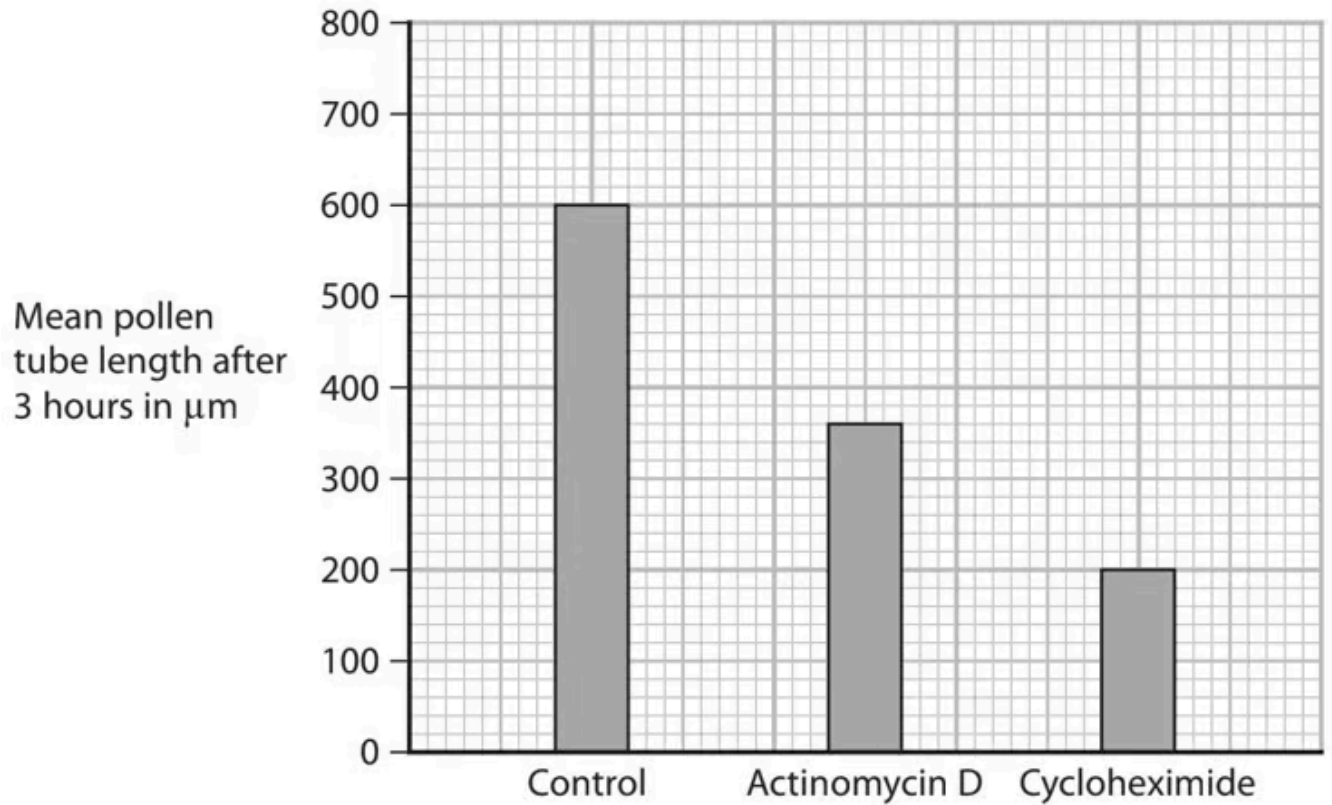
A scientist investigates the effect of three different solutions on the growth of pollen tubes using this apparatus.



This is the scientist's method.

- Place a different solution in three different flasks
- Add pollen grains to the solution in each flask
- Leave the grains in each solution for three hours
- Take a sample of pollen grains from each solution
- Measure the length of the pollen tubes in each sample

The graph shows the scientist's results.



- (i) Calculate the difference between the mean rate of pollen tube growth in the control solution and the mean rate of pollen tube growth in the actinomycin D solution.

Give your answer in μm per hour.

(2)

- (ii) Actinomycin D prevents transcription and cycloheximide prevents translation.

Use this information and your own knowledge to explain the results of this investigation.

(4)

(6 marks)

(d) Describe a method the scientist could use to observe pollen grains

(3 marks)

6 Some scientists have suggested that adding hydrogencarbonate solution to soil, instead of adding water, can increase plant growth.

Design an investigation to discover the effect that adding hydrogencarbonate solution has on the growth of seedlings.

Include experimental details in your answer and write in full sentences.



Head to www.savemyexams.com for more awesome resources

(6 marks)