Questions

Q1.

Figure 9 shows a plant with plantlets growing from it.

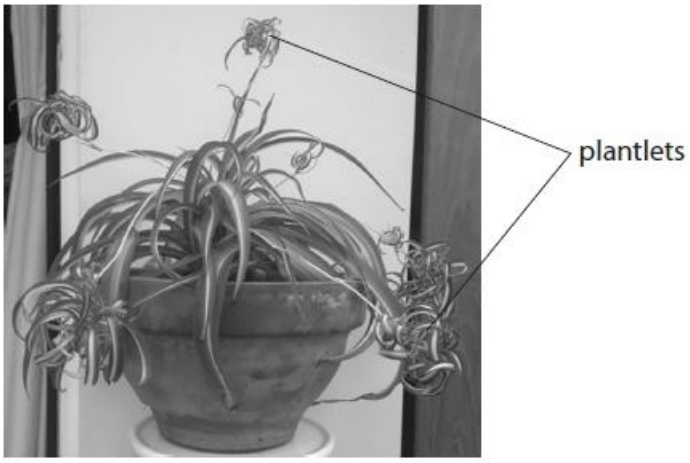


Figure 9

If a plantlet touches soil, it will grow roots and become a new plant.

This is an example of asexual reproduction.

The plant in Figure 9 also produces flowers for sexual reproduction.

Explain **one** advantage of sexual reproduction.

(2)

.....

.....

.....

.....

(Total for question = 2 marks)

Q2.

As we grow, we make new cells by mitosis and meiosis.

(i) The cells that are made can become specialised.

Figure 13 shows a diagram of a sperm cell.

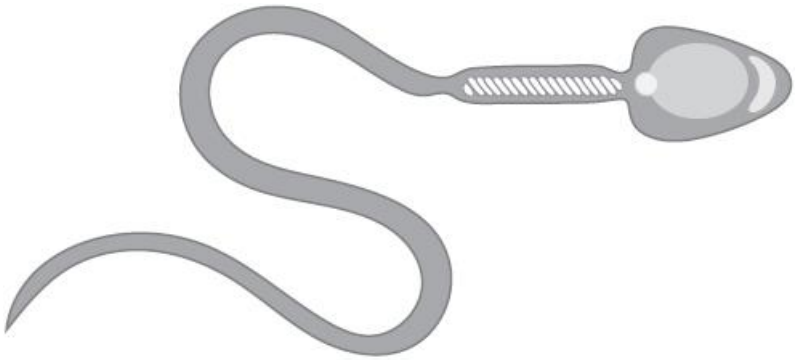


Figure 13

Describe **two** ways that the sperm cell is specialised.

(2)

1 .....

.....

2 .....

.....

(ii) Complete the table to show the results when a cell divides by mitosis or meiosis in humans.

Human body cells, except gametes, have 23 pairs of chromosomes.

(4)

	mitosis	**meiosis**
number of daughter cells produced		
number of chromosomes in each daughter cell		

(Total for question = 6 marks)

Q3.

Gregor Mendel used pea plants in plant breeding experiments. He discovered the basis of genetic inheritance.

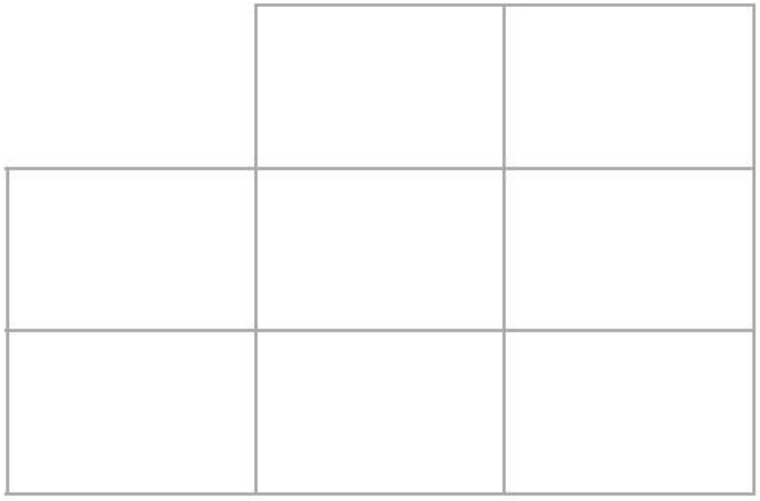
Pea plants produce different coloured peas.

The allele for yellow-coloured peas (A) is dominant to the allele for green-coloured peas (a).

Two heterozygous parent plants were used in a genetic cross.

(i) Predict, using the Punnett square, the percentage probability that this cross will have offspring that produce
green-coloured peas.

(3)



percentage probability of green-coloured peas =..... %

(ii) Explain **one** advantage to pea plants of using sexual reproduction to produce offspring.

(2)

.....

.....

.....

.....

(Total for question = 5 marks)

Q4.

* Discuss the advantages and disadvantages of sexual reproduction and asexual reproduction.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 6 marks)

Q5.

Figure 17 shows a strawberry plant that has produced several runners and new strawberry plantlets are growing at the end of each runner. This is an example of asexual reproduction.

