

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

It is necessary to monitor the products of a chemical reaction such as a combustion because they could be harmful products and may cause an increase in pollution. In other reactions, the products can also show that the starting materials were contaminated.

It is also important because it indicates how completely a material has combusted so as to show the amount of useful product made, that being energy, heat, etc. If it is harmful, it can add to greenhouse emissions and cause more damage to the atmosphere and environment as it could become acid rain.

In combustion of organic compounds for example it is necessary to control the emission of carbon monoxide and soot.

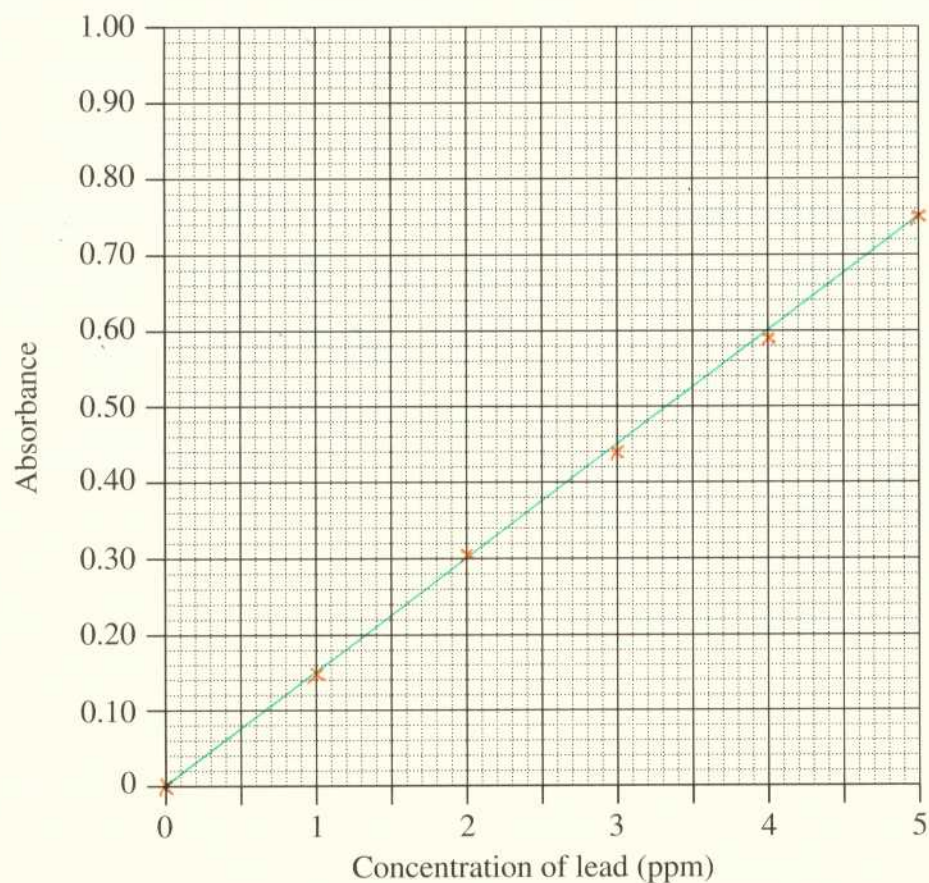
Question 26 (4 marks)

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.

<i>Concentration of lead standard (ppm)</i>	<i>Absorbance</i>
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.

Mail box

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

As the front of the house is directly next to a road where cars travel and emit lead ~~to~~ fumes from lead containing fuels being combusted, this results in the front proportion of the house being higher in lead concentration than the rear portion.

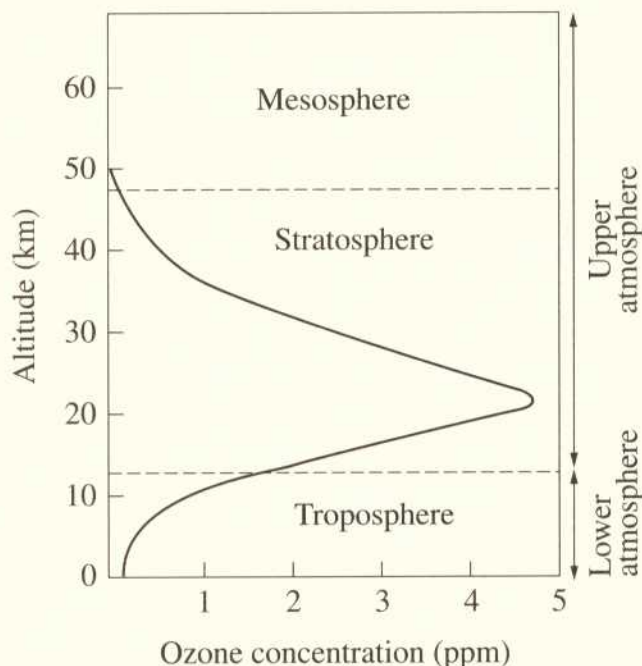
End of Question 26

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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.

(mainly in stratosphere) Ozone in the upper atmosphere acts as a shield for the earth. It transforms UV radiation, which is harmful to living things, into heat energy. In the upper atmosphere ozone is good for the environment. In the lower atmosphere however ozone can be potentially dangerous. It ~~combines~~ with ~~air~~ is formed by air pollutants from motor ~~vehicles~~ vehicles and industrial wastes in the presence of sunlight. The presence of high quantities of ozone in the lower atmosphere is a good indicator for high ^{air} pollution levels. It irritates throats, eyes & ²⁴lungs. It has a distinct smell.