



Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 31

1 Key words**[4]**

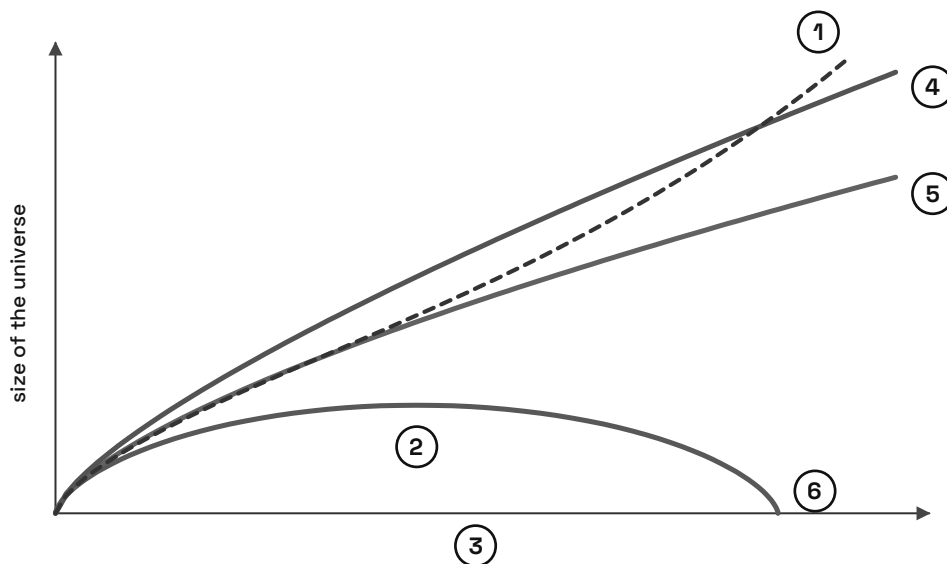
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

Big Bang theory Big Crunch cosmology critical density galaxy light-year meteor
Milky Way satellite universe

All of space and everything in it is called the _____. A huge group of billions of stars, gas and dust held together by gravity is a _____; ours is the _____. The distance light travels in one year is a _____. The branch of science that studies the universe as a whole, its history and its future, is _____. The theory that the universe began about 13.8 billion years ago from an extremely hot, dense state is the _____. The average density the universe would need for gravity to just stop its expansion is the _____. If the universe stops expanding and collapses, its end is called the _____.

2 Label the diagram**[3]**

The graph shows how the size of the universe changes with time in its possible futures. Write what belongs in place of 1 to 6. Each carries 0.5 mark.



- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |



3 Multiple choice

[5]

Choose the correct option for each of the following questions.

- i. Which force keeps the celestial bodies of the universe in their positions? [1]
a. the nuclear force of attraction b. the gravitational force
c. the magnetic force d. the electromagnetic force
- ii. According to the Big Bang theory, how did the universe originate? [1]
a. from the sudden expansion of an extremely hot, dense state
b. from the collision of celestial bodies
c. from the explosion of a star
d. from the adjustment of nebulae
- iii. According to Hubble's study, which of these is correct? [1]
a. The farther away galaxies are, the faster they move away.
b. The farther away galaxies are, the slower they move away.
c. There is no relation between the speed and distance of galaxies.
d. The gravitational force of the galaxies does not affect their speeds.
- iv. Under what condition can an open universe be expected? [1]
a. when the average density is greater than the critical density
b. when the average density is less than the critical density
c. when the average density is equal to the critical density
d. when the average density and critical density can't be compared
- v. A light-year is a unit of [1]
a. time b. distance
c. speed d. brightness

4 Very short answers

[3]

Write very short answers to the following questions.

- a. About how old is the universe? [1]

- b. Who found, in 1929, that the farther a galaxy is, the faster it is moving away? [1]

- c. Name the four fundamental forces that were joined as one at the beginning of the universe. [1]



5 Short answers

[6]

Write short answers to the following questions.

- a. Give a reason: celestial bodies remain in their own orbits.

[2]

- b. Give a reason: the farther apart two galaxies are, the faster they move apart.

[2]

- c. Write any two differences between a closed universe and an open universe.

[2]

6 Long answer

[4]

Write a long answer to the following question.

The table gives the distances of four galaxies and the speeds at which they are moving away from us.

Galaxy	Distance (Mpc)	Speed moving away (km/s)
A	50	3,650
B	100	7,300
C	200	14,600
D	300	?

- What relation between speed and distance does the table show?
- Calculate Hubble's constant from galaxy B.
- Calculate the speed of galaxy D.
- How does this support the Big Bang theory?



[4]

a. Light travels 300,000 km every second. Light from the Sun takes about 500 seconds to reach the Earth. How far is the Sun from the Earth?

[2]

Answer:

[2]

[illegible]

Answer:

[2]

In your opinion, what might the future of the universe be: open, flat or closed? Explain with arguments.

(not marked)

Dot	Distance from A before (cm)	Distance from A after (cm)	How much it grew (cm)
B			
C			
D			
E			