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EDEXCEL GCSE BIOLOGY: QUESTIONS BY TOPIC

Genetics (3)

GCSE Biology (Foundation) Topic 3

8 questions · 81 marks · Mark schemes included

Pearson Edexcel GCSE (9-1) Biology 1BI0, Foundation Tier, June 2018 - June 2025

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HOW TO USE THIS BOOKLET

Questions run from the lowest mark tariff to the highest, so similar questions sit together.

Click any row below to jump straight to that question.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme.

Diagrams, graphs, tables and data are printed exactly as they appeared in the original papers.

QUESTION	SOURCE	MARKS	PAGE
1. Q3	Paper 1 June 2018	8	4
2. Q3	Paper 1 November 2021	8	6
3. Q5 <i>also Topic 1</i>	Paper 1 November 2021	9	10
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QUESTIONS

8 questions · 81 marks · lowest tariff first



8-MARK QUESTIONS

2 questions in this booklet



3 Gregor Mendel investigated genetic inheritance using pea plants.

Figure 3 shows some of the equipment used in this investigation.

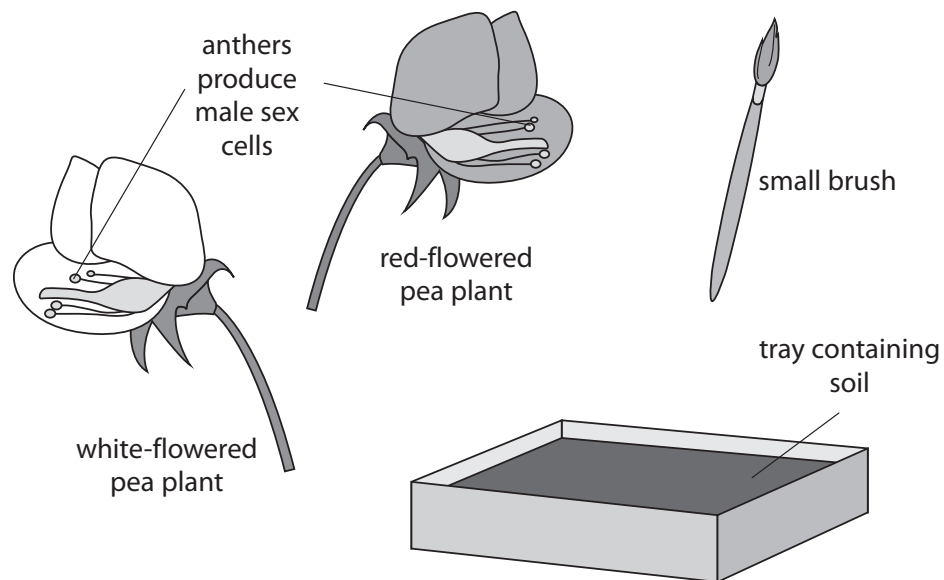


Figure 3

(a) (i) Gregor Mendel crossed red-flowered pea plants with white-flowered pea plants.

Describe how this equipment could be used to do this cross and discover the flower colour of the new pea plants produced.

(3)

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(ii) Describe how to make sure that the results obtained from this investigation are not anomalous.

(2)

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- (b) In a different investigation, Mendel crossed pea plants that produced yellow seeds (AA) with pea plants that produced green seeds (aa). The dominant allele is shown as A.

The Punnett square shows the genotypes of the offspring from this cross.

	A	A
a	Aa	Aa
a	Aa	Aa

Explain a conclusion that can be made from the results of this cross.

(2)

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- (c) Mendel did his investigations in the 19th century.

State **one** reason why Mendel could not fully explain the results of his investigations.

(1)

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(Total for Question 3 = 8 marks)



3 (a) Sickle cell disease is a recessive genetic disorder in humans.

(i) Two parents are heterozygous for sickle cell disease.

Complete the Punnett square to show the possible genotypes of their children.

(1)

	D	d
D		
d		

(ii) State the percentage probability that their children could have sickle cell disease.

(1)

percentage probability = ... %

(iii) A father with the genotype dd and a mother with the genotype DD plan to have several children.

Explain why none of their children will have sickle cell disease.

