

Mark Scheme (Results) Summer 2007

GCSE

GCSE Science (1520/4H)

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) | 2 / phase 2; | 1 |
| | (b) | (i) 8; | 1 |
| | | (ii) 40 / 40 minutes; | 1 |
| | (c) | A suggestion to include any three from:
1. lack of nutrients / food / minerals;
2. lack of oxygen / anaerobic conditions;
3. build up of toxins;
4. change in pH / adverse pH / extremes of pH;
5. rise in temperature;
[Ignore lack of space]
[Reject fall in temperature] | 3 |

Total 6 marks

- | | | | |
|----|-----|--|---|
| 2. | (a) | (i) identical DNA / genes;
to another organism; | 2 |
| | | (ii) fertilised (single) egg cell;
splits into two embryos / individuals / forms twins;
[Reject reference to two sperms entwining] | 2 |
| | (b) | (i) 1. (egg) cell must be enucleated / have nucleus removed;
2. (diploid) nucleus inserted (from donor);
3. cell stimulated to divide / under go mitosis;
[Reject meiosis] | 3 |
| | | (ii) A suggestion to include any three from:
1. risks in selection of particular features;
2. reduction in potential gene pool / reduction in biodiversity;
3. could be used for the wrong reasons in humans eg super race /
armies / gender imbalance;
4. conflict with religious belief;
5. risk of disease killing all of a clone;
6. social aspects eg segregation clonal versus non-clonal /
premature aging;
[Ignore psychological problems / loss of individual uniqueness /
designer babies] | 3 |

Total 10 marks

3. (a)

Cholera sp.
Escherichia sp.
Fusarium sp.
Lactobacillus sp.

✓;

- (b) (i) alimentary canal / (small / large) intestine / rectum / gut / stomach; 1
- (ii) through (contaminated faeces / contaminated food / faeces in food); 1
- (c) (i) a lot of chickens in a small area / space; 1
- (ii) increases (risk) of bacterial transfer / increased (risk) of cross-infection; 1
- (d) Any two from:
1. make certain it is totally defrosted;
2. cook thoroughly / completely / all the way through;
3. keep covered / in fridge after cooking; 2
- (e) A suggestion to include any two from:
1. babies / (very) young;
2. elderly / (very) old;
3. those already ill with another infection / HIV / immunity problems; 2

Total 9 marks

4.

An explanation to include any four from:

phagocytes -

1. surround / engulf bacteria / foreign bodies;
2. secrete enzymes onto them;
3. (chemically) digest them;

lymphocytes - 3 max

4. produce antibodies;
5. clump bacteria;
6. destroy / disable / kill / break down / disrupt bacteria /
makes it easier for phagocytes to work;
7. produce antitoxins;
8. neutralise toxins from bacteria;
9. reference to memory cell production;

plus one communication mark for using a suitable structure and style of writing

Total 5 marks

5. (a) (i) (antibiotic) B; 1
- (ii) (antibiotic) E; 1
- (b) (i) a mutation (in the bacterium); 1
- (ii) An explanation to include any three from:
 1. antibiotics kill non-resistant bacteria;
 2. resistant ones survive;
 3. resistant ones reproduce;
 4. they become the bulk of the population (over time); 3
 [Reject immunity = max 2 antibodies = max 2]
- (c) An explanation to include:
 1. antibiotics interfere with cell wall formation / cell metabolism;
 2. viruses do not have cell wall / their own (cell) metabolism; 2

Total 8 marks

6. (a) 1 - lymphocyte
 2 - tumour cell / cancer cell
 3 - hybridoma 3
- (b) A suggestion to include any three from:
 1. diagnosing illness / diseases;
 2. detecting the presence of drugs / drug testing;
 3. testing for the presence of hormones / pregnancy testing;
 4. cancer treatment / specific cell attack;
 5. attach a drug / radioactive isotope for treatment / targeting;
 6. use of fluorescent makers for food screening / diagnosis /
 detect specific antigens; 3

Total 6 marks

7.	(a)	main stages in producing genetically modified bacterium	order of stages	
		a plasmid is taken from a bacterium	1;	
		bacterium is cloned	6;	
		human gene is placed into bacterial plasmid	4;	
		modified plasmid is put into bacterium	5;	
		relevant gene is cut from human DNA	3;	
		the plasmid is cut open	(2)	5
	(b)	(i)	1. fertilised; 2. egg cell / gamete / zygote; [Ignore sperm / gonads] 3. thus passed on at mitosis / to all sheep's cells; [Ignore offspring]	2
		(ii)	50% / half / ½ / 0.5;	1
	(c)	A suggestion to include: (designer milk) can produce large quantities (of antibodies) / can pass feature on to offspring / can enlarge base for production; (human cell culture) potentially safer product / production of modified culture more reliable; [Ignore reference to economics]		2

Total 10 marks

8.

A description to include any five from:

1. stimulation of ovulation (of **Lincoln Red**) / superovulation / large numbers of egg cells;
2. by use of hormones / oestrogen / FSH / LH;
3. removal of eggs (from cow/**Lincoln Red**);
4. semen collected (from bull/**Lincoln Red**) / use of artificial vagina;
5. *in vitro* fertilisation / in test tube;
6. growth of embryo / of ball of cells;
7. implantation (of embryo) into **uterus** / **womb** (of Friesian);

5

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

1

Total 6 marks

TOTAL MARK 60