

A . Solar system: stability of orbital motions; satellites (physics only)

1. Put these astronomical objects in order of size from largest to smallest. (3)

Fill in the boxes in the correct order.

the Moon	the Sun	planets	asteroids	
largest				smallest

2. Complete the sentences below.

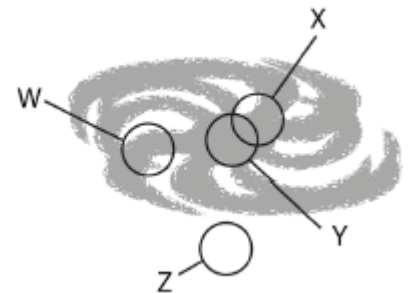
There are _____ of galaxies, each containing _____ of Stars.

All of these galaxies make up the _____.

Our Sun is part of a _____ called _____ (5)

3. (a) Which letter shows the approximate position of our solar system in the galaxy? (1)

(b) What is the name given to planets which orbit stars other than our Sun? (1)



(c) The age of our solar system is approximately: (1)
(tick the correct box).

4.5 billion years <input type="checkbox"/>	45 million years <input type="checkbox"/>
4.5 trillion years <input type="checkbox"/>	450 thousand years <input type="checkbox"/>

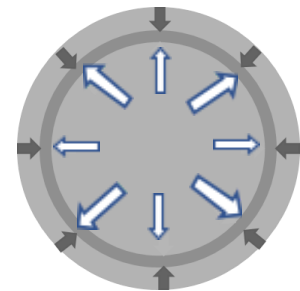
4. A star begins its life cycle as a nebula. Explain the structure of a nebula and the processes it goes through to become a star. (4)

5. The diagram shows the forces acting on a main sequence star.

(a) What do the two different arrows represent? (2)

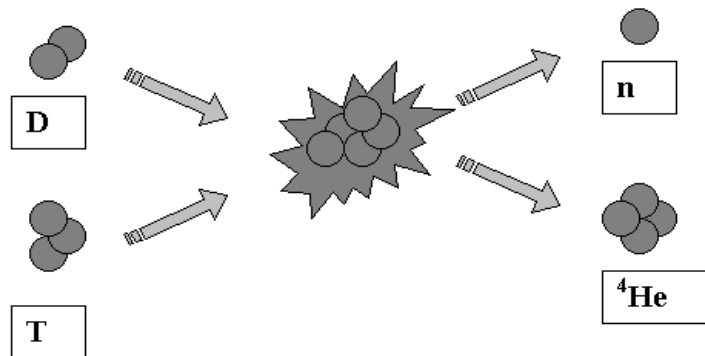
White arrows represent _____

Black arrows represent _____



(b) What can you assume about these two forces in the main sequence star? (1)

6. The diagram below shows nuclear fusion in a star.



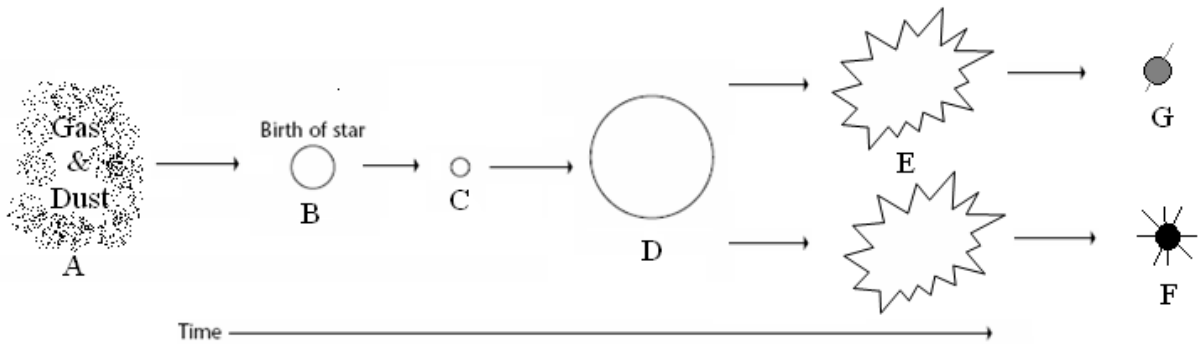
(a) What do the letters represent on the diagram? (3)

D = _____ T = _____

N = _____

(b) What else will be given off in this reaction?

7. The life cycle of a massive star is shown below.



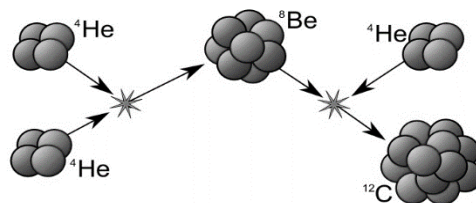
Complete the stages of the life cycle shown by the letters A to G. (4)

A _____ B _____ C _____
 D _____ E _____ F _____
 G _____

8. The sun is in its main sequence stage. What will happen to the sun as the hydrogen begins to run out? (2)

9. Explain why small stars remain in their main sequence stage much longer than very big stars. (2)

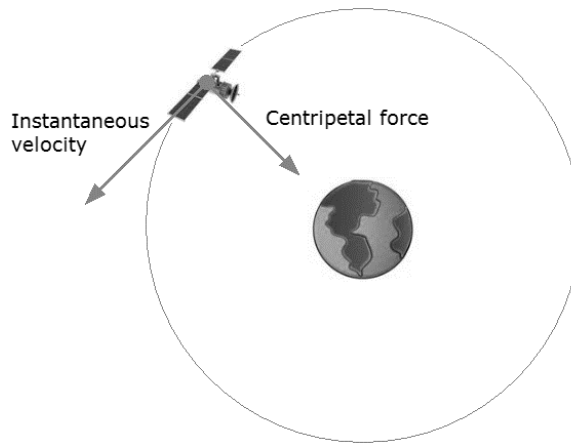
10. The diagram below shows how larger elements could be made in a star. In the space below write a reaction to show the process described. (3)