(2)

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(b) Figure 4 shows some information about two types of cattle.

type of cattle	survival in high temperatures	meat quality
Brahman	good	poor
Shorthorn	poor	good

Figure 4

Describe how these types of cattle could be selectively bred to produce cattle that can survive high temperatures and have good meat quality.

(2)

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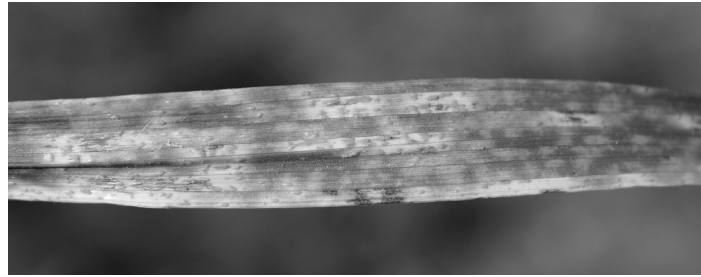
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(c) Figure 5 shows the leaf of a wheat plant with a fungal disease.



(Source: © Kazakov Maksim/Shutterstock)

Figure 5

Give **two** benefits of breeding wheat plants that are resistant to fungal disease.

(2)

1

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2

.....

(Total for Question 3 = 8 marks)

9-MARK QUESTIONS

1 question in this booklet



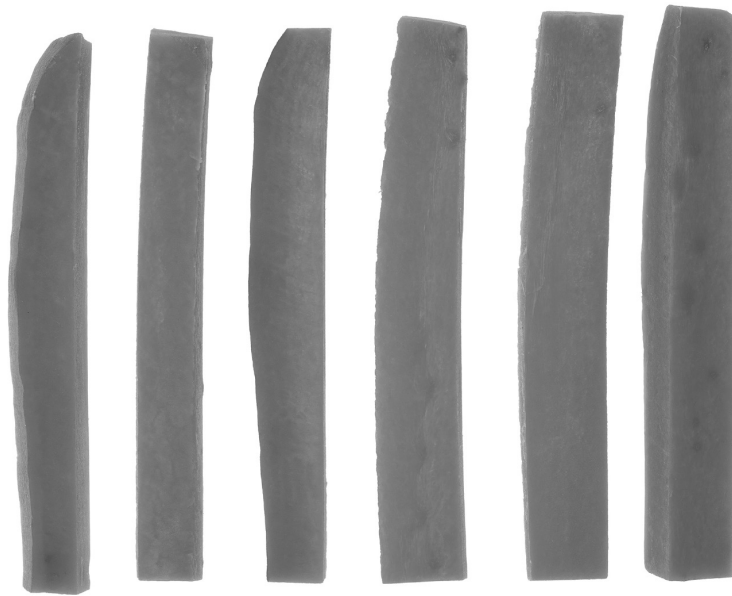
- 5 (a) Carrots have different physical characteristics such as colour.

Which genetic term describes the physical characteristics of a carrot?

(1)

- ☐ A genotype
- ☐ B monohybrid
- ☐ C phenotype
- ☐ D heterozygous

- (b) Figure 10 shows some carrot sticks.



(Source: © rukxstockphoto/Shutterstock)

Figure 10

A student chose three carrot sticks and weighed each one.

The carrot sticks were placed in 50 cm³ of distilled water.

After two hours the student weighed each carrot stick again.

Figure 11 shows the results for these carrot sticks P, Q and R.

carrot stick	mass at the start in grams	mass after two hours in grams	change in mass in grams
P	4.0	4.9	0.9
Q	4.2	5.0	0.8
R	4.1	5.0	0.9

Figure 11

- (i) Give **one** reason why the student used three carrot sticks instead of just one carrot stick.

(1)

.....

.....

- (ii) Give **two** ways that this method could be improved.

(2)

1

.....

2

.....

- (iii) Calculate the percentage change in mass of carrot stick **Q**.

(3)

Use the equation

$$\text{percentage change} = \frac{\text{change in mass}}{\text{mass at the start}} \times 100$$

Give your answer to 2 significant figures.

percentage change = ... %



(iv) Explain the change in mass of the carrot sticks.

(2)

(Total for Question 5 = 9 marks)



11-MARK QUESTIONS

4 questions in this booklet



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

(a) He cross-bred tall pea plants with short pea plants.

All the offspring were tall, as shown in Figure 16.

