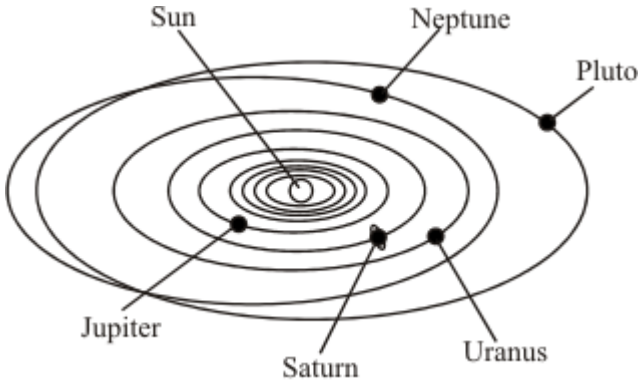
Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

The Sun at the centre of our solar system is a star.



(a) The Sun contains nuclei of the heaviest elements. Atoms of these heaviest elements are also present in the planets of the solar system. What does this suggest about the material from which the solar system is formed?

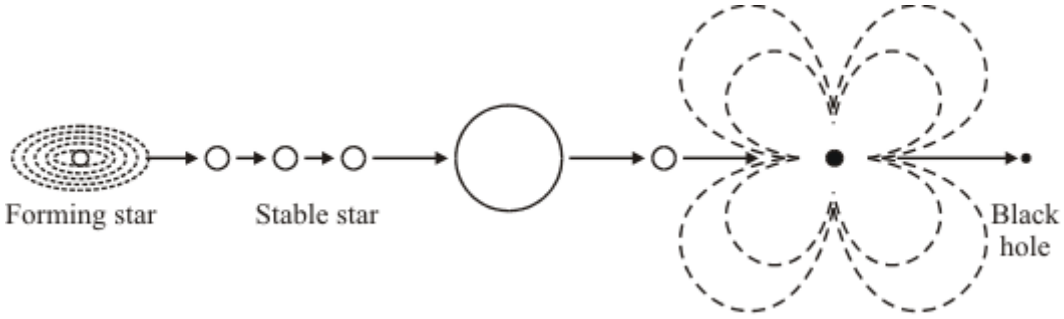
_____

_____

_____

(1)

(b) Stars form from gas (mostly hydrogen) and dust.



Describe, in as much detail as you can, what forces allow a stable star to exist and how the star may eventually form a black hole.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

_____

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(6)
(Total 7 marks)

Q2.

'Red shift' is one of the pieces of evidence which led scientists to propose the 'big bang' theory.

(a) Describe the big bang theory.

(2)

(b) *To gain full marks for this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Explain how red shift provides evidence for the big bang theory.

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_____

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(3)

(Total 5 marks)

Q3.

Astronomers use red shift in two ways.
They calculate the distance to each galaxy from Earth.
They also calculate the speed at which galaxies are moving away from Earth.

The table shows some results. Distance is given in zettametres, Zm. One zettametre is 10^{21} metres.

Galaxy	Distance from Earth to galaxy in Zm	Speed at which galaxy is moving away from us in Zm per billion years	Time the galaxy has been moving away from us in billions of years (Calculated by distance ÷ speed)
Abell 963	25 000	1950	12.8
Abell 1302	14 000	1100	
Abell 1314	4 100	320	12.8
Abell 1978	18 000	1400	12.9
Abell 2255	10 000	770	13.0

(a) Complete the data for Abell 1302.

(1)

(b) Describe the relationship between the distance to a galaxy and the speed at which the galaxy is moving away from us.

_____

_____

(1)

(c) Explain how the data for time provides evidence for the theory that the origin of the Universe was a huge explosion ('big bang').

_____

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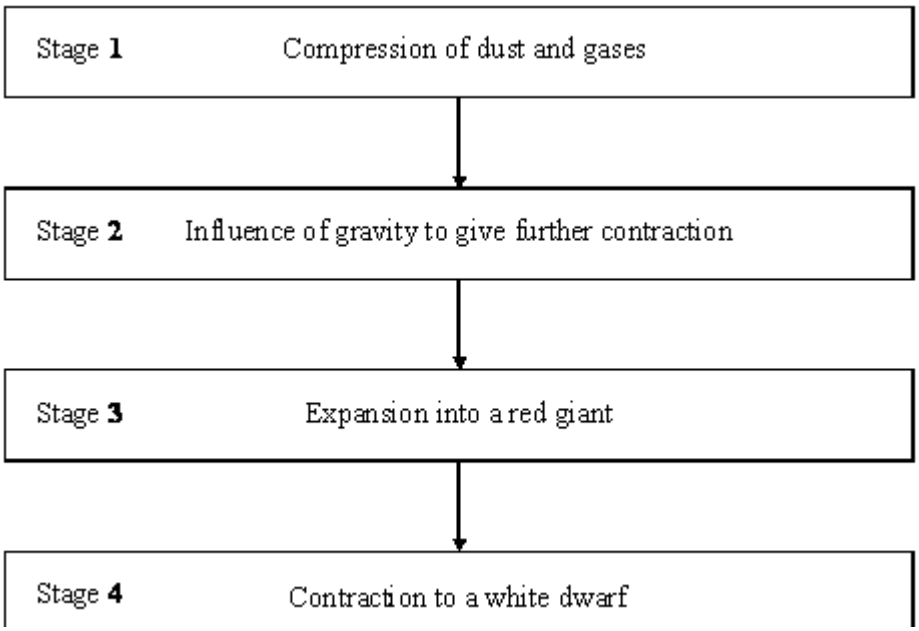
(2)

(Total 4 marks)

Q4.

The flowchart shows four stages thought to occur in the evolution of a star such as our Sun.

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At a particular time a star might have reached one of these stages or be between stages or be at a further stage. What period in its evolution has our star, the Sun, reached?

_____

(Total 1 mark)

Q5.

What does the Big Bang theory state? In your answer you may include evidence for the theory.

_____

_____

_____

_____

_____

_____

_____

(Total 4 marks)

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