

Chapter. 6

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Conceptual Questions - Answers

① Why are dish antennas curved?

- * Dish antennas are curved so that all the signals which fall on it can be reflected to one single point at its focus where the receiver is placed.
- * So the strength of signal received is maximum.

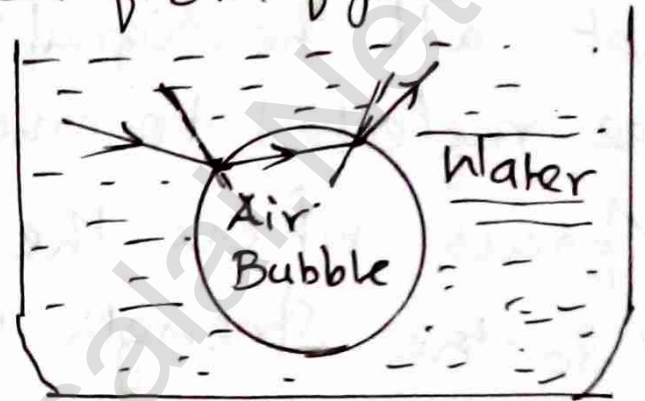
② What type of lens is formed by a bubble inside water?

- * Air bubble inside water is behaving like a lens Diverging lens.

- * When light enters from water to air, it is refracted so that it deviated away from normal because light is entering from denser (water) medium to rarer (air) medium.

* When light is emerging from air bubble again refraction is taking place at air-water boundary.

* The overall effect is giving divergence to light can be seen from figure.



③ ~~Is~~ it possible for two lenses to produce zero power?

* Power of the combination of two

lenses $P_T = P_1 + P_2$

* If one lens is converging lens with some focal length & its power $P_1 = P$ and the other lens diverging lens with the same focal length but with a negative sign so that its power $P_2 = -P$

* Then the combination of these two lenses will be $P_T = P_1 + P_2$

$$= P + (-P) = 0$$

④ Why does sky look blue and clouds look white?

* When sunlight reaches atmospheric particles in the sky, blue light is scattered away more easily than other colours. Hence the sky appears blue.

* In clouds sunlight (white light) is scattered by millions of relatively large water droplets. These droplets scatter all colours almost equally, so that the sunlight continues to remain white.

* This is why clouds appear white against the background of a blue sky.

⑤ Why is yellow light preferred to during fog?

* Fog droplets are smaller than cloud droplets but they still are huge compared with the wavelengths of visible light.

* Scattering of light is always greater than at the short wavelength end of the visible spectrum than at the long wavelength end.

* Red is obviously unsuitable because it is used for stop lights. Hence yellow colour is used instead

⑥ Two independent sources (monochromatic sources) cannot act as coherent sources. Why?

* Two independent sources of light cannot be coherent. This is because light is emitted by individual atoms, when they return to ground state.

* Even the smallest source of light contains billions of atoms which obviously cannot emit light waves in the same phase.

⑦ Does diffraction take place at the Young's double slit experiment?

* Yes.

* The light waves suffer diffraction at both the slits. Then interference occurs between the diffraction patterns of the two slits.

⑧ Is there any difference between the colours obtained from a prism and the colours of a soap film seen in sunlight?

* Yes

* In the prism, colours are produced due to dispersion of light.

* The colours of a soap film are due to interference of light.

⑨ A small circular disc is placed in the path of light from a distant source. Will the centre of shadow be bright or dark?

* Waves from distant source are diffracted by the edge of the disc.

* These diffracted waves interfere constructively at the centre of the shadow and produce a bright fringe.

- (10) When a wave undergoes reflection at a denser medium, what happens to its phase?
- * When a wave is reflected into rarer medium from the surface of a denser medium, it undergoes a phase change of π radian.

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