

Area 1: Space Exploration and Cosmology

Multiple Choice Questions 1 → 10

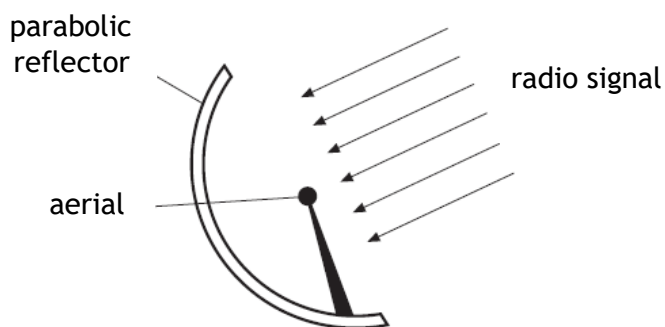
1. Identify the period of a geostationary satellite.
 - A 1 hour
 - B 1 day
 - C 1 week
 - D 1 month
 - E 1 year
2. The weather information satellite NOAA-15 has a period of 99 minutes and an orbital height of 833 km.

The weather information satellite Meteosat is geostationary.

Identify which of the following gives a possible period for a satellite with an orbital height of 20000 km.

- A 83 minutes
 - B 99 minutes
 - C 720 minutes
 - D 1440 minutes
 - E 1750 minutes
3. Calculate the time taken for light to reach the Earth from the Sun.
 - A 1 second
 - B 8 seconds
 - C 1 minute
 - D 8 minutes
 - E 1 hour
 4. Identify which term describes an object which orbits a star.
 - A moon
 - B planet
 - C solar system
 - D galaxy
 - E universe

5. A parabolic reflector is used to receive radio signals.



Identify how the parabolic reflector improves the received signal.

- A absorbing the signal
- B making more signals
- C reflecting the signal to the transmitter
- D reflecting the signal away from the aerial
- E reflecting the signal to a focus at the aerial

6. The distance from the Sun to Sirius A is 8.6 light years.

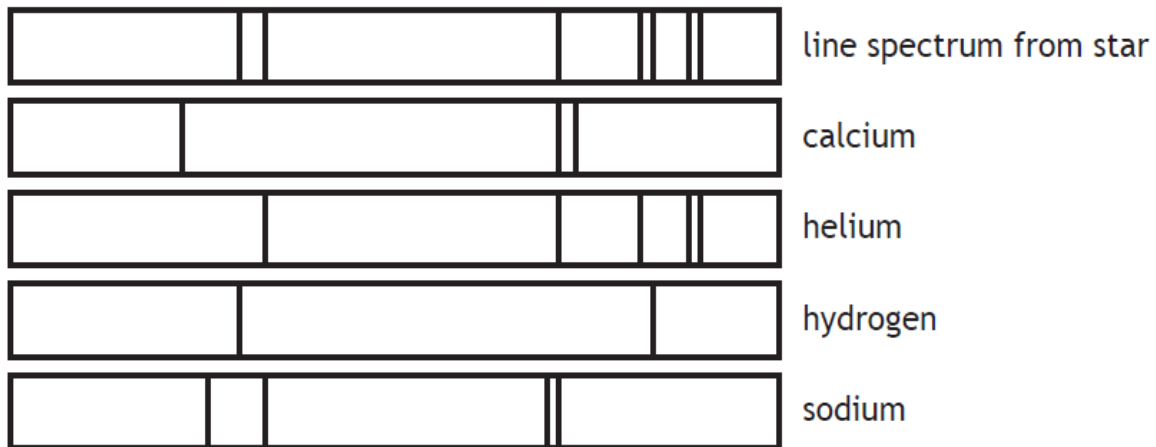
Calculate the distance to Sirius A in metres.

- A 1.4×10^8 m
- B 1.6×10^{14} m
- C 6.8×10^{14} m
- D 9.5×10^{15} m
- E 8.2×10^{16} m

7. Identify the approximate age of the Universe.

- A 13.8 thousand years
- B 13.8 million years
- C 13.8 billion years
- D 13.8 trillion years
- E 13.8 quadrillion years

8. Light from a star is split into a line spectrum of different colours. The line spectrum from the star is shown, along with the line spectra of the elements calcium, helium, hydrogen and sodium.



