

# Tutor Marked Assignment

Course and assignment number:

**S281 03**

Make sure you know how to complete and send in your TMA and PT3 form; detailed instructions are given in your student handbook (or supplement).

Covering: **Block 2,**  
**Chapters 1 and 3–8**

Cut-off date:  
**Friday 21 July 1995**

## Question 1

*This question relates to Book 2, Chapter 4, and carries 22% of the marks for this assignment.*

Table 1 lists the names and diameters of *all* known impact structures with diameters greater than 1 km on the continent of Australia, which has an area of  $7.68 \times 10^6 \text{ km}^2$ .

**Table 1** Diameters of all known Australian impact structures.

Name	Diameter/km
Acraman	90
Connolly Basin	9
Goat Paddock	5
Gosses Bluff	22
Kelly West	2.5
Liverpool	1.6
Piccaninny	7
Spider	5
Strangways	24
Teague	28

(i) Group the craters into size bins as in Table 4.2 of Book 2 (page 86), and work out the numbers of craters in each size bin per unit area of Australia – show your working, and present your data in a table.

**NB** Figure 4.22 in Book 2 (page 243) has an error – the first bin on the crater diameter axis should read ‘1–2’ not ‘0–2’.

(ii) Use your table to plot a graph of incremental crater size–frequency per  $\text{km}^2$  similar to Figure 4.22 (as corrected). Include the Figure 4.22 data on your graph. (Note that incremental crater size–frequency per  $\text{km}^2$  is the same as the number of craters in each size bin per unit area.) *A sheet of suitable graph paper is provided on page 7. Present your plot (and your table) as part of your assignment.*

(iii) Comment on your plot as follows.

1 In which parts of the size spectrum are craters most abundant per unit area? How does the shape of your plot of the Australian data compare with that of the plot for the whole Earth?

2 What inference can you draw about the average age of the surface of Australia compared with the average age of the surface of the whole Earth? *Justify your inference.*

3 Why should you be cautious in attempting to use the Australian crater statistics to calculate an absolute age of the Australian surface? *Hint: consider the difference that the discovery of another Australian crater would make.*

The marks for this question are divided between (i), (ii) and (iii) in the approximate ratios 5:7:10.

## Question 2

*This question relates to Book 2, Chapters 5 and 6 and carries 24% of the marks for this assignment.*

(a) (12 marks) Describe in about 200 words the evolution of the atmosphere of Venus from the formation of the planet to the present day. Include the following points:

- the initial composition of the atmosphere
- means by which this was lost
- the origin of the replacement atmosphere
- changes in the composition of this atmosphere

You do not need to give the evidence for the nature of the composition or for the mechanisms of change in this part of the question.

(b) (8 marks) (i) Write a brief explanation of how the present day high surface temperature of Venus came about.

(ii) Why is the temperature of the thermosphere of Venus less than that of the Earth’s thermosphere?

(c) (4 marks) Describe (in a few sentences) any evidence for volcanism on Venus in the past. Suggest why the presence of volcanism is important for the removal of large amounts of oxygen from the atmosphere.