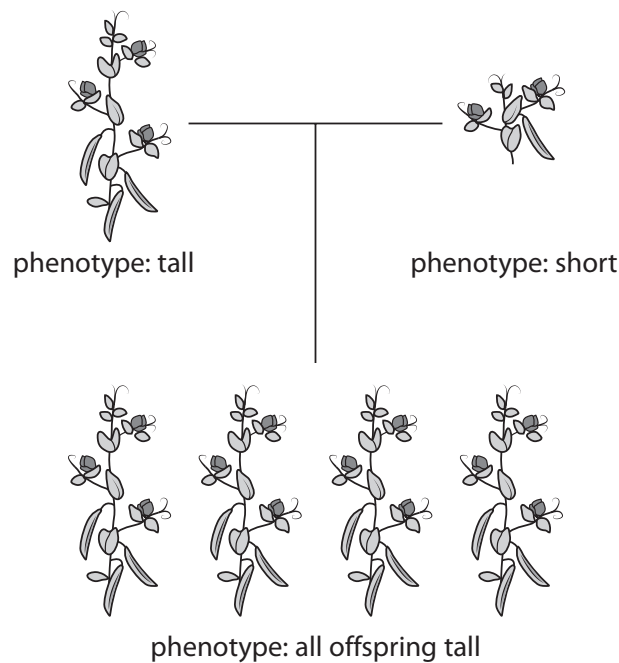


Figure 16

(i) Explain why the offspring are all tall.

(2)

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(ii) In this investigation, the parent pea plants were grown in a warm, closed greenhouse.

Give **two** reasons why the parent pea plants were grown in a warm, closed greenhouse.

(2)

1.....

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2.....

.....

(b) 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)

.....

.....

.....

.....



(c) Peas contain small amounts of fat.

Describe a test to identify fat.

(2)

(Total for Question 10 = 11 marks)



8 (a) Apple trees show genetic variation.

(i) State **one** possible cause of genetic variation in apple trees.

(1)

(ii) The colour of an apple is an observable characteristic.

Which is the term for an observable characteristic?

(1)

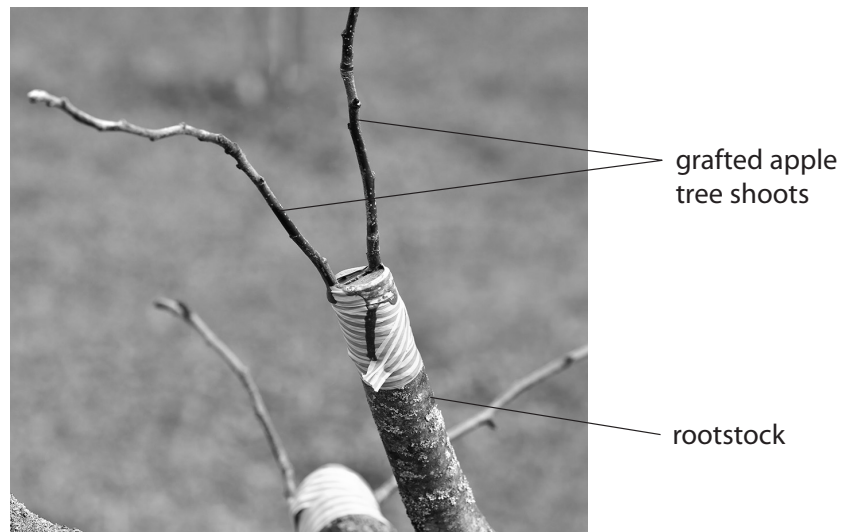
- ☐ **A** gene
- ☐ **B** genotype
- ☐ **C** heterozygous
- ☐ **D** phenotype

(b) Name the type of reproduction that produces genetically identical organisms.

(1)

(c) Grafting is a technique used to grow some varieties of apple tree.

Figure 16 shows apple tree shoots grafted on to a rootstock.



(Source: © ATTILA Barsan/Shutterstock)

Figure 16

Grafting can be used to produce apple trees that are genetically identical.

Give **one** advantage and **one** disadvantage of growing genetically identical apple trees.

(2)

advantage

disadvantage

(d) As apples ripen, enzymes convert starch into sugars.

Devise a method to find the optimum pH of an enzyme that breaks down starch.