Identify the elements present in the star.

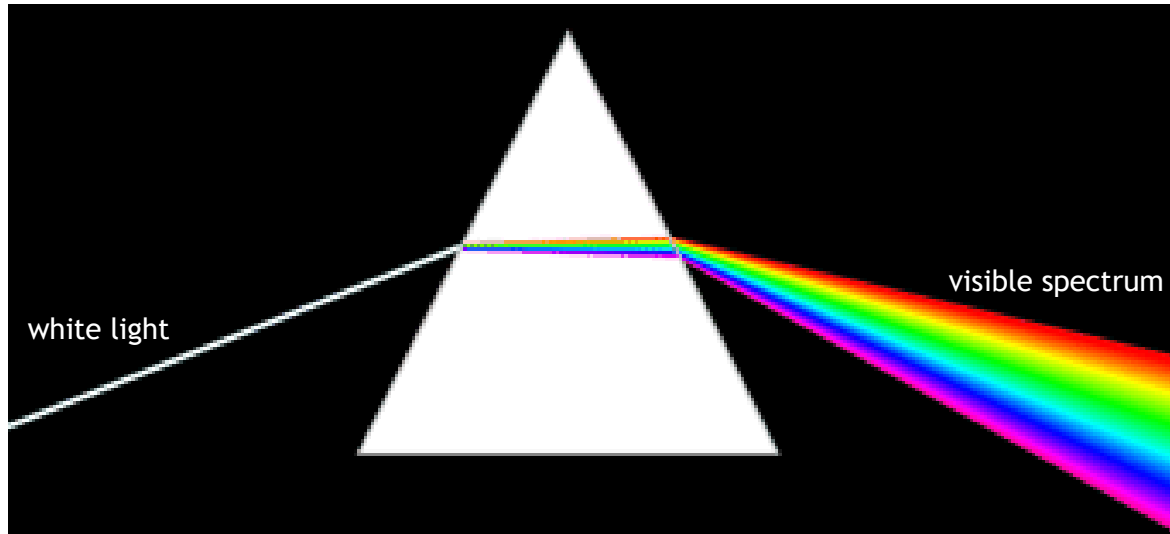
- A sodium and calcium
 - B calcium and sodium and hydrogen
 - C hydrogen and sodium
 - D helium and hydrogen
 - E calcium and helium
9. A pupil makes the following statements about the Universe.
- I the Big Bang Theory is a theory about the origin of the Universe.
 - II the Universe is approximately 14 million years old.
 - III the Universe is expanding.

Identify which of these statements is/are correct.

- A I only
 - B II only
 - C I and II only
 - D I and III only
 - E I, II and III
10. A rocket has a weight of 5.34×10^5 N when it landed on the surface of Venus.
Calculate the weight of the rocket when it crashes into the upper cloud layer of Saturn.
- A 5.45×10^4 N
 - B 6.00×10^4 N
 - C 5.34×10^5 N
 - D 5.40×10^5 N
 - E 1.38×10^6 N

Full Response Questions 11→ 16

11. The different wavelengths of visible light can be separated into a spectrum.



(a) State the optical device used above that splits white light into a continuous emission spectrum.

Another type of spectrum can also be created, using a different light source. This spectrum only shows specific wavelengths (colours) of visible light.

