

# Mark Scheme (Results) Summer 2007

GCSE

## GCSE Science (1522/4H)

## USING THE MARK SCHEME

1. This mark scheme gives you;
  - \* an idea of the type of response expected
  - \* how individual marks are to be awarded
  - \* the total mark for each question
  - \* examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. ( ) means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

## MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

## AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

## QUALITY OF WRITTEN COMMUNICATION

Students will be assessed on their ability to:

present relevant information in a form that suits its purpose

ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear

use a suitable structure and style of writing.



- |    |     |  |   |
|----|-----|--|---|
| 1. | (a) | 5 / retina / rods / cones / rods and cones / fovea;                                      | 1 |
|    | (b) | 5 / retina / fovea;  | 1 |
|    | (c) | 1 and 7 / or any two of: cornea / lens / aqueous humour / vitreous humour / conjunctiva; | 1 |
|    | (d) | 2 / iris;  | 1 |

**Total 14 marks**

- |    |  |  |   |
|----|--|--|---|
| 2. | A description to include any six from: |  |   |
|    | 1.                                     | (lung) / other relevant cancers;   |   |
|    | 2.                                     | mutagens;  |   |
|    | 3.                                     | emphysema / breathing difficulties;  |   |
|    | 4.                                     | damage to alveoli;   |   |
|    | 5.                                     | bronchitis / pneumonia;  |   |
|    | 6.                                     | affect on cilia;   |   |
|    | 7.                                     | addiction / hard to quit;  |   |
|    | 8.                                     | reduced oxygen carriage;   |   |
|    | 9.                                     | reduced birth weight;  |   |
|    | 10.                                    | reference to cough / smokers cough;  |   |
|    | 11.                                    | <b>increased</b> mucus secretion;  |   |
|    | 12.                                    | reduced gaseous exchange;  |   |
|    | 13.                                    | effect on circulation / heat stroke / heart attack / affected narrowing of arteries; |   |
|    | 14.                                    | increased blood pressure;  | 6 |
|    | 15.                                    | reduced sperm count;   | 1 |

plus one communication mark for ensuring that spelling, punctuation and grammar are accurate, so that the meaning is clear.

**Total 7 marks**

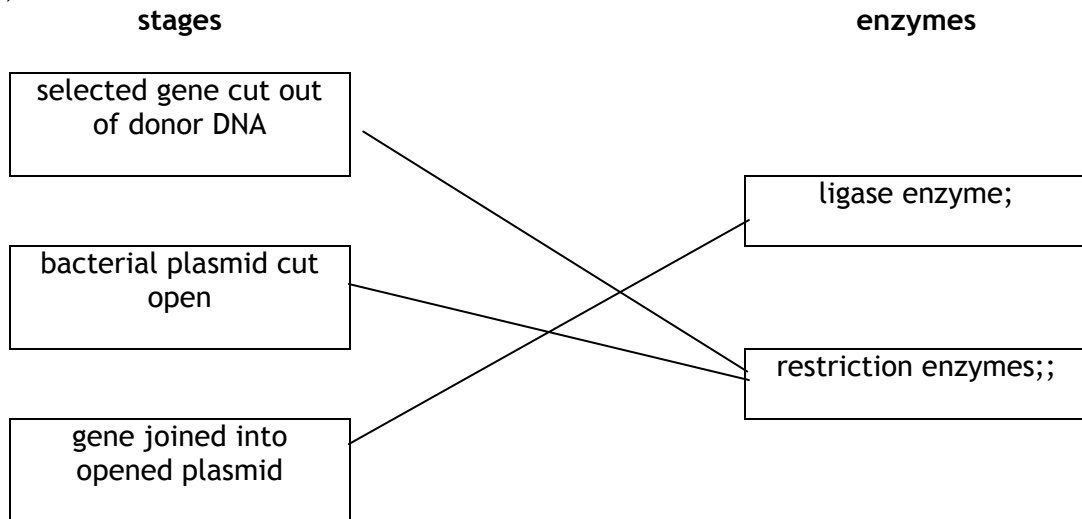
- |    |     |  |   |
|----|-----|--|---|
| 3. | (a) | axes plotted correct way around;<br>plotting correctly (lose 1 per error) ;; [less than a square]<br>smooth curve; | 4 |
|    | (b) | $40.5 \pm 1$ ;   | 1 |
|    | (c) | An explanation to include any six from:  |   |
|    |     | 1. at first as carbon dioxide increases photosynthesis increases;  |   |
|    |     | 2. between 0 and 1.0 - increase in photosynthesis;   |   |
|    |     | 3. rate slows down (0.6 and 1);  |   |
|    |     | 4. stays constant (after levelling off) / no change / stop rising;   |   |
|    |     | 5. rate limited by some other factor;  |   |
|    |     | 6. limiting factor;  |   |
|    |     | 7. example eg light / water / temperature;   |   |
|    |     | 8. saturation carbon dioxide;  | 5 |

plus one communication mark for presenting relevant information in a form that suits its purpose (logical sequence)