You may use standard laboratory equipment and the solutions listed in the box.

starch solution enzyme solution iodine solution
a range of pH solutions

(4)

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(e) The optimum pH of an enzyme is pH 6.

Explain why this enzyme would not work at pH 10.

(2)

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(Total for Question 8 = 11 marks)



- 10 (a) Mendel crossed pea plants that always produced purple flowers with pea plants that always produced white flowers.

The flowers of the offspring were all purple, as shown in Figure 19.

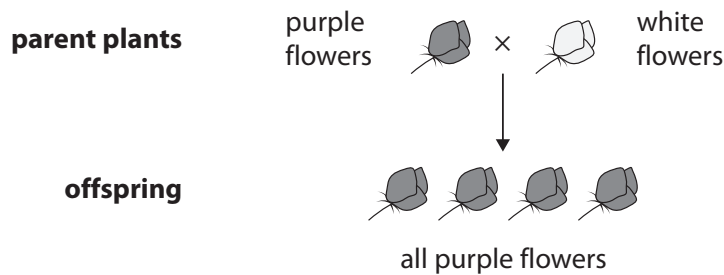


Figure 19

- (i) Which conclusion can be made about the characteristic for purple flowers?

(1)

- ☐ A the characteristic is recessive
- ☐ B the characteristic is dominant
- ☐ C the characteristic is a mutation
- ☐ D the characteristic is environmental

- (ii) Mendel used two of the offspring with purple flowers in another cross.

The pea plants he obtained from this cross produced purple flowers or white flowers in a ratio of 3 : 1.

Calculate the expected number of pea plants with purple flowers, in a sample of 160 pea plants.

(2)

Number of pea plants with purple flowers = ...

(iii) A pea plant producing purple flowers had the genotype Aa.

This pea plant was crossed with a pea plant producing white flowers.

Complete the Punnett square to show the possible genotypes of the offspring.

Show the percentage of pea plants that produce white flowers in your answer.

(3)

		white flowers	
purple flowers	A		
	a		

Percentage of pea plants that produce white flowers = ... %

(b) Asexual reproduction can be used to produce flowering plants.

Give **two** advantages of using asexual reproduction to produce flowering plants.

(2)

1

2



(c) Flower colour is controlled by genes.

(i) Which is a definition of a gene?

(1)

- ☐ **A** a section of a DNA molecule that codes for a protein
- ☐ **B** a section of a chromosome that codes for DNA
- ☐ **C** the entire DNA of an organism
- ☐ **D** a section of a chromosome that coils into a double helix

(ii) The two strands of a DNA molecule are linked by complementary bases.

Describe how the complementary bases are linked in a DNA molecule.

(2)

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.....

(Total for Question 10 = 11 marks)

10 (a) In the 19th century, Gregor Mendel studied genetic inheritance in pea plants.

Mendel made the conclusion that characteristics in organisms were determined by the inheritance of 'units'.

(i) What are these 'units' of inheritance known as today?

(1)

- ☒ **A** chloroplasts
- ☒ **B** enzymes
- ☒ **C** genes
- ☒ **D** mitochondria

(ii) Figure 20 shows one of Mendel's experiments on the inheritance of pea shape.

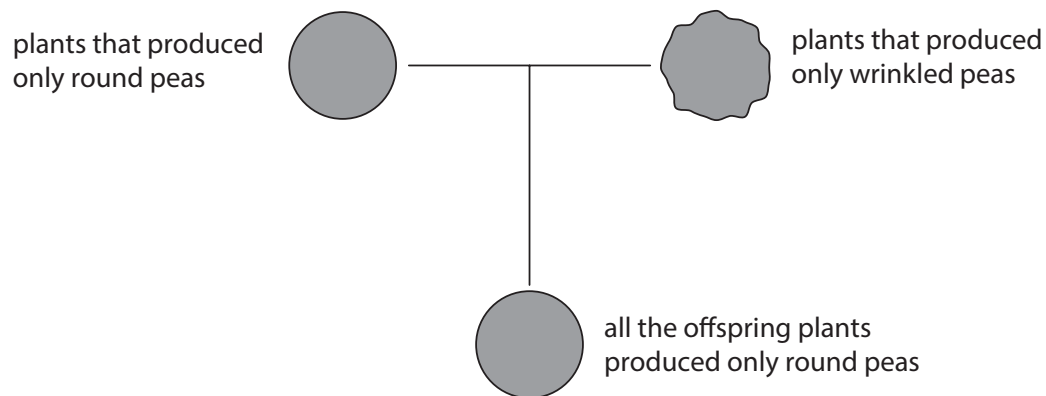


Figure 20

State the conclusion that Mendel was able to make about the wrinkled pea characteristic.

