

Name:

Edexcel Style

Combined Science GCSE

Extracting Metals and Equilibria Test (Levels 4–9)

Date:

Time Allowed: 50mins

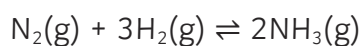
Question	Links to Student Progress Sheet	Score	Total Marks Available
1	4.13, 4.14, 4.15, 4.16, 4.17		11
2	4.3, 4.4, 4.5, 4.7		21
3	4.8, 4.10		3
4			5
Total			40

%	Estimated Grade
94-100	9
80-93	8
66-79	7
56-65	6
48-55	5
40-47	4
0 – 39	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

1. When ammonia is formed from hydrogen and nitrogen, the reaction reaches a dynamic equilibrium. The equation is shown below:



(a) i. What is the name of this process? (1)

ii. What does the ' $\rightleftharpoons$ ' symbol mean? (1)

iii. When equilibrium is reached, what gases will be present? (2)

(b) What does the term 'dynamic equilibrium' mean? (2)

(c) In industry, the reaction between hydrogen and nitrogen is performed under controlled conditions to produce the desired result.

(i) The reaction is exothermic and a temperature of 450°C is used. How would a lower temperature affect the equilibrium yield? (2)

(ii) The reaction is still slow at this temperature. How can this be overcome when being used in industry? (1)

- (iii) The reaction is still slow at this temperature. How can this be overcome when being used in industry? (2)

(Total for Question 1 = 11 marks)

2. Metals can be extracted from their natural state, such as iron from haematite.

- (a) What is the name given to the natural state of a substance from which a metal can be extracted? (1)

- (b) i. Iron can be extracted from iron oxide when it is heated with carbon. This process also produces a gas.

What is the word equation for this reaction? (1)

- ii. What is the test for the gas which is formed? (2)

- iii. Using part 2(bi), write the balanced symbol equation for this reaction. (3)

- (c) When lead oxide is converted into lead by heating with carbon, the carbon is oxidised. Explain how. (2)

(d) i. Aluminium is extracted by reduction. In terms of oxygen, what is meant by the term 'reduction'? (1)

ii. Two methods of reduction extraction are heating with carbon and electrolysis. Why does aluminium need to be extracted by electrolysis? (2)

iii. Electrolysis uses inert electrodes. What does 'inert' mean? (1)

iv. What happens in terms of electrons at the anode and cathode? (2)

Anode: _____

Cathode: _____

(e) Different metals are extracted using different methods according to where they are in the reactivity series. Gold is found in the earth's crust as an uncombined element. Aluminium is extracted using electrolysis and iron is extracted by heating its oxide with carbon.

Part of the reactivity series can be seen below:

calcium

magnesium

zinc

tin

lead

The missing elements are gold, iron and aluminium.

Using the information given, place these elements into the spaces above. Then, explain your reasoning for this placement. (6)

(Total for Question 2 = 21 marks)

3. Canned drinks are very popular and are often made from aluminium coated with tin.
The table below shows three different metallic substances and information about them.

Metal	Amount in Earth's Crust (%)	Cost per kg (£)
tin	0.0002	12.6
aluminium	8	1.31
steel (iron)	5	0.32

- (a) Using the information given, suggest two reasons why recycling tin is more important than aluminium or steel. (2)

1.

2.

- (b) Name one other way to remove copper from solid containing its compounds. (1)

(Total for Question 3 = 3 marks)

4. (a) Farmers use fertiliser on their fields. Explain why.

(1)

Some fertilisers use ammonia. The table below gives some information.

Substance	% by Mass of Oxygen	% by Mass of Nitrogen
urea	27	47
ammonium sulphate	48	21
ammonium nitrate	60	35

(b) Use information from the table above to explain why urea might be the most effective fertiliser.

(2)

(c) State two ways that fertilisers can affect plants and animals in rivers.

(2)

1. _____
2. _____

(Total for Question 4 = 5 marks)

TOTAL FOR PAPER = 40 MARKS