ASTRONOMY (SL)

Examination Paper 1
May 2008

There are four sections – answer ALL questions in all four sections.
ALL answers are to be written on the exam paper.

Calculators are allowed.

An Information Sheet is provided for this examination.

45 minutes

This exam paper has a total of 30 marks

Marking Grid	
Section	Marks
1	
2	
3	
4	
Total / 30	

Section 1 The Stars (8 marks)

1. Define the following two terms:

Chromosphere : .....

.....

.....

Light Year : .....

.....

[2 marks]

2. Briefly explain the difference between *sidereal time* and *solar time*? You may find it useful to use a sketch to help you.

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.....

.....

[2 marks]

3. The light from the Sun's photosphere can be approximated by a black body curve. At what colour is the maximum of this output?

.....

[1 mark]

4. The solar activity can be followed by observing the sunspots on the photosphere (see Figure 1).

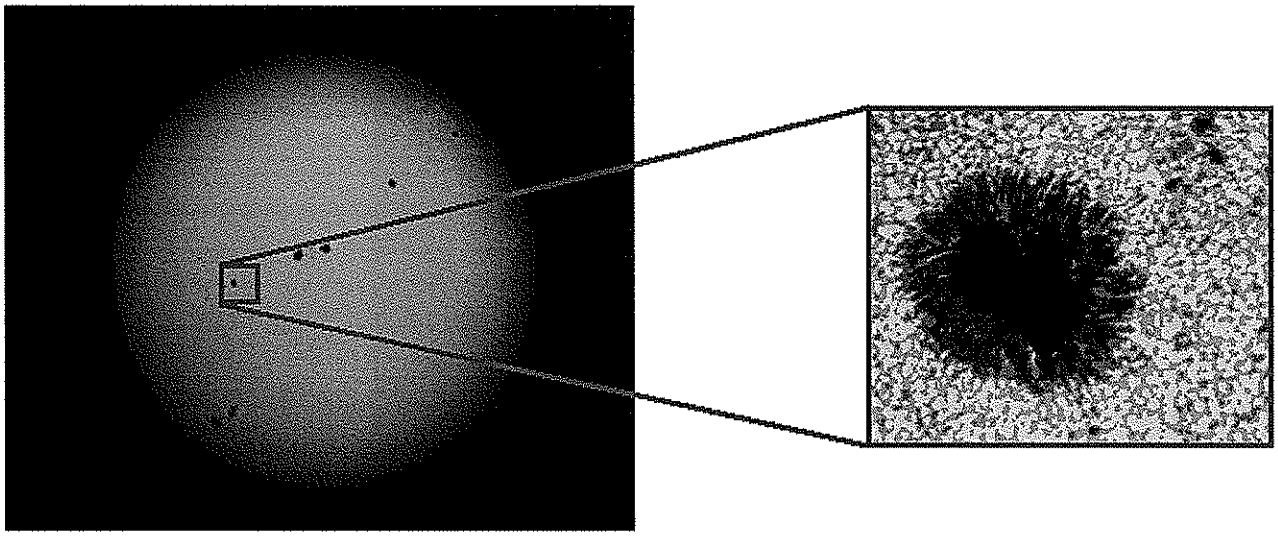

Figure 1. Sunspots on the surface of the Sun.

The timescale over which the Sun's activity cycle varies is often incorrectly said to be 11 years. State the correct period for the cycle and explain the error commonly made.

Correct period: ..... years.

Explanaition: .....

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[3 marks]

Section 2 The Planets (8 marks)

5. An object similar to that shown in Figure 2 orbits the sun with an orbital distance of 2AU.

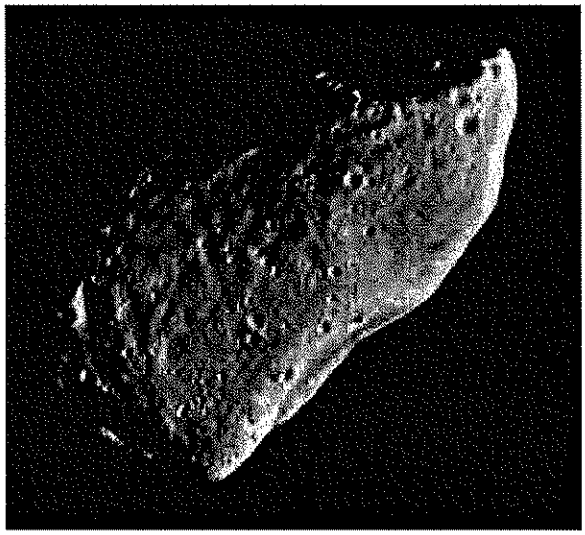

Figure 2. Object in orbit around the Sun.

