

Mark Scheme (Results)

Summer 2007

GCSE

GCSE Science B (3P/5647, 6P/5648)

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 total mark awarded for a question should be written in the box at the end of the question.
2. The total marks for a question should 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

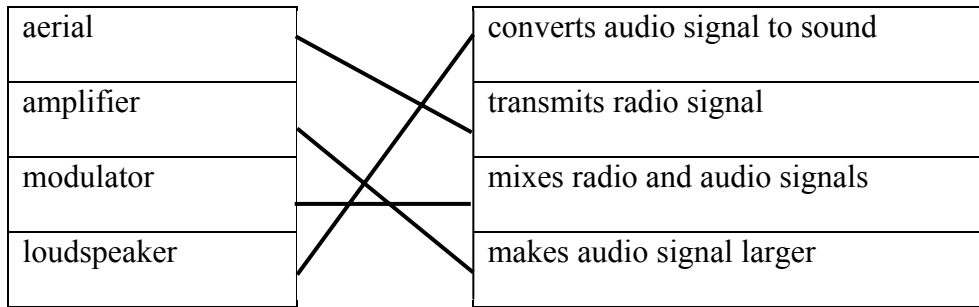
Students will be assessed on their ability to:

- 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 of a suitable structure and style of writing.
- use ✓c or Xc to show if the communication mark is given or not.

Mark Scheme

If there are two question numbers, the first refers to the Foundation tier paper and the second to the Higher tier paper.

1 a



all correct;;; 2 or 3 correct;; 1 correct;

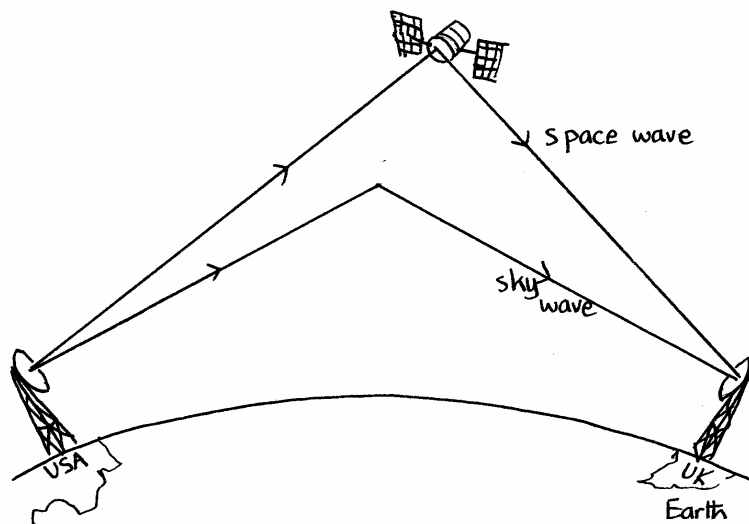
Total 3 marks

2

electron	✓	;
neutron		
proton		
quark	✓	;

Total 2 marks

3 a



b

wave follows curve of Earth;
reflection;
by/at/in ionosphere;

1
2

Total 3 marks

4 a **MS: USE GRAPH FROM PAPER WHEN IT HAS BEEN AMENDED**

- i plots;; 2
- ii line; 1
- iii ans from graph / -273; 1
unit if included must be correct
- iv absolute zero; 1
- b any two from 2
particles have more energy;
particles move faster;
hit walls/container more often;
hit walls/container harder;

Total 7 marks

5/1 a i reduced height on both;
constant frequency on both;



2

ii raggedness on both;
vertical raggedness displacement only;



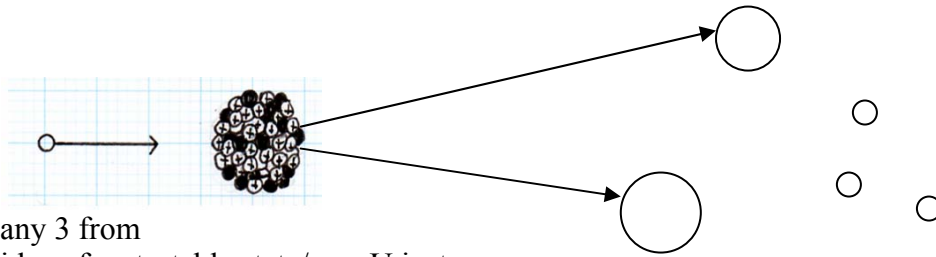
2

b i Communication mark: SPAG mark 3
AM =constant frequency OR varying amplitude;
FM = constant amplitude OR varying frequency;
allow diagram(s)

	property	AM	FM	DAB	
ii	greatest range	✓			2
	most susceptible to noise	✓			
	can be regenerated			✓	
	most information in signal			✓	

