

Mark Scheme (Results)

November 2009

IGCSE

IGCSE Science (Double Award) (4437) Paper 2F

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

<http://www.edexcel.com/Aboutus/contact-us/>

Alternately, you can speak directly to a subject specialist at Edexcel on our dedicated Science telephone line: 0844 576 0037

(If you are calling from outside the UK please dial + 44 1204 770 696 and state that you would like to speak to the **Science** subject specialist).

November 2009

Publications Code UG022406

All the material in this publication is copyright

© Edexcel Ltd 2009

SECTION A

| Question | | Mark | Acceptable answers | | Notes | Total |
|----------|---|------|--------------------|--|----------------------|----------|
| 1 | a | M1 | S | | | 1 |
| | b | M1 | O | | | 1 |
| | c | M1 | 1 | | Accept Alkali metals | 1 |
| | d | M1 | 2 | | | 1 |
| | e | M1 | Al / aluminium | | | 1 |
| | | | | | TOTAL | 5 |

| Question | | Mark | Acceptable answers | | Notes | Total |
|----------|---|------|--------------------|--|--------------|----------|
| 2 | a | M1 | hydrocarbons | | | 1 |
| | | M2 | heated | | | 1 |
| | | M3 | distillation | | | 1 |
| | | M4 | top | | | 1 |
| | | M5 | condenses | | | 1 |
| | | | | | TOTAL | 5 |

| Question | | Mark | Acceptable answers | | Notes | Total |
|----------|---|------|--------------------|-----------------|--------------|----------|
| 3 | a | i | M1 | copper | | 1 |
| | | ii | M1 | sodium / copper | | 1 |
| | | iii | M1 | iron | | 1 |
| | | iv | M1 | copper | | 1 |
| 3 | b | | M1 | cross in box 2 | | 1 |
| | | | M2 | cross in box 3 | | 1 |
| | | | | | TOTAL | 6 |

| Question | | Mark | Acceptable answers | Notes | Total |
|----------|-----|------|--|--------------------------|----------|
| 4 | a | M1 | white | | 1 |
| | | M2 | colourless | | 1 |
| | | M3 | decomposition | | 1 |
| | b | M1 | ammonium chloride | | 1 |
| | c i | M1 | white precipitate / solid / suspension | ignore powder / crystals | 1 |
| | ii | M1 | ammonia / NH ₃ | | 1 |
| | | | | TOTAL | 6 |

| Question | Mark | Acceptable answers | Notes | Total |
|----------|------|--|--|-------|
| 5 | a | M1 M2 (dilute) sulphuric acid water + carbon dioxide (gas) + (solid) zinc carbonate sulphate → + zinc | M1 zinc sulphate M2 complete equation | 1 |
| | b | M1 limewater | | 1 |
| | | M2 turns milky | | 1 |
| | c | M1 heat / increase the temperature | Any two for 1 each | 1 |
| | | M2 use powdered/smaller pieces(of zinc carbonate) | | 1 |
| | | M3 use more concentrated (sulphuric) acid | | 1 |
| | d i | M1 carbonic (acid) | | 1 |
| | | ii M1 cross in box 2 | | 1 |
| | | iii M1 orange / yellow | | 1 |
| | | | TOTAL | 9 |

| Question | Mark | Acceptable answers | Notes | Total |
|----------|------|---|---|-------|
| 6 | a | M1 limestone / calcium carbonate | Either way round | 1 |
| | | M2 coke / carbon | | 1 |
| | | M3 (hot) air | | 1 |
| | | M4 slag / calcium silicate | Award 1 mark for D and E in reverse order | 1 |
| | | M5 iron | | 1 |
| | b i | M1 $C + O_2 \rightarrow CO_2$ | | 1 |
| | | ii M1 carbon + carbon dioxide → carbon monoxide | | 1 |
| | | iii M1 loss of oxygen | Accept gain of electrons | |
| | | | TOTAL | 8 |

| Question | | Mark | Acceptable answers | | Notes | Total |
|----------|---|------|--------------------|--|---------------------------|----------|
| 7 | a | | M1 | black | | 1 |
| | | | M2 | blue | Reject green | 1 |
| | b | i | M1 | to neutralise/use up/react with all the acid | | 1 |
| | | ii | M1 | to remove the solid / copper oxide | | 1 |
| | | iii | M1 | to remove/evaporate (some of) the water | Accept "so crystals form" | 1 |
| | | iv | M1 | to dry the crystals / absorb water | | 1 |
| | | | | | TOTAL | 6 |