Give a brief comment about the duration of its 'day' and 'year'.

The object's day: .....

.....

.....

The object's Year: .....

.....

.....

[2 marks]

6. Name the planet indicated by the statement below:

Statement : Orbital period is 88 days.

Planet: .....

[1 mark]

7. Explain the following statement about the Moon by reference to how it is thought that the Moon was formed:

Analysis of lunar rock has shown it to have similarities with Earth rock (in particular, the relative proportions of the oxygen isotopes : ^{16}O, ^{17}O and ^{18}O).

.....

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[2 marks]

8. Give the location on Earth, of the impact event shown in Figure 3.

Figure 3. An impact event on Earth.

Location : .....

[1 mark]

9. For electromagnetic radiation of wavelength 21cm, calculate the frequency.

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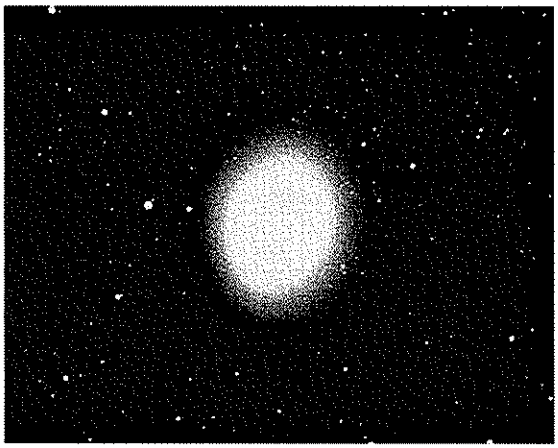
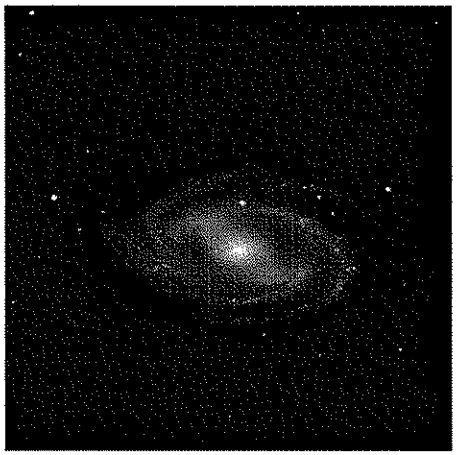
[2 marks]

Section 3 Galaxies (7 marks)

10. Figure 4 gives examples of two of the four main types of galaxy. Using the Hubble classification for naming galaxies, state what type of galaxy is shown.





Name : M32 M109

Figure 4. Two galaxies.

Type of galaxy : ....

[2 marks]

11. Define the following two terms:

Redshift .....

.....

HII region .....

.....

[2 marks]

12. Briefly explain what is known as *the winding dilemma.*

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[2 marks]

13. Of the three main parts of the Milky Way, which part is thought to contain a majority of dark matter?

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[1 mark]

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Section 4 Cosmology (7 marks)

14. Theoretically, the shape of spacetime could be shown by considering parallel lines, the internal angles of a triangle and the circumference of a circle. For the spacetime shown in Figure 5, indicate the result of such tests with a single tick in each row below the figure.

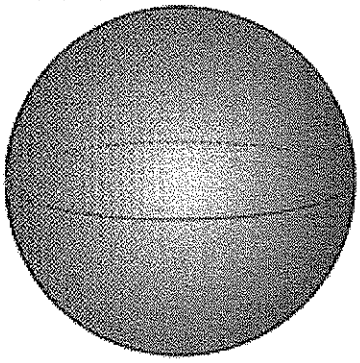

Figure 5. A possible shape for spacetime.

Parallel lines :	Stay parallel	Diverge	Intersect
Internal angles of a triangle :	Less than 180°	Equal to 180°	Greater than 180°
Circumference of a circle :	Less than $2\pi r$	Equal to $2\pi r$	Greater than $2\pi r$

[3 marks]

15. Using Hubble's constant, calculate the age of the universe.

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[2 mark]

16. State two pieces of evidence supporting the Big Bang.

Evidence 1 .....

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Evidence 2 .....

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.....

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[2 marks]

END OF EXAMINATION