(1)

.....

.....

(b) A scientist crossed two pea plants that were heterozygous for pea shape.

- (i) Complete the Punnett square to show the inheritance of the alleles for pea shape and the percentage probability of producing a plant with wrinkled peas.

Use the letter R for the allele for round shape.

Use the letter r for the allele for wrinkled shape.

(3)

		heterozygous	
heterozygous			

percentage probability of producing a plant with wrinkled peas%

- (ii) Plants used to study inheritance are grown in controlled environmental conditions.

Suggest **two** ways of controlling these environmental conditions.

(2)

1

.....

2

.....



(c) Some plants can reproduce asexually and sexually.

(i) Complete the table by writing **yes** or **no** in **each** box to show the features of asexual and sexual reproduction.

(3)

feature	asexual reproduction	sexual reproduction
produce genetically identical offspring		
requires male and female gametes		
rapid reproductive cycle		

(ii) A zygote with a diploid nucleus is formed by sexual reproduction.

State what is meant by a diploid nucleus.

(1)

(Total for Question 10 = 11 marks)

12-MARK QUESTIONS

1 question in this booklet



6 Figure 12 shows some characteristics of pea plants.

flower colour	seed shape
purple	round
white	wrinkled

Figure 12

The allele for purple flowers is dominant to the allele for white flowers.

(a) Which term describes the allele for white flowers?

(1)

- ☐ **A** heterozygous
- ☐ **B** homozygous
- ☐ **C** gamete
- ☐ **D** recessive

(b) A scientist crossed a pea plant that produced round seeds (Rr) with a pea plant that produced wrinkled seeds (rr).

(i) Complete the Punnett square.

(2)

		wrinkled seeds	
round seeds	R		
	r		

(ii) State the percentage of the offspring that will produce round seeds.

(1)

percentage = ...%



(c) The scientist crossed **two** purple flowering pea plants.

The offspring were:

- 133 plants with purple flowers
- 46 plants with white flowers

(i) Calculate the ratio of offspring with purple flowers to offspring with white flowers.

Give your answer to the nearest whole number.

(2)

ratio:1

(ii) Explain why it was possible for this cross to produce some offspring with white flowers.

(2)

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(d) The cells in pea plants are diploid.

These cells have 14 chromosomes.

(i) Explain why pea plant gametes have only seven chromosomes.

(2)

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(ii) Describe what happens at fertilisation.

(2)

(Total for Question 6 = 12 marks)



MARK SCHEMES

official Pearson Edexcel mark schemes



Question Number	Answer	Additional guidance	Mark
3(a) (i)	Any three from: - remove pollen/male gametes from one plant using a brush (1) - transfer pollen/ (male) sex cells to other plant (1) - collect the seeds (1) - grow seeds (in the soil) (1)	accept cross-pollinate	(3) AO 2 2

Question Number	Answer	Mark
3(a) (ii)	Any two from: - repeat (1) - compare results (1) - if all the results are the same then they are not anomalous/OR A (1)	(2) AO 2 2

Question Number	Answer	Mark
3(b)	Any two from: - all offspring are the same/Aa / produced yellow seeds/have same genotype (1) - as dominant allele (A) present in genotype of offspring)/ are heterozygous (1) - proves that both parents are homozygous (1)	(2) AO 3 2a AO 3 2b

Question Number	Answer	Additional guidance	Mark
3(c)	chromosomes/DNA/genes/ alleles not known at the time	accept not yet discovered at that time	(1) AO 1 1

Total for Question 3 = 8 marks



Question Number	Answer	Mark									
3(a)(i)	<table border="1"> <tr> <td></td><td>D</td><td>d</td></tr> <tr> <td>D</td><td>DD</td><td>Dd</td></tr> <tr> <td>d</td><td>Dd</td><td>dd</td></tr> </table> Accept dD for Dd		D	d	D	DD	Dd	d	Dd	dd	(1) AO3 2a
	D	d									
D	DD	Dd									
d	Dd	dd									

