



Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Road Safety, Radioactivity
and Earth in Space

Module 6

Higher Tier

[GSC62]

WEDNESDAY 29 FEBRUARY 2012

11.00 am–11.45 am



Centre Number

71	
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Candidate Number

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TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	

Total Marks	
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3 The statement below is from a national newspaper.

“The speed limit on thousands of residential roads will be reduced to 20mph under government moves over the next decade.”

(a) Explain fully why the government wants to reduce the speed limit from 30 mph to 20 mph in residential areas.

[2]

(b) Explain fully, in terms of forces, why drivers should reduce speed even more when there is ice on the road.

[2]

(c) Each of these drinks contains 1 unit of alcohol.

$\frac{1}{2}$ pint of
ordinary
strength beer
lager or cider

1 small
glass of
wine

1 single
measure of
spirits

1 small
glass of
sherry

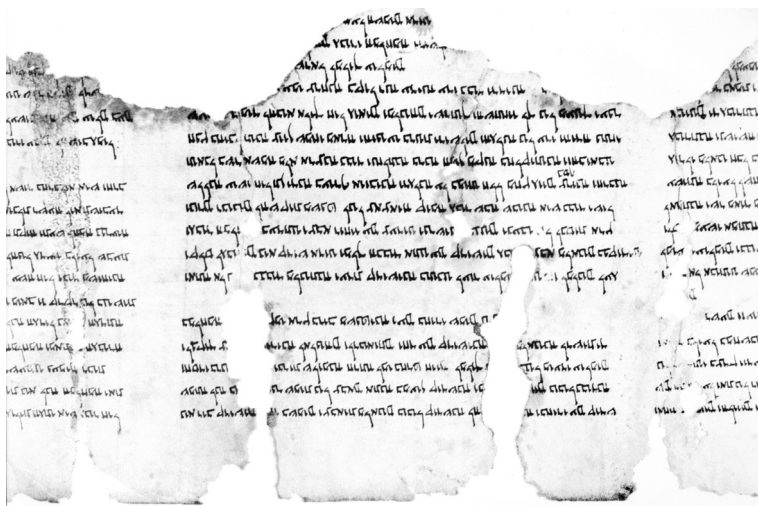
(i) Calculate the number of units of alcohol contained in two pints of beer.

_____ units [1]

Examiner Only	
Marks	Remark

BLANK PAGE
(Questions continue overleaf)

- 4 The photograph below shows part of the Dead Sea Scrolls. They were discovered between 1947 and 1956.



© Library of Congress / Science Photo Library

- (a) The age of the scrolls was calculated using carbon dating which is the radioactive decay of carbon-14.