SECTION A TOTAL: 45 MARKS

SECTION B

| Question | | Mark | Acceptable answers | Notes | Total |
|----------|-----|------|----------------------------------|---|----------|
| 8 | a | M1 | (electron) 1/1836 / negligible | Accept value in range 1/2000 to 1/1800 and 0.0005 to 0.00056 Ignore zero | 1 |
| | | M2 | (neutron) 0 | | 1 |
| | | M3 | (proton) 1 | | 1 |
| | | M4 | (proton) +1 | | 1 |
| | b i | M1 | (number of) protons and neutrons | | 1 |
| | | M2 | 35 | | 1 |
| | ii | M1 | 18 | | 1 |
| | c i | M1 | 5 | | 1 |
| | ii | M1 | isotopes | | 1 |
| | | | | | |
| | | | | TOTAL | 9 |

| Question | | | Mark | Acceptable answers | Notes | Total |
|----------|---|----|------|--|---|----------|
| 9 | a | i | M1 | different boiling points / boiling point of propanone lower than that of water | | 1 |
| | | ii | M1 | heat / boil | | 1 |
| | | | M2 | propanone boils/collects (first) | | 1 |
| | | | M3 | stop collecting liquid above 56 °C | Accept wording that indicates that water collected separately or not at all | 1 |
| | b | | M1 | cross in column 1 box 4 | | 1 |
| | | | M2 | cross in column 2 box 2 | | 1 |
| | | | | | | |
| | | | | | TOTAL | 6 |

| Question | | | Mark | Acceptable answers | Notes | Total |
|----------|---|-----|------|--|--|----------|
| 10 | a | | M1 | (bromine) liquid | | 1 |
| | | | M2 | grey / black | | 1 |
| | b | i | M1 | any indication of chlorine in left hand tube | | 1 |
| | | ii | M1 | hydrogen / H ₂ | | 1 |
| | | iii | M1 | brine / sodium chloride solution / NaCl(aq) | Accept concentrated/saturated NaCl Ignore sea water | 1 |
| | c | | M1 | chlorine + sodium bromide → | M1 reagents | 2 |
| | | | M2 | bromine + sodium chloride | M2 products | |
| | | | | | | |
| | | | | | TOTAL | 7 |

| Question | Mark | Acceptable answers | Notes | Total | |
|----------|------|--------------------|---|--|----------|
| 11 | a | M1 | double bond / C=C / not all bonds are single | 1 | |
| | b | M1 | contains bromine / another element/atom does not contain only carbon and hydrogen | 1 | |
| | c | M1 | B and E | 1 | |
| | d | M1 | A and B / A and E / C and F | 1 | |
| | e | M1 | alkane(s) | 1 | |
| | | M2 | C_nH_{2n+2} | Accept other symbols such as x | 1 |
| | f | M1 | yellow / orange / brown | 1 | |
| | | M2 | colourless / decolorised | Ignore clear | 1 |
| | | | | If only colourless stated, assume it is final colour | |
| | | | | | |
| | | | | TOTAL | 8 |

SECTION B TOTAL: 30 MARKS

PAPER TOTAL: 75 MARKS

Further copies of this publication are available from
International Regional Offices at www.edexcel.com/international

For more information on Edexcel qualifications, please visit www.edexcel.com
Alternatively, you can contact Customer Services at www.edexcel.com/ask or on + 44 1204 770 696

Edexcel Limited. Registered in England and Wales no.4496750
Registered Office: One90 High Holborn, London, WC1V 7BH