Stars & The Universe

Question Paper

Course	CIE IGCSE Physics
Section	6. Space Physics
Topic	Stars & The Universe
Difficulty	Medium

Time Allowed 50

Score /40

Percentage /100

Question 1a

The Sun is our nearest star.

(i) State the three main forms of electromagnetic radiation emitted by the Sun.

[2]

(ii) State the two main elements that are found in the Sun.

[1]

[3 marks]

Question 1b

State and explain what can be deduced from the 'redshift' observed by astronomers in the light from all distant galaxies.

[3 marks]

Question 2a

Extended tier only

Describe and explain how a stable star is formed.

[3 marks]

Question 2b

Extended tier only

Describe and explain what can be deduced from cosmic microwave background radiation (CMBR).

[1 mark]

Question 3a

Extended tier only

Some main sequence stars become black holes.

Describe the evolution of a main sequence star to the point at which it becomes a black hole.

[5 marks]

Question 3b

Extended tier only

State and explain whether the Sun will eventually become a black hole.

[2 marks]

Question 4a

The visible part of the electromagnetic spectrum from a star includes a dark line. This line is at a specific wavelength.

Fig 1.1 shows the position of the dark line in the spectrum from the Sun and in the spectrum from two different galaxies, galaxy A and galaxy B.

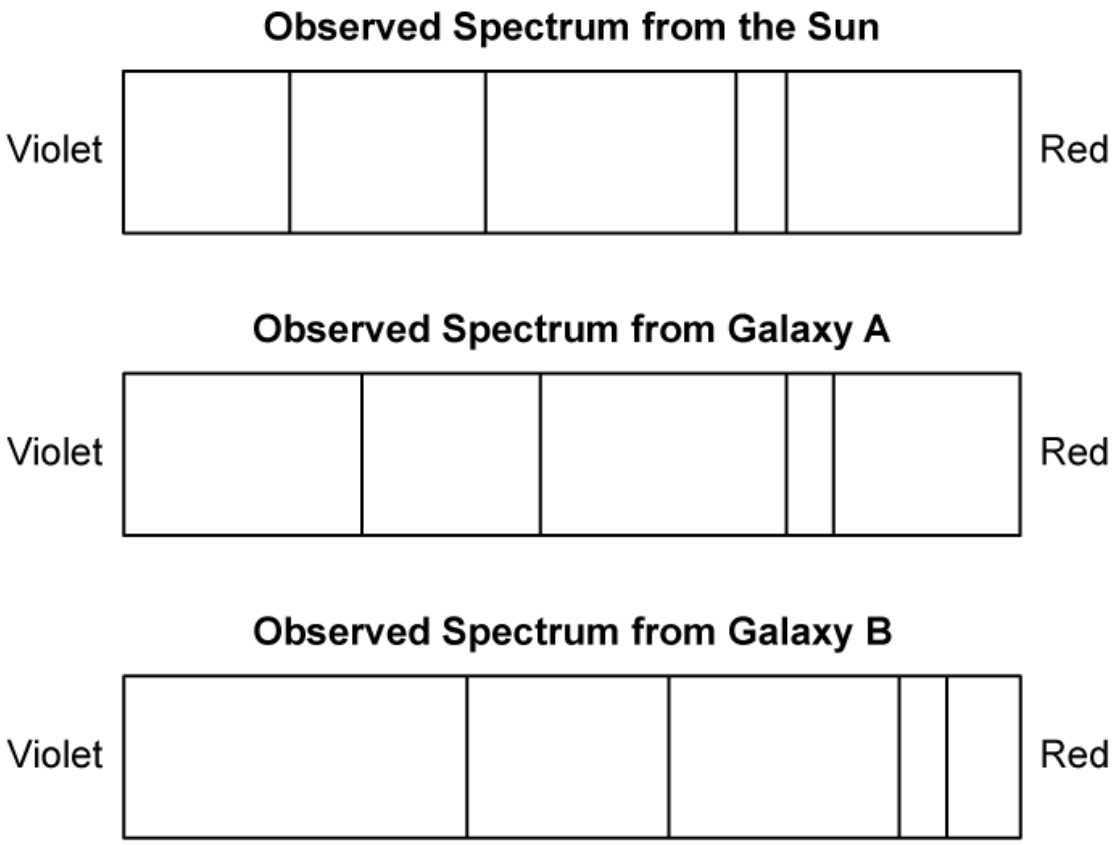

Fig. 1.1

Explain what the spectrum 'shifts' of the dark lines tells us about the direction of the galaxies.

[2 marks]

Question 4b

Extended tier only

State which galaxy is:

(i) is moving faster.

[1]

(ii) is further away.

[1]

[2 marks]

Question 4c

Extended tier only

Galaxy A is $150\ 000 \times 10^{9}$ m away.

Calculate its recession velocity.

Hubble constant = 2.2×10^{-18} per second.

[4 marks]

Question 4d

Extended tier only

A galaxy C is twice as far as galaxy A.

Determine the recession velocity of galaxy C.

[2 marks]

Question 5a

Extended tier only

Describe *nuclear fusion* in stars.

[2 marks]

Question 5b

Extended tier only

Derive the distance of 1 light year in metres.

Speed of light = 3.0×10^8 m/s

[5 marks]

Question 5c

Extended tier only

The Milky Way is approximately 100 000 light years in diameter.

Calculate the time it would take a spacecraft travelling at the speed of light to travel from one side of the Milky Way to the other.

time = ... s

[2 marks]

Question 5d

Below are some statements related to Cosmology.

1. Galaxies are made of up millions of stars
2. The Sun is a planet because it has a core
3. Other stars that make up the Milky Way are much further away from the Earth than the Sun is from the Earth
4. There may be other galaxies in the Milky Way

State all of the statements that are false and explain why.

[4 marks]