Question Number	Answer	Mark
3(a)(ii)	25 (%)	(1) AO3 2b

Question Number	Answer	Additional guidance	Mark
3(a)(iii)	An explanation including: - all the children will have the genotype Dd / will be heterozygous (1) - but to have sickle cell disease the children must have {the genotype dd / two recessive alleles} (1)	accept children will always inherit a dominant allele / D from their mother accept a correctly completed Punnett square for this marking point	(2) AO2 1

Question Number	Answer	Mark
5(a)	C phenotype The only correct answer is C <i>A is not correct because genotype does not describe the physical characteristics</i> <i>B is not correct because monohybrid does not describe the physical characteristics</i> <i>D is not correct because heterozygous does not describe the physical characteristics</i>	(1) AO1 1

Question Number	Answer	Additional guidance	Mark
5(b)(i)	Any one from: - a single result could be anomalous (1) - to calculate a mean (1)	accept to see if the results are the same / similar ignore references to increasing accuracy	(1) AO1 2

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	Any two from: • measure the length / width of the carrot sticks (1) • cut sticks from the same carrot / same part of carrot (1) • use the same variety of carrot (1) • (surface) dry the carrot sticks before weighing (1)	accept other valid ways of improving this method, e.g. using more than three carrot sticks (1)	(2) AO3 3b

Question Number	Answer	Additional guidance	Mark
5(b)(iii)	substitution ($0.8 \div 4.2$) $\times$ 100 (1) evaluation 19.048 (1) 2 significant figures 19 (%)	full marks for correct answer without any working accept 19.0476 / 19.05 (2) award one mark for rounding an incorrectly calculated answer to 2 significant figures	(3) AO2 1

Question Number	Answer	Mark
5(b)(iv)	An explanation linking any two from: • the carrot sticks gained mass (1) • because water moved into the carrot (cells) (1) • by osmosis / description of osmosis (1)	(2) AO3 2a 2b

(Total for question 5 = 9 marks)



Question number	Answer	Additional guidance	Mark
10 (a)(i)	An answer that links the following - tall is dominant (1) - they are heterozygous / have one tall allele (1)	accept short is recessive accept one of each allele ignore genes accept they have inherited one tall dominant allele for 2 marks	(2)

Question number	Answer	Additional Guidance	Mark
10(a)(ii)	An answer including: - provide {optimal/identical /best/ideal/controlled} growth conditions (1) - reduce chances of disease/pests/pathogens (1)	accept all grown under the same conditions accept examples of optimal conditions. accept prevent unwanted pollination	(2)

Question number	Answer	Additional guidance	Mark									
10 (b)(i)	One mark for gametes One mark for the offspring <table><tr><td></td><td>A</td><td>a</td></tr><tr><td>A</td><td>AA</td><td>Aa</td></tr><tr><td>a</td><td>Aa</td><td>aa</td></tr></table> 25 (%) (1)		A	a	A	AA	Aa	a	Aa	aa	accept aA accept ecf from the Punnett square	(3)
	A	a										
A	AA	Aa										
a	Aa	aa										

Question number	Answer	Additional guidance	Mark
10(b)(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)

Question number	Answer	additional guidance	Mark
10 (c)	An answer linking: - mix the food in ethanol and pour into water (1) - white emulsion forms (1)	accept add water and ethanol and mix accept white precipitate / goes cloudy / emulsion test accept rub pea / food on filter paper (1) and look for a translucent mark (1)	(2)

(Total for question 10 = 11 marks)



Question number	Answer	Additional guidance	Mark
8(a)(i)	mutation / sexual reproduction / different combinations of alleles can occur	accept genetic modification	(1) AO2 1

Question number	Answer	Mark
8(a)(ii)	D phenotype The only correct answer is D <i>A is not correct because gene is not the correct term for an observable characteristic</i> <i>B is not correct because genotype is not the correct term for an observable characteristic</i> <i>C is not correct because heterozygous is not the correct term for an observable characteristic</i>	(1) AO1 1

Question number	Answer	Additional guidance	Mark
8(b)	asexual (reproduction)	ignore mitosis reject meiosis accept cloning / binary fission	(1) AO1 1