11. Elements bigger than iron cannot be produced in fusion reactions in stars. Explain how the larger elements are created and dispersed in the Universe. (3)

12. What is different about the orbits of the minor planets and moons? (2)

13. The international space station is in orbit around the Earth.



(a) What force keeps the space station orbiting the Earth? (1) _____

(b) Explain why the velocity of the space station is constantly changing even though the speed remains constant. (4)

(c) If the space station were to move into a higher orbit (further away from the Earth), what would happen to its speed to keep it in this orbit? (2)

GraspIT (physics only)

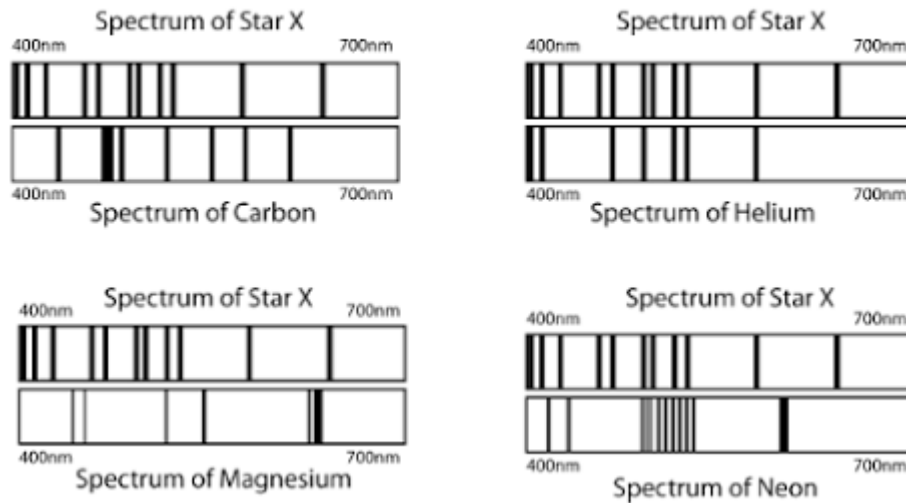
1. (a) Light from distant galaxies is red shifted. What does this tell us? (1)

- (b) Light from some galaxies show a greater red shift. What does this tell us? (2)

- (c) Circle the correct answer.

Red shift gives us evidence that the Universe is **slowing down / expanding / getting hotter** (1)

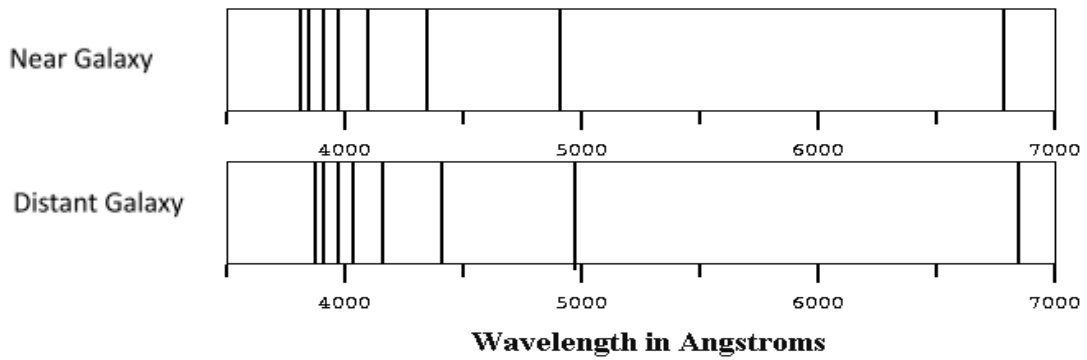
2. The spectra below are from Star X. Underneath each Star X spectrum is the spectrum from a different element.



Which of the four elements is present in star X? (1)

3. If a galaxy was moving towards the Earth, explain what the observed spectrum would look like. (3)

4. The spectra below show light from two galaxies when viewed from Earth.



Explain why the spectrum from the near galaxy looks different to that from the distant galaxy. (6)

5. The Big Bang theory is the currently accepted theory for how the Universe began.

(a) Describe how the Universe began according to the Big Bang theory. (2)

(b) Name **one** piece of evidence that supports the Big Bang theory. (1)

6. Observations of red shift of the supernova in distant galaxies suggest the galaxies at the extreme of our Universe are _____

Choose the correct word to complete the above sentence. (1)

Accelerating

cooling down

getting bigger

slowing down

7. Only around 5% of the known Universe is made of visible matter. What two properties are thought to make up the other 95% of the universe? (2)

8. Scientists have discovered over 3000 planets orbiting stars outside our solar system. Explain why probes have not been sent to see whether life exists on any of these planets? (2)

9. The table shows the distances to three different galaxies, **X**, **Y**, and **Z** and the speed with which these galaxies are moving.

Galaxy	X	Y	Z
Distance (millions of light years)	400	900	2200
Speed (km/s)	7000	20 000	50 000

Describe the correlation shown by the data. (2)
