

## Chemistry

## Section I – Part B (continued)

Marks

## Question 25 (6 marks)

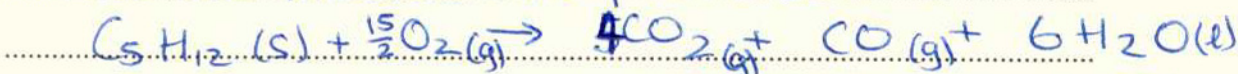
Explain the need for monitoring the products of a chemical reaction such as combustion. 6

Monitoring the products and conditions of a reaction such as combustion is needed to obtain the desired product.

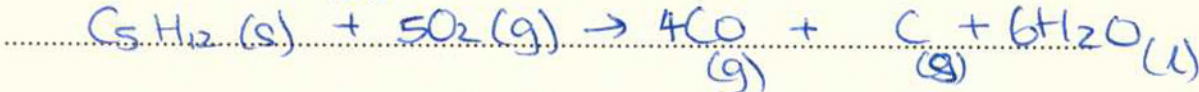
For complete combustion (using ~~pentane~~ pentane as an example)



If less oxygen is used and incomplete combustion occurs the products may be:  $CO_2$  and  $CO$  and water



If even less oxygen is provided products may be  $CO$  and  $C$



So the reaction must be monitored so as to give desired product of  $CO_2$  and/or  $CO$  and/or  $C$  and water.

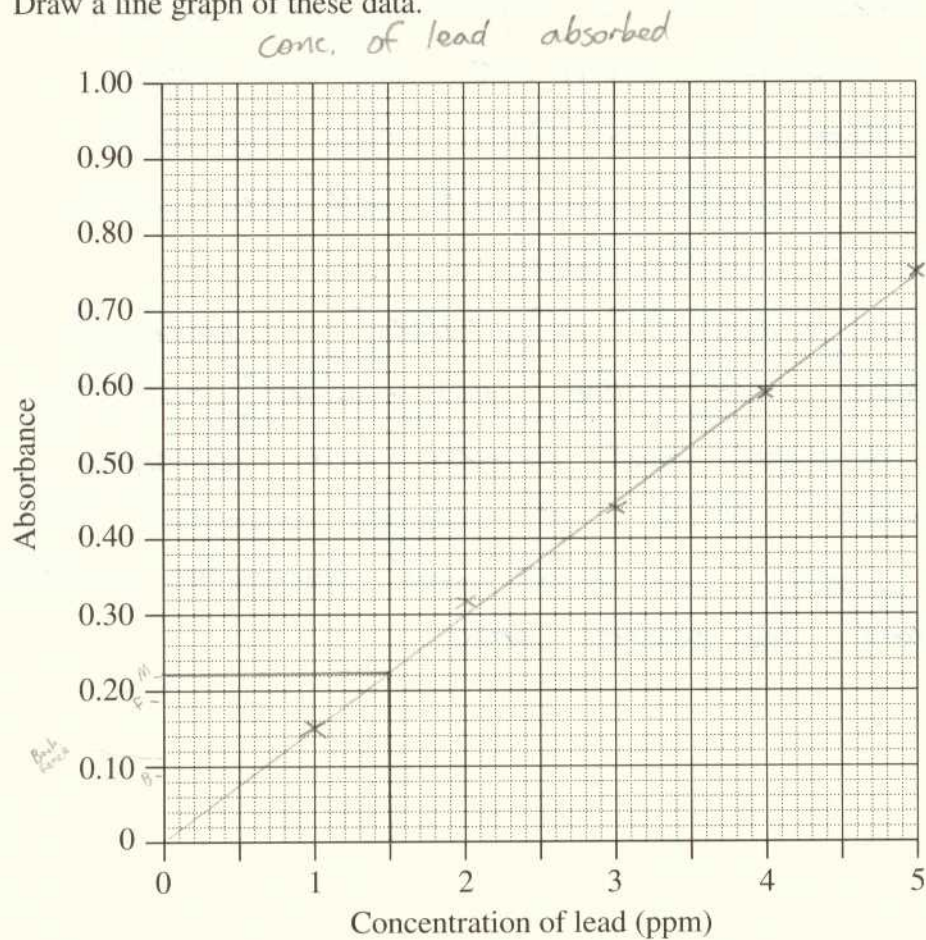
**Question 26** (4 marks)

A university student decided to measure the concentration of lead (Pb) in the soil around his home. He prepared five standard lead solutions of known concentration. The absorbance of these solutions was measured. These results are shown in the table.

Concentration of lead standard (ppm)	Absorbance
0	0.00
1	0.15
2	0.31
3	0.44
4	0.59
5	0.75

(a) Draw a line graph of these data.

1



Question 26 continues on page 23

## Question 26 (continued)

- (b) The student prepared solutions from four different soil samples around his home. These solutions were also analysed using the same method. The results are shown in the table. 1

<i>Solutions made from soil samples</i>	
<i>Area sampled</i>	<i>Absorbance</i>
Front garden bed	0.19
Back garden bed	0.09
Mail box	0.22
Back fence	0.11

Determine the highest concentration of lead in the soil around the home.

..... *At the mailbox = 1.5 ppm* .....

- (c) State an hypothesis to account for the variation in lead concentration around the student's home. 2

..... *Out the front with the front garden bed and mailbox showing the highest concentration of lead could be because of lead from the road and cars with ~~car~~ leaded fuel, with the back garden and fence further away  $\therefore$  less lead.* .....

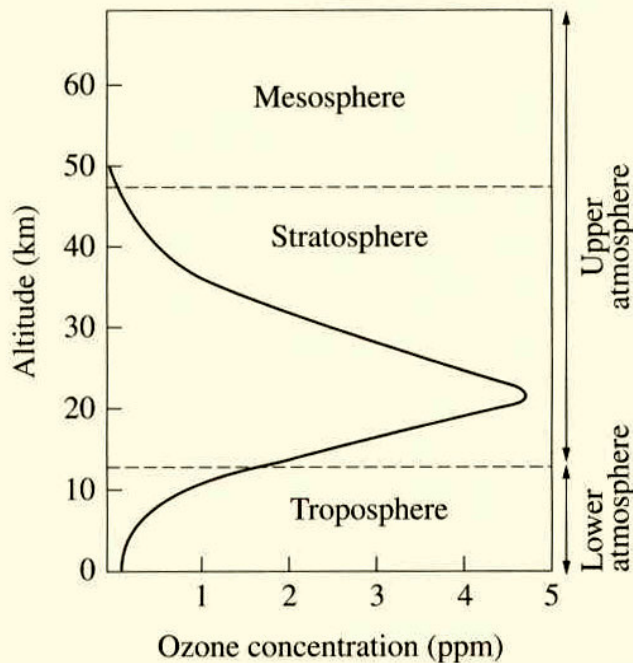
**End of Question 26**

**Please turn over**

## Question 27 (4 marks)

Oxygen exists in the atmosphere as the allotropes oxygen and ozone. The graph shows a typical change in ozone concentration with changing altitude.

4



Compare the environmental effects of the presence of ozone in the upper and lower atmosphere.

In the lower atmosphere ozone is detrimental to the environment as it is very poisonous. Concentrations as small as 0.02 ppm can harm people as the  $O_3$  is breathed in and one O attaches to the molecules in the body - not allowing them to function properly.

In the upper atmosphere it is needed as it stops most ultra violet radiation in the short wave form - e.g. most UV-B and some UV-C. UV-B and UV-C are very harmful to plants and our skin and eyes <sup>(causing skin cancer and cataracts)</sup>. The ozone layer is essential as it keeps these short wave U.V. lights out.