Question number	Answer	Additional guidance	Mark
8(c)	One from advantages: • (fruit) will have desired qualities (1) • can be produced faster (1) AND One from disadvantages: • susceptible to a disease (1) • can't survive an environmental change (1) • reduced gene pool (1)	ignore genetically identical / no variation for advantages and disadvantages accept examples of characteristics e.g. all tasty / same taste ignore higher yield accept inherited/genetic diseases accept can't survive a selection pressure	(2) AO2 1

Question number	Answer	Additional guidance	Mark
8(d)	A method including four from: • mix starch, enzyme and pH (solution) (1) • use iodine (to test for starch) (1) • (with iodine solution) blue-black means starch is present / {orange / brown} means no starch present (1) • control of one variable e.g. concentration, volume, temperature (1) • repeat using different pH solutions (1)	all three solutions are required accept add iodine to a spotting tile ignore blue ignore amount unless a measurement is given	(4) A03 3a

Question Number	Answer	Additional guidance	Mark
8(e)	An explanation linking two from: • enzyme denatures (1) • which changes the shape of the active site (1) • so {the enzyme cannot bind to its substrate / active site no longer complementary / no enzyme-substrate complexes form} (1)	accept enzyme changes shape accept substrate {no longer fits /is no longer complementary} accept starch for substrate	(2) A02 1

(Total for question 8 = 11 marks)



Question number	Answer	Mark
10(a)(i)	B the characteristic is dominant The only correct answer is B <i>A is not correct because the characteristic is not recessive</i> <i>C is not correct because the characteristic is not a mutation</i> <i>D is not correct because the characteristic is not environmental</i>	(1) A03 1a

Question number	Answer	Additional guidance	Mark
10(a)(ii)	One from • 40 (1) • 480 (1) • $160 \div 4$ (x3) (1) • 160×3 ($\div 4$) (1) • 160×0.75 (1) • $160 \times \frac{3}{4}$ (1) AND Evaluation 120	award full marks for the correct answer with no workings accept 120:40 for two marks accept 40:120 for one mark	(2) A02 2

Question number	Answer	Additional guidance	Mark									
10(a)(iii)	white flowers <table><tr><td></td><td>a</td><td>a</td></tr><tr><td>A</td><td>Aa</td><td>Aa</td></tr><tr><td>a</td><td>aa</td><td>aa</td></tr></table> purple flowers correct genotype for white flowers (1) correct offspring from their parental gametes (1) percentage of white flowers = 50% (1)		a	a	A	Aa	Aa	a	aa	aa	accept aA for Aa ignore other letters for genotypes ecf for incorrect gametes for white flowers ecf from incorrect Punnett square	(3) AO3 1a+1b
	a	a										
A	Aa	Aa										
a	aa	aa										

Question number	Answer	Additional guidance	Mark
10(b)	Any two from: genetically identical offspring (1) - they will have the {same / desired} characteristics (1) (flowering plants) produced faster (1) - only one parent plant needed (1)	accept clones produced / same (advantageous) alleles ignore no variation / same genes accept same features accept named characteristics e.g. flower colour accept shorter reproductive cycle / reproduce faster accept no need to find a mate / no need for {pollination / (named) pollinators} ignore more plants are produced / needs less resources / energy efficient / cheaper	(2) A02 1

Question number	Answer	Mark
10(c)(i)	A a section of a DNA molecule that codes for a protein The only correct answer is A <i>B is not correct because a chromosome does not code for DNA so it is not a gene</i>	(1) A01 1

Question number	Answer	additional guidance	Mark
10(c)(ii)	An answer including two from: • A with T / C with G (1) • weak (1) • hydrogen bonds (1)	accept names of bases accept H bonds	(2) AO1 1

(Total for question 10 = 11 marks)

Question number	Answer	Mark
10(a)(i)	C genes The only correct answer is C A, B and D are not correct because they are units of inheritance.	(1) 3.11B

Question number	Answer	Mark
10(a)(ii)	wrinkled characteristic is recessive / wrinkled characteristic is not passed on	(1) A03 1a

