

GCE

Edexcel GCE

Chemistry Nuffield(8086/9086)

January 2005

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Mark Scheme

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SECTION A

1 Magnesium or beryllium (1 mark)

2 Only penalise wrong or missing units once in parts (a) & (b).

(a) 24 dm³ OR 24 000 cm³ (1 mark)

(b) 48 dm³ OR 48 000 cm³ (1 mark)

3 (a) Reduction – gained electron(s)/ decrease in oxidation number (1 mark)

(b)  (1 mark)

(c) Na⁺ or Mg²⁺ or Al³⁺
Ne / Neon
F⁻ or N³⁻ (3 marks)

4 Too many electrons
No electrons between the positive ions
Positive ions touching / should have gaps } Any two

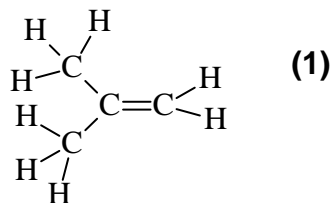
Check words like ion / molecule / atom / electron / are correctly used to award full marks (2 marks)

TOTAL SECTION A: 10 MARKS

SECTION B

- 5 (a) Isomer(s) (1 mark)
- (b) B and C (1 mark)
- (c) A (1 mark)
- (d) 2-methylpropan-2-ol (1 mark)
- (e) D and E (2 marks)
- (f) (i) Removal of water (1 mark)
- (ii) Alkene / C=C /carbon carbon double bond (1 mark)

(iii)



2-methylprop-1-ene (1)

(2 marks)

(Total 10 Marks)

- 6 (a) $\dots 2p^6 3s^2 3p^6 3d^{10} 4s^2 (1) 4p^6 5s^2 (1)$ (2 marks)
- (b) (i) $\text{Sr(g)} \rightarrow \text{Sr}^+(\text{g}) + \text{e}^-$
Formulae (1)
State symbols (1) (2 marks)
- (ii) ALL increasing (1)
Jump between second and third larger than between any other pair (1) (2 marks)
- (c) Provide red colour (1 mark)
- (d) (i) Sr^{2+} (1 mark)
- (ii) Sr(OH)_2 (1 mark)
- (e) (i) $\text{Sr(s)} + 2\text{H}_2\text{O(l)} \rightarrow \text{Sr(OH)}_2(\text{aq or s}) + \text{H}_2(\text{g})$
Formula, H_2 and balancing (1)
state symbols (1) (2 marks)
- (ii) $\text{Sr(OH)}_2(\text{s}) + 2\text{HCl(aq)} \rightarrow \text{SrCl}_2(\text{aq}) + 2\text{H}_2\text{O(l)}$
Formulae and balancing (1)
State symbols (1) (2 marks)
- (f) Any number from 8 to 12 inclusive (1 mark)

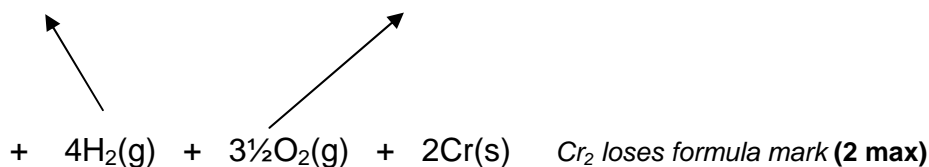
(Total 14 Marks)

- 7 (a) (ionic) precipitation (1 mark)
- (b) (i) $(2)\text{NH}_4^+$ and $\text{Cr}_2\text{O}_7^{2-}$ (2 marks)
- (ii) $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 2\text{NH}_4^+(\text{aq}) \rightarrow (\text{NH}_4)_2\text{Cr}_2\text{O}_7(\text{s})$
State symbols not required (1 mark)
- (iii) The orange colour would move towards the anode / + / left (1 mark)
- (c) (i) $18 \times 2 + 52 \times 2 + 16 \times 7 = 252 \text{ (g / g mol}^{-1}\text{)}$
Penalise incorrect units eg 252 g⁻¹ in (i) and (ii) only once. (1 mark)
- (ii) 0.1 mol has a mass of 25.2 (g)
ALLOW TE (1 mark)
- (iii) $100 \text{ cm}^3 / 0.1 \text{ dm}^3$ must have units (1 mark)
- (iv) Filter (1)
Wash with (small quantity) / (cold) water (1)
 Dry between filter papers / in a warm oven (< 40 °C) / in a desiccator (3 marks)
- (v) Some remains in solution
 Some lost on washing
 Transfer loss eg on glassware, filter paper } *Any two* (2 marks)
- (Total 13 Marks)

8 (a) thermal decomposition / redox
NOT reduction or oxidation *on their own* (1 mark)

(b) (i) Formation of 1 mole of the compound/substance (1)
from its elements (1)
in their standard states/ under standard conditions/ (temperature
and pressure) at 298K and 1 atmosphere pressure (1) (3 marks)

(ii) (3 marks)



Mark independently formulae (1)
number of moles (1)
arrows and state symbols (1) – *depend on one mark being given for
the above.*

(3 marks)

(iii) 0 / zero (kJ mol⁻¹) (1 mark)

(iv) 4 × -242 + -1140 (OR - 2108) - -1810 (1)

-298 kJ mol⁻¹
value (1)
signs and units (1) *dependent on value being one of these given* (3 marks)

(c) Exothermic + attempt at explanation (1)
Bonds are formed when a gas turns to a liquid (1)
ACCEPT answers based on kinetic theory
Evaporation is endothermic (therefore by Hess's Law) the reverse
must be exothermic (2 marks)

(Total 13 Marks)

END