**Total 11 marks**

4.	(a)	testosterone;	
	(b)	growth of pubic / auxiliary hair / development of genitalia;	
	(c)	(i) A descriptions to include:	
		1. (FSH) - causes ovary to produce an ovum / to produce oestrogen / graafia follicles;	
		2. (LH) - causes ovulation / ovary to produce progesterone / corpus luteun;	
		3. oestrogen - causes rebuilding of uterine lining / prevents ovary from producing an ovum / causes pituitary to produce LH / inhibits FSH at low levels / ORA;	
		4. progesterone - maintains uterine lining / prevents FSH / LH production;	4
	(ii)	FSH and LH;	1
			<b>Total 7 marks</b>
5.	(a)	pancreas;	1
	(b)	(i) lipase;	1
		(ii) fatty acids and glycerol;	1
	(c)	(i) 40;	1
		(ii) (fatty) acids are formed / increased acidity; [Ignore amino] these lower the pH (to less than 5);	2
		(iii) A suggestion to include five from:	
		1. tube originally at 10 °C / tube 1 yellow;	
		2. enzyme not destroyed at low temperatures;	
		3. higher temperature raises rate of reaction / ORA;	
		4. reference to collisions;	
		5. reference to (activation) energy;	
		6. tube originally at 70 °C / tube 7 no change / remains blue;	
		7. no reaction (at 40 °C) / no acids produced;	
		8. enzyme destroyed / denatured at high temperature / enzyme does not work;	
		9. reference to optimum temperature / 40 °C;	
		10. enzyme not reactivated / start working again;	5
		plus one communication mark for using a suitable structure and style of writing	1
			<b>Total 12 marks</b>

6. (a)



3

(b) A suggestion to include any three from:

1. chemicals produced by the GM crop might enter food chain;
2. could get interbreeding between GM and non-GM plants / gene escapes into wild;
3. **weed** plants might gain resistance to herbicides;
4. **weed** plants might produce own insecticide;
5. insecticide produced by GM crop might kill non-pests, e.g. bees / humans / humanity;
6. any other valid logical suggestion; [Ignore colour / taste / shape]
7. not natural / against God / interfering with nature / unethical;

3

**Total 6 marks**

7. (a) cornea / conjunctiva / aqueous humour / vitreous humour;

1

(b) (i) N labelling the point with the greatest curvature of the lens;

1

(ii) H labelling a period of the curve which is flat / horizontal;

1

(iii) An explanation to include four from:

1. bird moving closer; [Reject bird gets further away]
2. lens curvature (constantly) increasing / more convex / thicker / lens rounder;
3. ciliary body contracting; [Reject radial muscles contract] [Allow circular muscles]
4. gradually / in steps (idea);
5. tension on lens decreases / suspensory ligaments becoming slacker;
6. lens elasticity;

4

**Total 7 marks**

8.	(a) (i)	adrenaline;	1
	(ii)	A description to include four from: 1. increases rate of heart beat; 2. increase depth / stroke volume of heart beat; 3. increase rate of breathing; 4. increase depth of breathing; 5. releases more glucose into blood / converts glycogen to glucose; 6. diverts more blood flow to skeletal muscles / more oxygen; 7. reduces blood flow to skin / gut; 8. increased blood flow to brain; 9. increased alertness / reduced reaction time / pupils dilate; 10. dulls pain;	4
	(b) (i)	An explanation to include any three from: 1. sweat contains water; 2. water evaporates; 3. uses heat from body for evaporation / reference to latent heat of vaporisation; 4. lowers body temperature towards normal;	3
	(ii)	An explanation to include any three from: 1. skiers buried in snow will have lost a lot of body heat; 2. hypothermia state; 3. will cause more blood to flow near skin's surface; 4. capillaries dilating; 5. loss of further heat; 6. could lead to / aggravate hypothermia; [Reject movement of capillaries]	3
			<b>Total 11 Marks</b>
9.	(a)	recessive;	1
	(b) (i)	1 - Aa and 3 - aa;	1
	(ii)	4;	1
	(c)	chance of any child being female is 1 in 2 / 50%; chance of homozygous recessive from a heterozygous cross is 1 in 4 / 25% thus chance of next child being female with albinism is 1 in 8 / 25% of 50% / 12.5%;	3
			<b>Total 6 marks</b>

- 10 (a) (i) 15:00 ± 30 minutes / 3pm;
- (ii) 15:00 ± 30 minutes / 3pm;
- (b) A description and explanation to include six from:
1. no photosynthesis at night;
  2. carbon dioxide high, oxygen low;
  3. respiration at night;
  4. photosynthesis during day;
  5. oxygen high, carbon dioxide low;
  6. light intensity varies during day;
  7. more photosynthesis than respiration;
  8. respiration 24 hours;

6

**Total 8 marks**

- 11 (a) (i) denitrifying bacteria; [Ignore named bacteria]  
change nitrates back to nitrogen; [Ignore give off nitrogen] 2
- (ii) nitrifying bacteria;  
change ammonia / nitrites / urea into nitrates; 2
- (iii) nitrogen-fixing bacteria;  
convert nitrogen to nitrates; 2
- (b) A description to include any two from:
1. nitrates in the soil; [Reject amino acids]
  2. available to plants/taken up by plants;
  3. used to make **proteins** / amino acids; 2
- (c) A description to include any three from:
1. nitrogen-fixing bacteria;
  2. convert nitrogen to nitrates;
  3. in root **nodules**;
  4. leguminous plants; 3

**Total 11 Marks**

**TOTAL MARK 90**