Question number	Answer	Additional guidance	Mark									
10(b)(i)	<table border="1"><tr><td></td><td>R</td><td>r</td></tr><tr><td>R</td><td>RR</td><td>Rr</td></tr><tr><td>r</td><td>Rr</td><td>rr</td></tr></table> correct parental gametes (1) correct offspring genotypes (1) percentage probability = 25% (1)		R	r	R	RR	Rr	r	Rr	rr	accept rR accept other letters ecf from incorrect parental genotypes ecf from incorrect Punnett square	(3) A03 1a and 1b
	R	r										
R	RR	Rr										
r	Rr	rr										

Question number	Answer	Additional guidance	Mark
10(b)(ii)	Any two from: - grow in a greenhouse (1) (same) soil (conditions) (1) (same) temperature / use a heater (1) (same) light / use a lamp (1) (same) watering / rain (1) - eliminate (micro) organisms / insects (1)	accept enclosed area / (same) carbon dioxide (concentration) accept named soil condition e.g. pH accept optimum temperature accept same humidity accept pathogens / named pathogens accept use pesticides accept control {abiotic / biotic} factors (1)	(2) AO2 2

Question number	Answer	Additional guidance	Mark												
10(c)(i)	<table><tr><th>feature</th><th>asexual reproduction</th><th>sexual reproduction</th></tr><tr><td>produce genetically identical offspring</td><td>yes</td><td>no</td></tr><tr><td>requires male and female gametes</td><td>no</td><td>yes</td></tr><tr><td>rapid reproductive cycle</td><td>yes</td><td>no</td></tr></table>	feature	asexual reproduction	sexual reproduction	produce genetically identical offspring	yes	no	requires male and female gametes	no	yes	rapid reproductive cycle	yes	no	accept Y / ✓ / true for Yes accept N / X / false for No	(3) AO1 1
	feature	asexual reproduction	sexual reproduction												
	produce genetically identical offspring	yes	no												
	requires male and female gametes	no	yes												
	rapid reproductive cycle	yes	no												

One mark for each correct row of the table

Question number	Answer	Additional Guidance	Mark
10(c)(ii)	{two copies / pairs} of each chromosome / full set of chromosomes	accept 46 chromosomes / a chromosome from the male and a chromosome from the female ignore double the number of chromosomes / all of the chromosomes / all the genetic material	(1) AO1 1

Total for Question 10 = 11 marks



Question Number	Answer	Mark
6(a)	D recessive The only correct answer is D <i>A is not correct because the term that describes the allele for white flowers is not heterozygous</i> <i>B is not correct because the term that describes the allele for white flowers is not homozygous</i> <i>C is not correct because the term that describes the allele for white flowers is not gamete</i>	(1) AO1 1

Question Number	Answer	Mark									
6(b)(i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td><td>r</td><td>r</td></tr> <tr> <td>R</td><td>Rr</td><td>Rr</td></tr> <tr> <td>r</td><td>rr</td><td>rr</td></tr> </table> • gametes (r r) (1) • genotypes of offspring (1)		r	r	R	Rr	Rr	r	rr	rr	(2) AO2 2ab
	r	r									
R	Rr	Rr									
r	rr	rr									

Question Number	Answer	Additional guidance	Mark
6(b)(ii)	50 (%)	ecf from Punnett square	(1) A03 2a

Question Number	Answer	Additional guidance	Mark
6(c)(i)	$(133 \div 46) = 2.89 / 2.9$ (1) Rounded to the whole number 3 (:1)	award full marks for correct answer without working	(2) A03 2a

Question Number	Answer	Mark
6(c)(ii)	An explanation linking - both parents are heterozygous / Pp / each parent has an allele for white flowers (1) (so) some offspring have {two recessive alleles / pp} / are homozygous recessive (1)	(2) A02 2

Question Number	Answer	Additional guidance	Mark
6(d)(i)	An answer including two from - gametes are produced by meiosis (1) (meiosis) {halves the number of chromosomes / produces haploid gametes} / gametes have one of each pair of chromosomes (1)	accept when gametes fuse diploid cells / cells with 14 chromosomes are produced (1)	(2) AO1 1

Question Number	Answer	Mark
6(d)(ii)	Any two from: (male and female) gametes fuse (1) (forming a) zygote (1) (forming a) diploid cell (1)	(2) AO1 1

(Total for question 6 = 12 marks)

