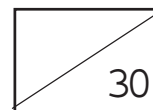


# National 5 Chemistry in Society

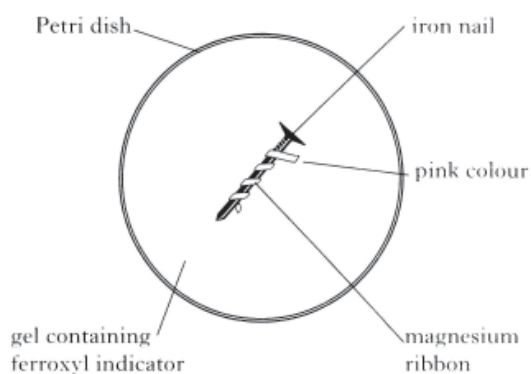
## Test 2



Name \_\_\_\_\_



1.



Which ion gives a pink colour with ferroxyl indicator?

- A  $\text{OH}^- (\text{aq})$
- B  $\text{Fe}^{2+} (\text{aq})$
- C  $\text{Fe}^{3+} (\text{aq})$
- D  $\text{Mg}^{2+} (\text{aq})$

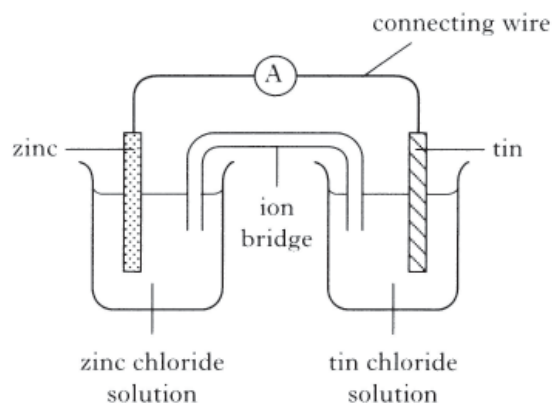
2. Which of the following elements is most likely to be obtained by electrolysis of its molten compounds?

- A Calcium
- B Gold
- C Iron
- D Zinc

3. What is the percentage by mass of aluminium in aluminium oxide,  $\text{Al}_2\text{O}_3$ ?

- A 40%
- B 53%
- C 62%
- D 66%

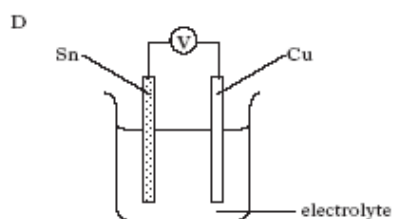
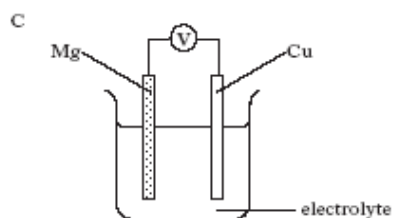
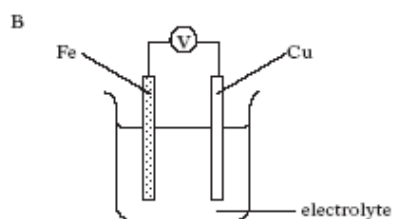
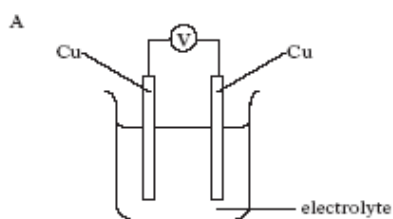
4. In the experiment below



Electrons will flow from

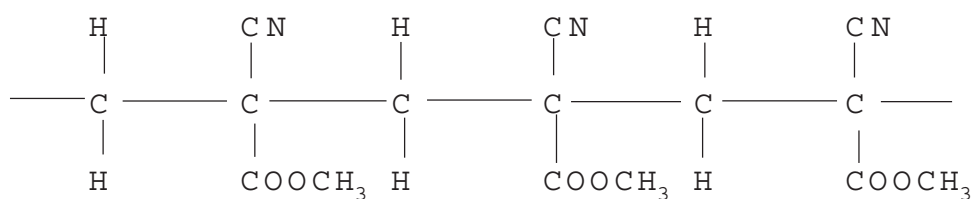
- A Tin to zinc through the wire
- B Zinc to tin through the wire
- C Tin to zinc through the ion bridge
- D Zinc to tin through the ion bridge

- 5 Which of the following metals reacts vigorously with acid?
- A Magnesium  
B Silver  
C Lead  
D Tin
- 6 In which of the following situations will the iron be protected from rusting?
- A Lead pipes connected to iron pipes.  
B Copper nails used to support iron sheets.  
C Iron plates held by copper rivets  
D Zinc nails used to support iron sheets
- 7 Which of the following cells would produce the highest voltage?  
(You may wish to use page 7 of the data booklet to help you.)