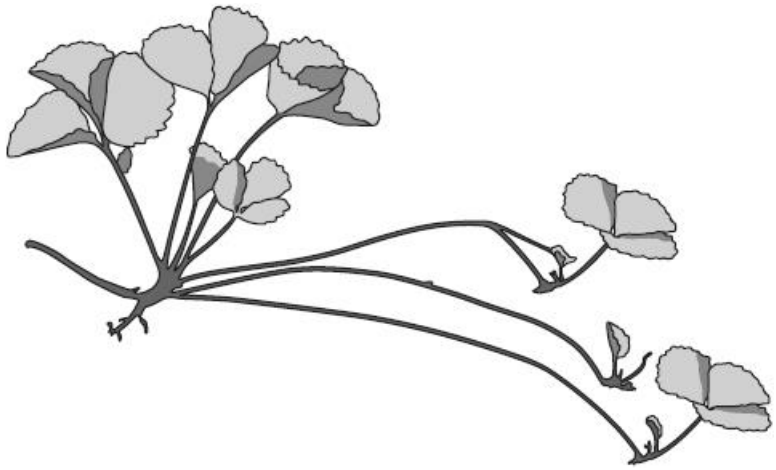


Figure 17

(i) Explain why asexual reproduction in strawberries is beneficial to strawberry farmers.

(2)

.....

.....

.....

.....

Strawberry fruits, containing seeds, are produced after a flower is fertilised.

(ii) Explain why seed production is an advantage to the strawberry plant.

(2)

.....

.....

.....

.....

(Total for question = 4 marks)

Q6.

(i) Some plants reproduce sexually.

Give **one** advantage of this type of reproduction.

(1)

.....

.....

(ii) Name the process that forms gametes for sexual reproduction.

(1)

.....

(Total for question = 2 marks)

Q7.

Figure 1 shows a pea plant with flowers.

Figure 1

(i) Name the type of reproduction involving flowers.

(1)

.....

(ii) What is the advantage of reproduction involving flowers?

(1)

☒ **A** all the offspring are identical

☒ **B** there is variation in the offspring

☒ **C** there is no fertilisation

☒ **D** all the offspring grow faster

(Total for question = 2 marks)

Mark Scheme

Q1.

Question number	Answer	Additional guidance	Mark
	An explanation including **two** of: • inherit different alleles (1) • (which gives greater) variation in (species) / structures / characteristics / example of a characteristic (1) • (so) will be able to exploit / survive / grow in different {conditions / environments} (1)	accept gets DNA from different plants	**(2)** **AO1 1**

Q2.

Question number	Answer	Additional guidance	Mark
(i)	A description including any **two** from: • tail / flagellum (1) • acrosome / sac with enzymes (1) • (many) mitochondria (1) • streamlined (1) • haploid / has 23 chromosomes (1)	accept has enzymes to digest the membrane around the egg	**(2)** **AO1 1**

Question number	Answer	Mark
(ii)	Award one mark for each correct square in the table. **mitosis** / **meiosis** number of daughter cells produced: 2 / 4 number of chromosomes in each daughter cell: 46 / 23 pairs / 23 For mitosis (number of chromosomes) ignore 23 on its own, must be qualified as 23 pairs	**(4)** **AO1 1**

Q3.

Question number	Answer	Additional guidance	Mark
(i)	One mark for gametes One mark for the offspring A / a A: AA / Aa a: Aa / aa 25 (%) (1)	accept aA accept ecf from the Punnett square	**(3)** AO3 2

Question number	Answer	Additional guidance	Mark
(ii)	An answer linking the following: • genetic variation increases / (offspring) show variation (1) • more likely to survive {a disease / environmental change / selection pressure} / allows evolution/survival of the fittest (1)	 accept different combination of alleles accept allows dispersal of offspring through seeds accept other examples of a survival reason e.g. natural disaster	**(2)** AO2 1

Q4.

Question Number	Indicative content	Mark
*	**AO1 6 marks** **Sexual reproduction** **Advantages** • creates variations in a species • some organisms in a species can survive selection pressure • allows for evolution **Disadvantages** • requires a mate to be found • time for fertilisation / pollination means the process takes longer • offspring can have features that are less advantageous than the parents. **Asexual reproduction** **Advantages** • no requirement to find a mate • rapid productive cycle • organisms with beneficial characteristics of the parent can be produced **Disadvantages** • there is no variation • a selection pressure could affect all organisms of a species.	**(6)**

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. • Presents an explanation with some structure and coherence.
Level 2	3-4	• Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and /or developed. • Presents an explanation that has a structure which is mostly clear, coherent and logical.
Level 3	5-6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. • Presents an explanation that has a well-developed structure which is clear, coherent and logical.

Additional Guidance

Level 1	1-2	• A brief discussion of advantages or disadvantages for sexual OR asexual reproduction. • The response identifies the statements as advantageous or disadvantageous.
Level 2	3-4	• A brief discussion of advantages or disadvantages for sexual and asexual reproduction OR a brief discussion of the advantages and disadvantages for sexual or asexual reproduction. • The response is mainly error free and identifies the descriptions as advantageous or disadvantageous.
Level 3	5-6	• A detailed discussion of the advantages and disadvantages for sexual and asexual reproduction including the consequences of being genetically identical or genetically different. • The response is error free identifies all the discussion points as advantageous or disadvantageous.

Q5.

Question number	Answer	Mark
(i)	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • asexual reproduction is a rapid reproduction technique allowing the production of more plants • as there is no requirement for cross pollination/higher crop yield/increased profit)	(2)

Question number	Answer	Mark
(ii)	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • introduces variation into the population • which allows for natural selection of fitter plants/increased chance of the population surviving	(2)

Q6.

Question number	Answer	Additional guidance	Mark
(i)	(genetic) variation in the offspring / offspring have different alleles / genetically diverse (1)	accept allows evolution / natural selection / species to adapt /survive a selection pressure	(1) AO1 1

Question number	Answer	Additional guidance	Mark
(ii)	meiosis	accept meiotic division	(1) AO1 1

Q7.

S.S Question	Answer	Mark
(i)	sexual	(1) AO1

Question number	Answer	Mark
(ii)	B there is variation in the offspring **1aii The only correct answer is B** ***A*** *is not correct because the offspring are different* ***C*** *is not correct because fertilisation occurs* ***D*** *is not correct because the offspring do not grow faster*	(1) AO1