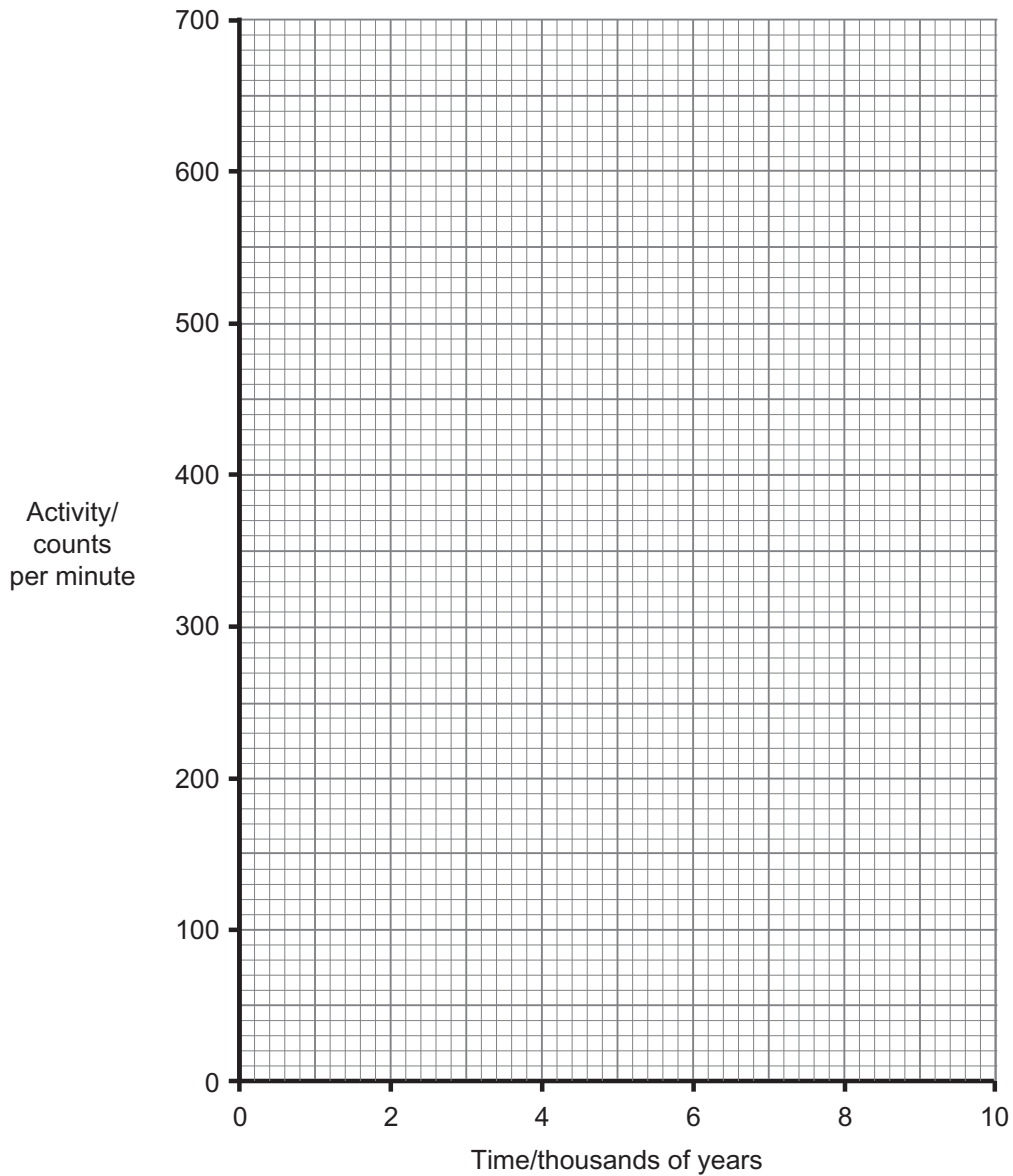
The table below shows how the activity of carbon-14 changes with time.

Time/thousands of years	Activity/counts per minute
0	640
2.5	470
5.0	350
7.5	260
10.0	190

Examiner Only

Marks Remark

- (i) On the grid below plot and draw a line graph to show the information in the table.



[3]

- (ii) What is meant by the term half-life?

_____ [2]

- (iii) Use the graph to find the half-life of carbon-14.

Answer _____ years [1]

- (iv) The activity of carbon-14 from the Dead Sea Scrolls was found to be 490 counts per minute. Use the graph to find the age of the Dead Sea Scrolls.

Answer _____ years [1]

Examiner Only	
Marks	Remark

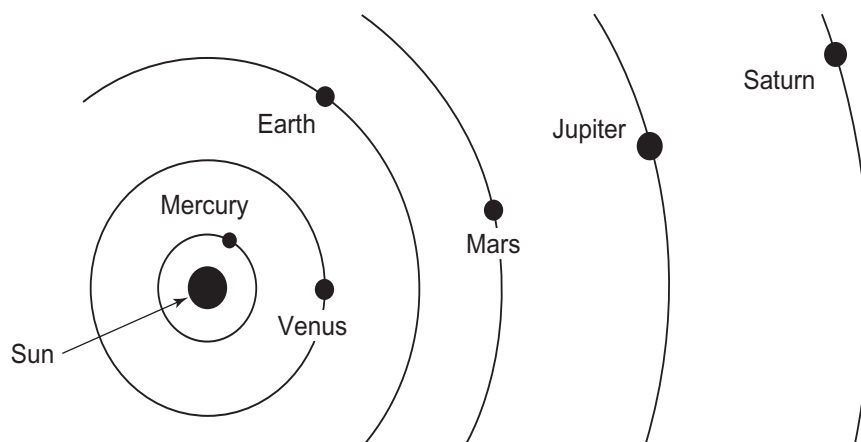
- 5 (a) (i) Most astronomers believe the Universe started with the Big Bang. Explain fully the Big Bang Theory.

[3]

- (ii) Suggest an alternative to the Big Bang Theory.

[1]

- (b) The diagram below shows part of the model of the Solar System which was suggested by Copernicus. This model is still accepted today.