- 8 Monomers used to make addition polymers must be
- A carbohydrates  
B hydrocarbons  
C saturated  
D unsaturated
- 9 Polyethene is
- A a synthetic addition polymer  
B a natural addition polymer  
C a synthetic condensation polymer  
D a natural condensation polymer
10. Which of the following salts can be prepared by precipitation?
- A calcium nitrate  
B calcium chloride  
C silver chloride  
D nickel sulphate
11. Which of the following is not a fertiliser?
- A Potassium sulphate  
B Sodium chloride  
C Sodium nitrate  
D Sodium phosphate
12. A sample of polluted water gives a green flame colour. Which element must be present in the water?
- A Calcium  
B Copper  
C Potassium  
D Sodium

13. When superglue sets, a polymer is formed. Part of the polymer structure is shown.



- (a) Draw the structure of the repeat unit in the superglue polymer.

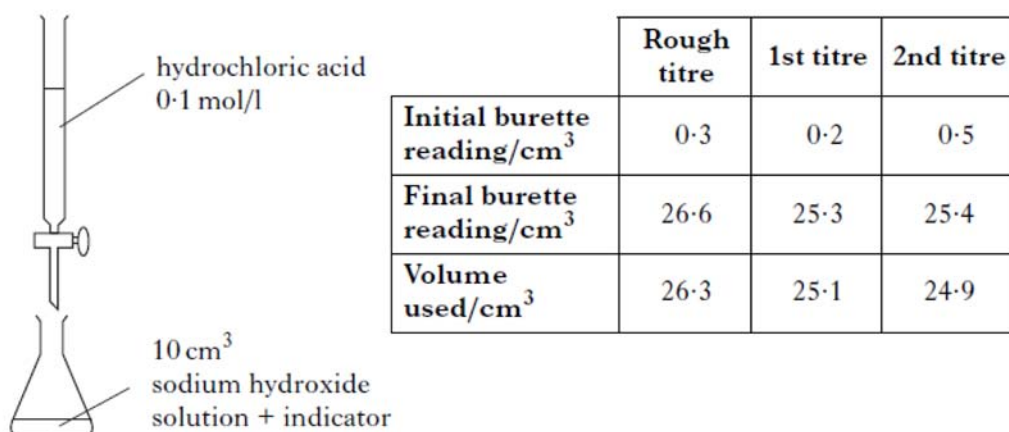
- (b) The polymer shown above contains methyl groups ( $\text{CH}_3$ ).  
 Another type of superglue, used to close cuts, has the methyl groups replaced by either butyl groups ( $\text{C}_4\text{H}_9$ ) or octyl groups.  
 Complete the table to show the number of carbon and hydrogen atoms in an octyl group.

Group	Number of atoms	
	Carbon	Hydrogen
methyl	1	3
butyl	4	9
octyl		

- (c) Name a toxic gas made when superglue burns.

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14. A pupil carried out a titration using the chemicals and apparatus below.

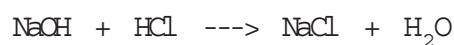


- (a) Using the results in the table, calculate the average volume of hydrochloric acid required to neutralise the sodium hydroxide solution.

.....cm<sup>3</sup>

1

- (b) The equation for the reaction is:



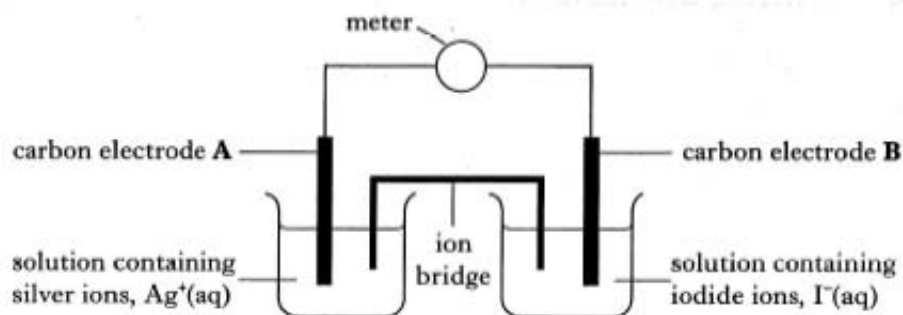
Using your answer from part (a), calculate the concentration of the sodium hydroxide solution.

.....mol l<sup>-1</sup>

2

(3)

15. A pupil set up the following cell.



Electrode	Reactions taking place
<b>A</b>	$\text{Ag}^+(\text{aq}) + \text{e}^- \longrightarrow \text{Ag}(\text{s})$
<b>B</b>	$2\text{I}^-(\text{aq}) \longrightarrow \text{I}_2(\text{s}) + 2\text{e}^-$

- (a) Combine the two ion-electron equations for the electrode reactions to produce a balanced redox equation.

1

- (b) What is the purpose of the ion bridge?

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1

- (c) Describe the chemical test which could be used to show that iodine is formed at electrode B.

