



**Option: Metals**

**Chemistry Past Exam Questions**

**Higher Level**

2013

Section B - Question 11 C

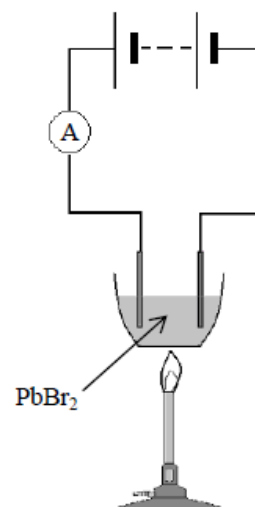
(c) Answer either part A or part B.

A

An arrangement to demonstrate the electrolysis of molten lead bromide ( $\text{PbBr}_2$ ) using inert electrodes is shown in the diagram. The demonstration is carried out in a fume cupboard.

- (i) What is meant by *electrolysis*? (4)
- (ii) Why must the lead bromide be molten? (3)
- (iii) Suggest a suitable material for the electrodes. (3)
- (iv) Write balanced half equations for the reactions that occur at the electrodes during the electrolysis. (9)
- (v) Name a metal, other than lead, that is extracted from one of its compounds by electrolysis. (6)  
Name the compound that is electrolysed to produce this metal.

OR



2012

Section B - Question 11 C (a)

(c) Answer part A *or* part B.

A

Bauxite from Africa is transported to Aughinish in Co. Limerick, where it is converted to pure alumina ( $\text{Al}_2\text{O}_3$ ). The alumina is then shipped to Russia where aluminium metal is produced from it by electrolysis.

- (i) Describe the chemical processes used to produce pure alumina from bauxite. (12)
- (ii) Draw a labelled diagram of the electrolytic cell used to produce aluminium metal from alumina. (9)
- (iii) Explain why the recycling of aluminium is environmentally desirable. (4)



2011

Section B - Question 4 B (K)

A How do metallic crystals conduct electricity?

2009

Section B - Question 11 C (a)

(c) Answer either part A *or* part B.

A

(i) Why can very electropositive metals such as sodium only be extracted from their ores by electrolysis? (4)

(ii) Explain why the electrolyte used in the Downs cell is molten.  
What is the purpose of the calcium chloride used in the process? (6)

(iii) Write a balanced equation for overall reaction in the Downs cell.  
Explain how the products are prevented from recombining after they have been formed by electrolysis.  
Give **one** commercial use for each product. (15)

2008

Section B - Question 11 C (a)

**B**

- (i) Name the ore from which aluminium is extracted. What substance is used to convert this ore into a soluble aluminium compound in the first stage of the extraction? (7)
- (ii) Write balanced equations for the reactions taking place at the positive and negative electrodes in the electrolysis of alumina. (12)
- (iii) What is the function of cryolite ( $\text{Na}_3\text{AlF}_6$ ) in the electrolysis of alumina? (3)
- (iv) Why is recycling of aluminium metal important for the protection of the environment? (3)

2007

Section B - Question 11 C (a)

**B**

Aluminium, sodium chloride and graphite are all crystalline solids.

For each of these substances, name the type of crystal formed.

(7)

Explain clearly, in terms of bonding, why

(i) aluminium is a good conductor of electricity,

(ii) sodium chloride is soluble in water,

(iii) graphite is soft and slippery.

(18)

2006

Section B - Question 11 C (a)

**B**

A blast furnace may be used in the extraction of iron from iron ore.

- (i) What materials must be added to a blast furnace in operation? (12)
- (ii) Name the principal reducing agent in the blast furnace and write a balanced equation for its reaction with haematite ( $\text{Fe}_2\text{O}_3$ ). (9)
- (iii) Why is the pig iron produced in a blast furnace further processed into steel? (4)