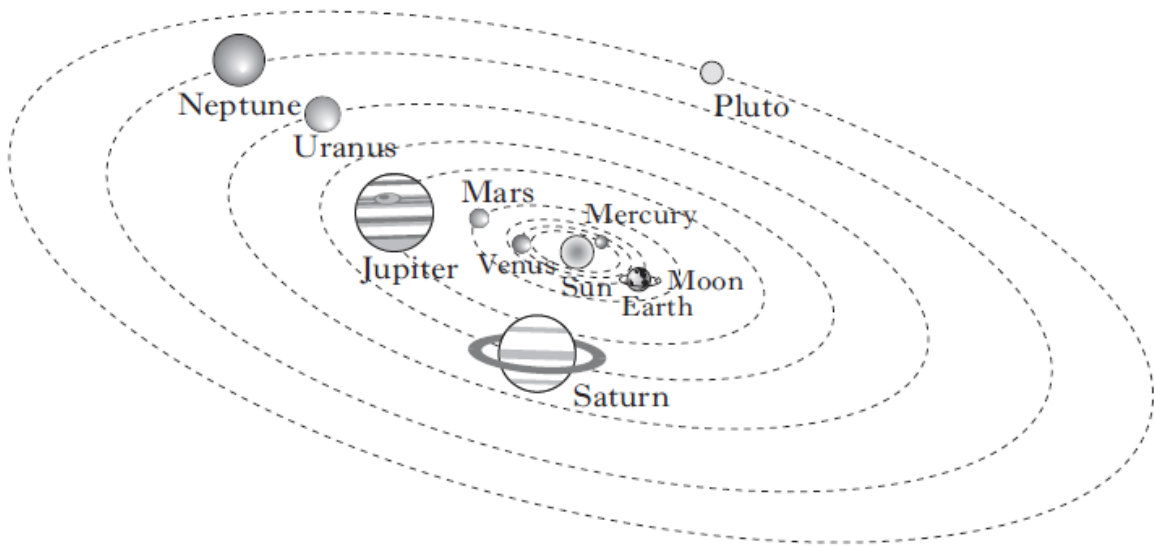


(b) State the name of this type of spectrum.

Telescopes can be used to detect visible light.

(c) State the name of another type of electromagnetic wave that can be detected using a telescope.

12. Astronomers study space.



Select the correct answer to complete each sentence.

(a) The Earth is a $\begin{pmatrix} \textit{planet} \\ \textit{moon} \\ \textit{star} \end{pmatrix}$ which orbits the Sun.

The Earth has one natural satellite called the $\begin{pmatrix} \textit{International Space station} \\ \textit{Hubble Space telescope} \\ \textit{Moon} \end{pmatrix}$.

(b) The Sun is at the centre of our $\begin{pmatrix} \textit{solar system} \\ \textit{universe} \\ \textit{galaxy} \end{pmatrix}$.

Light from the Sun takes about $\begin{pmatrix} \textit{8 seconds} \\ \textit{4.2 years} \\ \textit{8 minutes} \end{pmatrix}$ to travel to the Earth.

(c) The nearest star to the Earth is $\begin{pmatrix} \textit{Sirius} \\ \textit{Mars} \\ \textit{the Sun} \end{pmatrix}$.

All of space is known as the $\begin{pmatrix} \textit{Milky Way} \\ \textit{solar system} \\ \textit{universe} \end{pmatrix}$.

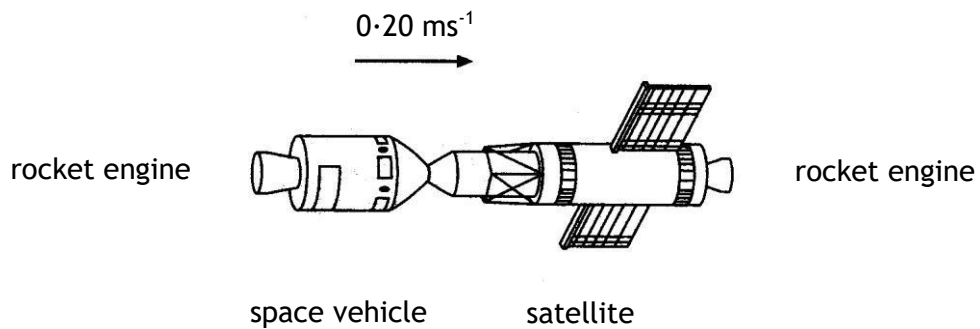
13. As a rocket accelerates after launch, the acceleration is found to increase as the altitude of the rocket increases.

State one factor that causes the acceleration to increase.
Justify your answer.

14. Artificial satellites are put into an orbit around Earth for a variety of reasons.

State one benefit to society of having an artificial satellite in orbit.

15. The rocket engine of a space vehicle is used to move a satellite, which is in orbit above the surface of the Earth.



The rocket engine of the space vehicle is used to decelerate the satellite to a slower orbital velocity and so a lower orbital height.

(a) State the effect this will have on the orbital period of the satellite.

Once the correct orbital height has been reached the rocket engine of the space vehicle is switched off.

(b) Describe the motion of the two objects.
You must justify your answer.

(c) State the use for the rocket engine on the satellite.