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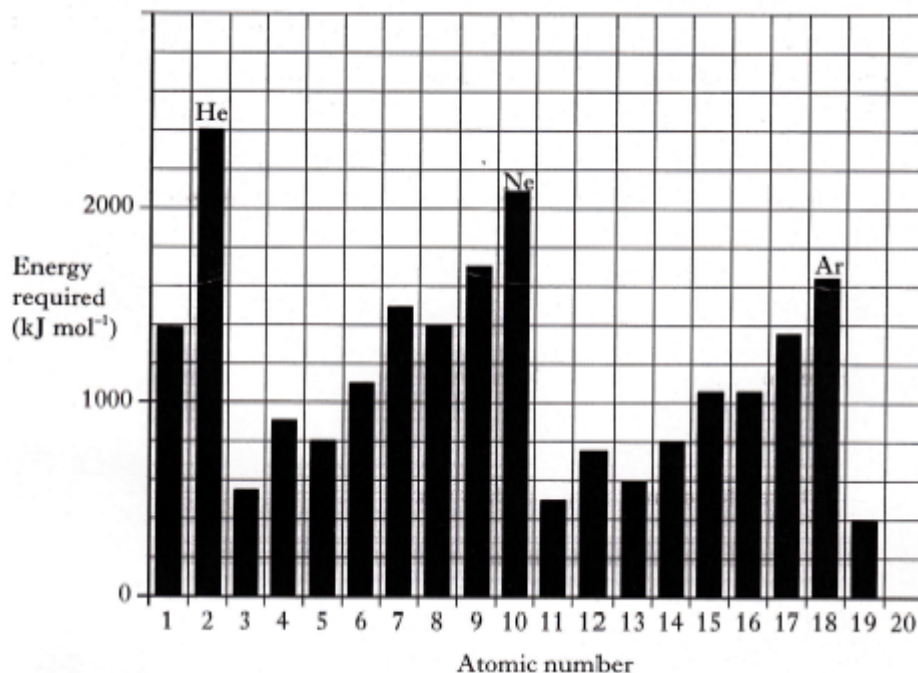


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1

(3)

16. Energy is required to remove an electron from an atom.  
The graph shows the energy required to do this for the first 19 elements.



- a) Describe what happens to the energy required going down a group.

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1

- b) Describe the general trend in the energy required going from sodium to argon.

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1

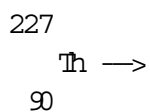
- c) Draw a bar on the graph to show the energy you would expect to be required for the element with atomic number 20.

1

(3)

17. Thorium 227 decays by alpha emission.

- (a) Complete the nuclear equation for the alpha decay of thorium-227.



- (b) A sample of thorium-227 was placed in a wooden box. A radiation detector was held 10 cm away from the box.

Why was alpha radiation not detected?

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- (c) Thorium-227 has a half-life of 18 days. What fraction of the original radioactivity will remain in a sample which is 36 days old?

1

1

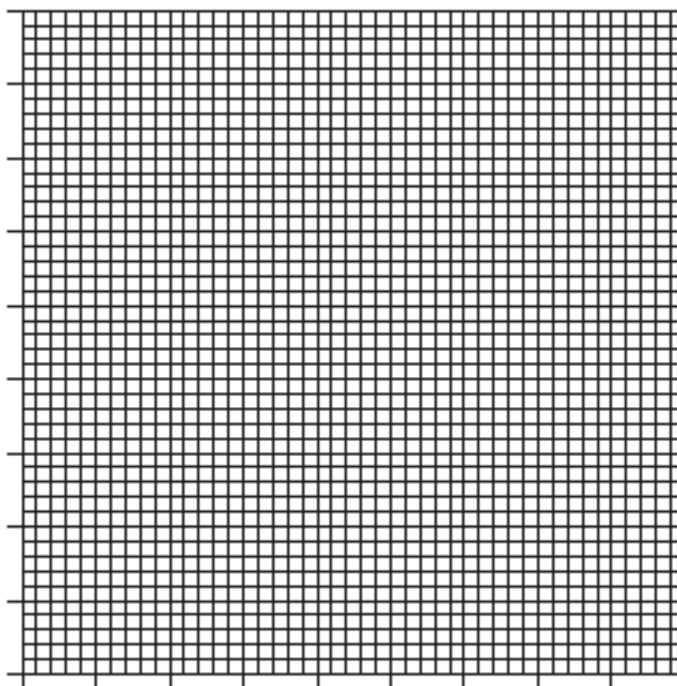
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18. Ammonia is produced in the Haber process.  
The percentage yield of ammonia, obtained at different pressures, is shown in the table.

Pressure/ atmospheres	Percentage yield of ammonia
50	6
100	10
150	14
200	19
250	22
350	29
400	32

- (a) Draw a line graph of the results.  
Use appropriate scales to fill most of the graph paper.



- (b) Using your graph, estimate the yield of ammonia at 300 atmospheres.

.....%

- (c) Which two gases react to make ammonia in the Haber process?

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