

# GCSE

Science: Double Award B (1536)

Separate Sciences: Biology B (1529),  
Chemistry B (1539), Physics B (1549)

Summer 2005

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Mark Scheme (Results)

2P/5667

2P/5647

5P/5668

5P/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

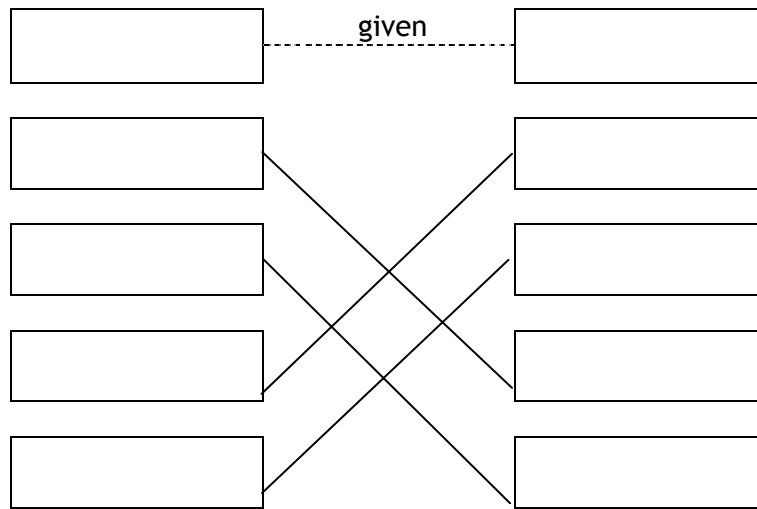
conductors	insulators
iron	<i>Nylon (given)</i>
copper	glass
	rubber

same item in both columns  
 scores zero  
 ignore extra words  
 allow Fe,FE,fE etc.

1 mark for each correct answer

Total 4 marks

2



1 mark for each correct line;;;;  
 (any two lines to or from a box score 0 for that box)

Total 4 marks

3

- a) total/complete internal; (TIR/totally internally reflected = 1 1
- reflection; ( bald reflected = 0) 1
- b) straight (by eye) from A to opposite wall of fibre; 1
- (must touch, must not emerge)
- reasonable attempt at reflection law at A and maximum of 2 extra 1
- reflections;

Total 4 marks

4

- a) i) 35 (m/s) ; (ignore all units) 1
- ii) 25 (m/s); (ignore all units) 1
- b) line has steeper gradient ; (curve OK if all above A) 1
- (vertical =0) 1
- line is horizontal above A; 1

Total 4 marks

- 5/1 a) (idea of) time for half of undecayed nuclei/atoms to decay 1  
OR (idea of time) for radioactivity/count rate halved;  
(reject mass changes)
- b)  $1000 \div 2$  [any other value (in range 500-1000)  $\div 2$ ]; (check graph) 2  
50 (47-53) (min); (ignore unit)  
(or alternative calculation for 2 marks)  
[Reject  $100/2 = 50$  for both marks]
- c) i) 2 (Bq); (ignore units) 1  
ii) any two from:  
contamination idea; e.g. still waste there/soil contaminated  
opinion/perception of risk/worry/fright;  
radioactivity can be harmful/dangerous/cause cancer/mutations;  
2 Bq (or ecf from ci)/only 2 half lives/remains radioactive for long time; 2

Total 6 marks

- 6/2 a) i) arrow shown C  $\rightarrow$  D on coil; 1  
ii) arrow shown vertically upwards near CD; 1
- b) QWC mark for ensuring spelling, punctuation and grammar are accurate, so that the meaning is clear; 3  
reverse the magnets/OWTTE;  
reverse the polarity of the battery/OWTTE;  
(accept reverse current/flow of charge)  
(ignore references to force)
- c) (P=I.V); eqn 3  
(accept P = amps x volts but not P=A.V unless A is defined )  
substitution  
P=0.5 x 6;  
=3 W; ans with unit accept J/s 3  
(3 with any unit =2)

Total 8 marks

- 3 a) Any three from:  
particles (atoms/molecules);  
moving;  
hit/collide with sides of container; (accept bounce for hit)  
(ignore particles colliding with each other)  
many collisions;  
change of momentum idea/force; 3
- b)  $P_2 = \frac{P_1 V_1}{V_2}$  ; rearrangement  
 $\frac{5 \times 10^5 \times 200}{960}$  ; substitution (5x10<sup>5</sup>x200 = P<sub>2</sub>x960 scores 1)  
104 167 answer (1.042\_5 or 1.042 5 scores 2) 3  
104 170  
104 200  
104 000  
100 000  
any of these in standard  
form (Pa) (ignore unit)

Total 6 marks

- 4 a) KE due to motion/velocity, /  $\frac{1}{2} mv^2$  / equivalent to work done accelerating an object; 2  
 GPE due to position/height/mgh/equivalent to work done lifting; (gravity on its own is insufficient); accept alternative method
- b) i) GPE = mgh; 3  
       =  $500 \times 10 \times 3$ ; (ignore unit)  
       = 15 000 (J); energy form
- ii) energy lost as heat or sound; where/how dissipated 2  
 in the wires/motor/bearings/rope; (e.g. the wires get hot = 2, heat lost as friction = 1. Note friction is not a form of energy)

Total 7 marks

- 5 a)  $f = v / \lambda$  or in words; 1
- b) Any two from: 1  
 high (frequency) means shorter wavelength ORA explicitly shown in words or on diagram;  
 more diffraction for low frequency because wavelength similar to door width/ORAs; 1  
 (diagrams must show same aperture size , different wavelengths, and correct diffraction for two marks)

Total 3 marks

TOTAL FOR PAPER 30 MARKS