- (i) What name is given to this model?

[1]

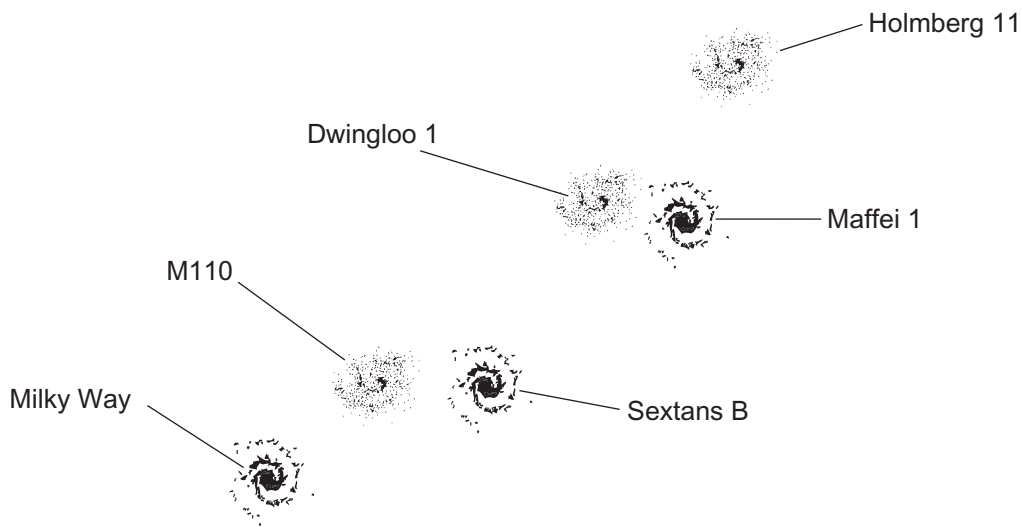
Before Copernicus scientists had a different model of the Solar System.

- (ii) Describe how the previous model differs from this model.

[1]

Examiner Only	
Marks	Remark

(c) The diagram below shows our galaxy (the Milky Way) and some of our neighbouring galaxies.

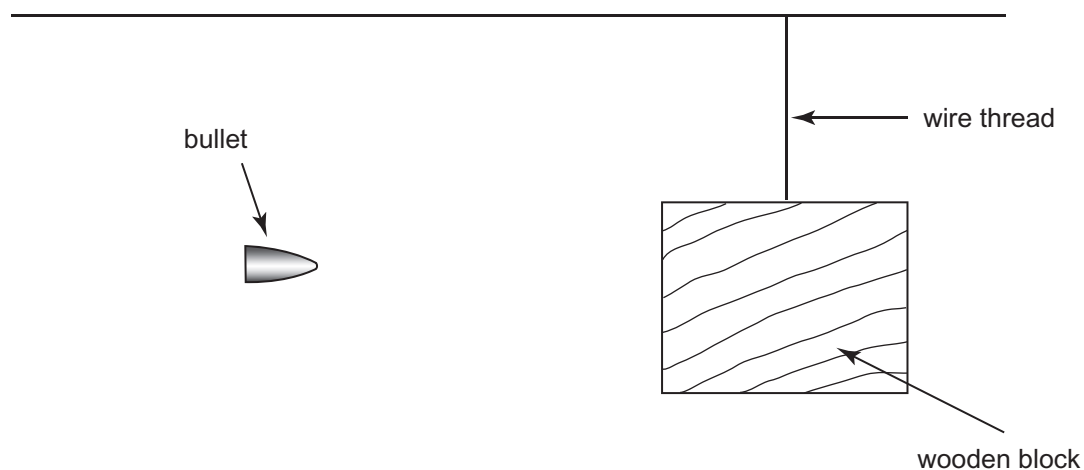


Name the galaxy which is moving at the greatest speed away from the Milky Way. Give a reason for your answer.

[2]

Examiner Only	
Marks	Remark

- 6 A wooden block of mass 1.0 kg is freely hanging. A bullet of mass 0.01 kg is fired at the wooden block. The bullet hits the wooden block and becomes embedded in it. The block then moves with a velocity of 3 m/s.



- (a) Use the formula:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

to calculate the momentum of the block after impact.

(Show your working out.)

Momentum _____ kgm/s [3]

- (b) In a similar experiment an identical bullet is fired with a greater momentum. State how the momentum of the bullet is increased.

_____ [1]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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