ASTRONOMY (SL)

Examination Paper 1
May 2008

Marking Scheme

Marking Grid	
Section	**Marks**
1	
2	
3	
4	
Total / 30	

Section 1 The Stars (8 marks)

Question 1. [2 marks]

Chromosphere :

[1] : Any two from:

- ✓ (part of the) atmosphere of the Sun.
- ✓ Layer outside/above the photosphere.
- ✓ (Sun's) atmosphere below the Corona.

Light Year :

[1] – distance travelled by light in 1 year

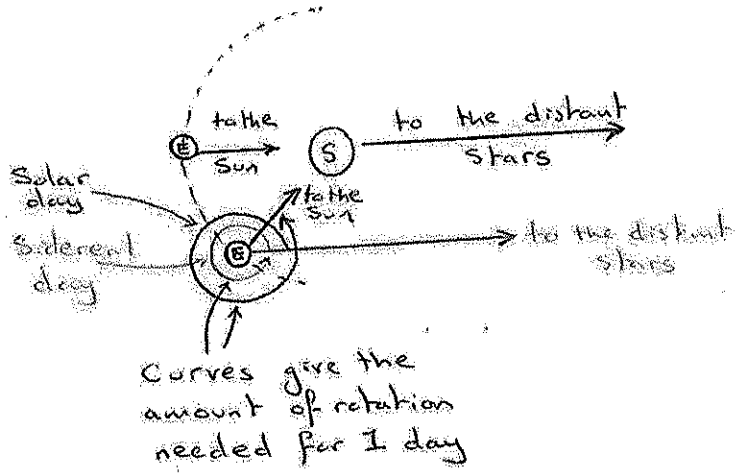
Note(s) : No marks for stating a light year in 'm', etc – this information is given on the Information Sheet.

Question 2. [2 marks]

[2] : Any two from:

- ✓ Solar day – 1 rotation of the planet/Earth such that the Sun is in the same position.
- ✓ Sidereal day – 1 rotation of the planet/Earth such that the (distant) stars are in the same position.
- ✓ A mark can be given for some comment that the actual difference between these two days is such that a solar day is longer than a sidereal day (3.94 minutes / 3min 56s)

Note(s) : A good diagram could also get the marks eg.,



Question 3. [1 mark]

[1] : Yellow

Note(s) :

Question 4. [3 marks]

[1] : 22 (years)

[1] : the abundance/amount of sunspots(on the photosphere) cycles over 11 years

[1] : but the magnetic poles also change/oscillate (between N and S) (producing the 22 year cycle).

Note(s) :

Section 2 The Planets (8 marks)

Question 5. [2 marks]
[1] : Day – (the length of the objects day) is not related to the orbital distance / is random
[1] : Year – longer than the Earth/365 (earth) days

Note(s) :

Question 6. [1 mark]
[1] : Mercury

Note(s) :

Question 7. [2 marks]
[1] : General abundance of isotopes is possibly determined by the region of the nebula
[1] : similar isotope proportions indicate the Moon and Earth were formed in the same region around the Sun.

Note(s) :

Question 8. [1 mark]
[1] : Tunguska/Russia/Siberia

Note(s) :

Question 9. [2 marks]
[1] : correct working
[1] : 1.4(3) x 10^9 (Hz) / 1.4(3) GHz

Note(s) :

Section 3 The Galaxies (7 marks)

Question 10. [2 marks]
[1] : M32 = E2 / E3
[1] : M109 = SBc

Note(s) :

Question 11. [2 marks]
[1] : Redshift – The shifting/moving of the wavelength of emitted light towards to the red of the spectrum.
[1] : HII region – ionised nebula / region where star formation is happening
/ region ionised by nearby (OB type) stars

Note(s) :

Question 12. [2 marks]
[1] : If the spiral arms were due to (a large amount of light output from) a fixed set of stars
[1] : then (with time), the spirals would be expected to wind up.

Note(s) :

Question 13. [1 mark]
[1] : Halo.

Note(s) :

Section 4 Cosmology (7 marks)

Question 14. [3 marks]

[3] :

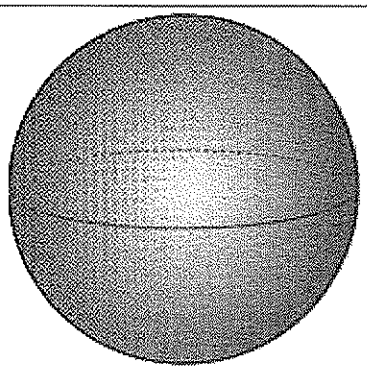


Figure 5. A possible shape for spacetime.

	Stay parallel	Diverge	Intersect
Parallel lines :			√
Internal angles of a triangle :	Less than 180°	Equal to 180°	Greater than 180° √
Circumference of a circle :	Less than 2πr √	Equal to 2πr	Greater than 2πr

Note(s) :

Question 15. [2 marks]

$$H_o = 72\ kms^{-1}Mpc^{-1} = 2.3 \times 10^{-18}s$$

$$Age = 1/H_o = 1/2.3 \times 10^{-18} = 4.3 \times 10^{17}s = 13.6\ b\ years$$

[1] : Age = $1/H_o$

[1] : correct answer

Note(s) :

Question 16. [2 marks]

[2] : Any two from:

- ✓ Redshift data (for galaxies)
- ✓ The cosmic microwave background radiation
- ✓ Spatial variations in the background radiation
- ✓ Nuclear abundance

Note(s) :