Total 9 marks

6/2 a i



3

any 3 from
 idea of metastable state/new U isotope
 splits /fission/breaks up; not 'breaks'
 2 daughters/ 2(smaller) nuclei/ 2 new isotopes;
 additional/new/other neutron(s);
 energy released;

ii idea of continued **nuclear** reaction (the neutrons produced hits another nucleus and produces fission) /OWTTE; **1**

allow description in ai

bi one from **1**
 no green-house gases produced/CO₂
 does not use a fossil fuel
 does not produce atmospheric pollution
 does not contribute to global warming;
 allow no slag heaps
 reject nuclear energy is renewable.

ii produces waste that is radioactive/toxic/difficult to dispose of ; **1**
 no ORA in either mark

Total 6 marks

3

$$T_2 = P_2 \times T_1$$

$$T_2 = P_2 \times T_1 / P_1$$

$$= 45 \times 273 / 30$$

$$= 410 \text{ K} (-273 = 137 \text{ C})$$

allow reverse calculation

$$P_2 = (T_2 \times P_1) / T_1$$

$$(413 \times 30) / 273$$

$$= 45 \text{ MPa}$$

[140°C → 45.38 MPa; ; ;]

equation is given – no mark
 rearrangement;
 substitution in the correct units;
 ans;

Total 3 marks

4 a

any two of **2**
 oval shaped path
 over N and S poles
 Mars is at a focus/variable height of orbit;;
 allow diagram

b

new orbit is polar;
 any one from
 Mars turns between orbits
 satellite sees new swathe/ORAs; **2**

c

$$F = m \times \frac{v^2}{r}$$
$$= \frac{1031 \times (3.142 \times 1000)^2}{3690000}$$

=2758 N;
accept 2757N or 2760N
if other than 4 sig figs max of 1 mark
allow 2.758 N for 1 mark

equation given – no mark

substitution in SI units

ans with unit

2

Total 6 marks

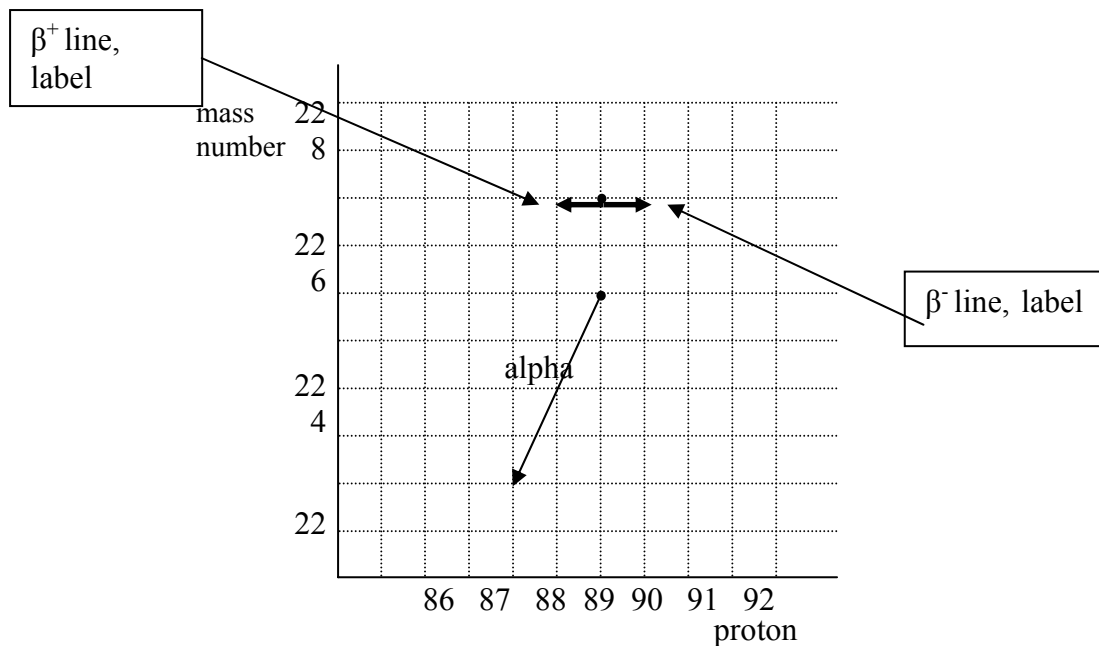
5 a

type of decay	mass number	proton number
α	decreases by 4	decreases by 2
β^+	no change	decreases by 1
β^-	no change	increases by 1

all correct;;
one correct line;

2

b



all 4 marking points;;

- arrow 1
- arrow 2
- correct label
- correct label

allow any 2 from 4 marking points for 1 mark

allow for 1, correct lines/labels from Ac224

c

any one of

(excited) nucleus loses extra energy;

nuclear rearrangement;

(gamma emitted as result of) change from metastable to stable state;

d

one of the quarks changes from/ turns into/ becomes one type of quark to the other;

UP and DOWN do **not** need to be specifically mentioned

2

1

1

Total 6 marks

TOTAL FOR PAPER: 30 MARKS