

FOUNDATION / HIGHER TIER

Question	Marking details	Marks Available
6/1 (a)	(i) I DD II dd; Allow e.c.f from (a)(i)	1
	(ii) Gametes correct; Cross correct;	1 1

F1	Gametes	D	D
	d	Dd	Dd
	d	Dd	Dd

(b) (i)	Allow e.c.f from (a)(ii) Gametes correct;	1
	Cross correct (mark independently of gametes);	1

Gametes	D	d
D	DD	Dd
d	Dd	dd

(ii)	Answer from candidate's Punnett square	
	1 homozygous dominant : 2 heterozygous : 1 recessive; NOT 25:50:25/ 2:4:2/ ¼: ½: ¼	1

Question total [6]

Question	Marking details	Marks Available
7/2 (a)	Variation; NOT {environmental/ genetic} variation/ mutation	1
(b)	Any two from: (Trees in region) A have <u>less</u> water/ <u>further</u> away from {water/ river} ORA; (Trees in region) A have <u>less</u> (sun)light /ORA; Accept south facing slope has <u>more</u> sunlight (Trees in region) A are growing on <u>thinner</u> soils/ ORA; (Trees in region) A are growing higher up the hillside therefore at a <u>lower</u> temp/ ORA; NOT REFERENCES TO DIFFERENCES IN O ₂ OR CO ₂ CONCENTRATIONS <u>Candidates must make it clear which survey points they are referring to in their answer</u>	2
(c)	They are <u>genetically</u> different / <u>genetic</u> differences / <u>genes</u> are different / DNA is different/ genetic variation/ variation in inherited genes; NOT: Chromosomes are different/ They come from seeds from different parents/ mutations/ genetics	1
Question total		[4]

Question	Marking details	Marks Available
8/3 (a)	<u>Erector</u> muscle;	1
(b)	<p>Indicative content:</p> <p>Sweat gland</p> <p>Removes {sweat / water and salts} from blood/ produces sweat</p> <p>Sweat travels up sweat duct</p> <p>Through sweat pore onto surface of skin</p> <p>{ Water in sweat evaporates / accept sweat evaporates Removing heat</p> <p>The order of these two statements can be reversed as shown below:</p> <p>{ Heat is removed from the body to Evaporate the water in sweat / accept to evaporate the sweat</p>	

5 – 6 marks

6

The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3 -4 marks

The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.

1 – 2 marks

The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.

0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit

Question total [7]

Question	Marking details	Marks Available
9/4 (a)	<p>$8400 \div 992 \times 100 = 846.8\text{g}$ (accept 846.77g);;</p> <p>Award 2 marks for correct answer – unit required</p> <p>Award 1 mark for correct answer if no unit indicated.</p> <p>If answer is incorrect award 1 mark for $8400 \div 992 \times 100$</p> <p>NOT 847</p>	2
(b) (i)	<p>White sliced because it has the <u>{lowest/ lower/ less}</u> {fat / saturated fat} content (salt is neutral)</p> <p>NOT low fat</p>	1
(b) (ii)	<p>White sliced because it has the <u>{lowest/ lower/ less}</u> salt content</p> <p>NOT low salt</p>	1
(c) (i)	<p>Any 2 from:</p> <p>Initial temperature (of water);</p> <p>Final temperature (of water);</p> <p>{Rise/ Change} in temperature of water = 2 marks</p> <p>NOT temperature alone</p> <p>Mass (accept weight) of {bread/ food (being burned)}</p> <p>NOT amount</p>	2
(c) (ii)	<p>Much of the heat from the burning {food sample / bread} is {not transferred to the water / lost to the surroundings}/ incomplete burning / apparatus is not insulated.</p>	1
	Question total	[7]
	PAPER TOTAL	[60]

HIGHER TIER

Question	Marking details	Marks Available
5.	(a) (i) {Grown / bent/ curved/ leaning/ turned} towards the {light/ lamp} NOT moves towards light	1
	(ii) <u>Positive</u> phototropism	1
	(iii) Hormones / plant hormones / phytohormones / auxins	
	(b) (i) C (straight up)	1
	(ii) All { <u>sides/ parts</u> } of the {shoot/ seedlings} receive an equal amount of light/ correct reference to distribution of auxin; In each revolution / every 20 minutes/ as plant {revolves/ rotates/ turns}; All shoots receive an equal amount of light as it is rotating = 1 mark Accept an answer which states: The effect of one sided illumination has been cancelled out by the fact that the shoots are revolving (OWTTE) for 2 marks	2
Question total		[6]

Question	Marking details	Marks Available
6. (a)	'Eat' marked between 'normal conc of glucose' and bottom of 'glucose conc increases' box;	1
(b)	To keep glucose constant/ too much glucose in the blood/ control glucose level in blood/ lower level (in blood)/ help level return to normal; It = glucose level	1
(c)	'X' on "insulin released" box; Accept 'X' on "glucose changed to glycogen" box.	1
(d)	Negative feedback;	1
Question total		[4]
7. (a)	D C B A ;;; 3/ 4 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark	3
(b)	To understand the possible effects on environment / health (safe to eat)/ health problems/ to check there is no transfer of genes to other species; NOT to see if genetic modification is successful	1
Question total		[4]

Question	Marking details	Marks Available
8. (a)	On pair 7; Opposite (defective allele)/ at the same locus/ at the same position;	1 1
(b) (i)	Could cause disease (leukaemia / cancer); NOT makes you ill/ gives you health problems/ side effects	1
(ii)	New cells / replaced cells / copies would have {cystic fibrosis/ defective} allele/ copy would not have the virus/ gene therapy would have to be repeated;	1
(c)	Profile would show {cystic fibrosis/ defective} gene/ show if parents were carriers (of the disease); would show chances/ risk of having a child with cystic fibrosis / (counsellor could) predict/ determine risk;	2
Question total		[6]

Question	Marking details	Marks Available
9. (a)	Any 2: Depth of soil; constant flow of spray/ Ref to rain e.g. rain is not constant; allowance for wind; evaporation; capacity of soil to soak up solution/ soil composition; ref to slope;	Max 2
(b)	Any 2 for 1 mark; Nitrate/ NO_3^- Phosphate/ PO_4^- Potassium/ K Named trace element e.g. Magnesium Allow correct formulae NOT NPK	Max 1

(c)

Indicative content

6

The fertiliser {runs off / leaches into} the water. The fertiliser causes {overgrowth of plants/ algal bloom} in the water. Top layers of plants {stop light reaching the lower layers/ stops photosynthesis underneath} so the lower layers of plants die. They decay by the action of bacteria which use up oxygen for respiration. This causes the fish to die because of lack of oxygen.

5 – 6 marks

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1 – 2 marks

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0 marks

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Question total**[9]**

Question	Marking details	Marks Available
10. (a)	Any 2 Same <u>volume</u> of water; same soil/ pH/ mineral (content); same temperature; NOT heat NOT light	Max 2
(b)	<u>Keep all factors the same</u> but use {pure water / tap water/ distilled water/ unpolluted water/ water without copper} NOT clean/ normal water	1
(c)	Mutation; Variation; Survival value – {some were tolerant to/ not poisoned by/ resistant to copper}; NOT immune to copper Gene passed on.	4
Question total		[7]
PAPER TOTAL		60