



Page 292

Q1.

Atmospheric refraction of light

Q2.

Twinkling of stars; Advance sunrise and delayed sunset

Q3.

(a) Atmospheric refraction of sunlight

(b) Atmospheric refraction of sunlight

Q4.

(a) About 2 minutes

(b) About 2 minutes

Q5.

False

Q6.

Atmospheric refraction of light

Q7.

two, two, refraction

Q8.

Stars seem higher than they actually are because of atmospheric refraction of light coming from the star while passing through the successive denser layers of earth's atmosphere.

Q9.

The sun can be seen about two minutes before actual sunrise because of atmospheric refraction of sun's light as shown in the following diagram. When the sun is slightly below the horizon, then the sun's light coming from less dense air to more dense air is refracted downwards as it passes through the atmosphere and the appears to be raised above the horizon.

Q10.

The air just above the fire becomes hotter. This hotter air is optically rarer but the colder air further up is optically denser, so when we see the objects by the light coming from them through hot and cold air layers having different optical densities, then refraction of light takes place randomly due to which the objects appear to be moving slightly.

Q11.

(a) The refraction of light caused by the earth's atmosphere is called atmospheric refraction. It is caused due to the varying optical densities of different layers of earth's atmosphere.

(b) The light coming from a star undergoes atmospheric refraction due to varying optical densities of air at various altitudes. The continuously changing atmosphere refracts the light from the star by different amounts from one moment to the next. Thus, the star-light reaching our eyes increases and decreases continuously and the star appears to twinkle.

(c) Planets appear to be quite big to us and can be considered to be a collection of a very large number of point sources of light. The dimming effect produced by some of the point sources is nullified by brighter effect produced by some other point sources. Thus, the overall brightness remains the same and the planets do not appear to twinkle.

Page 293

Q20.

The atmosphere only contains air but all the air in the atmosphere is not at the same temperature. Some of the air layers are cold whereas others are comparatively warm. The cooler air layers of the atmosphere behave as optically denser medium for the light rays whereas the warmer air layers behave as optically rarer medium. So, light gets refracted on passing through these layers of air in the atmosphere.

Q21.

By about 4 minutes

Q22.

(a) This means that due to atmospheric refraction we continue to see the sun about two minutes after the actual sunset. No such atmospheric refraction could have been possible if the earth had no atmosphere. Hence, the day is longer due to the atmosphere of earth.

(b) Yes

\*\*\*\*\* END \*\*\*\*\*