Conceptual Questions

Question 1 Define the term wavefront?
Solution: The locus of all such particles of the medium which are vibrating in the same phase is called a wavefront.

Question 2 Give the relation between path difference and wavelength for constructive interference between two waves.
Solution*:* For constructive interference the path difference between two waves must be an integral multiple of λ i.e., p=nλ, n=0,1,2,3,..

Question 3 State two conditions to obtain sustained interference of light.
Solution: The conditions for obtaining sustained interference of light are
(a) the two light sources should be coherent
(b) the two light sources should be narrow and placed close to each other.

Question 4 If the separation between the two slits is decreased in Young's double-slit experiment keeping the screen position fixed. What will happen to the fringe width?
Solution: Fringe width β=Dλ/d,
As the separation d between two slits decreases, fringe width β decreases.

Question 5 Why are coherent sources necessary to produce a sustained interference pattern?
Solution:Coherent sources have a constant phase difference. This ensures that the position of Maxima and minima do not change with time i.e., a sustained interference pattern is obtained.

Question 6 Sunglasses are made of Polaroid and not colored glasses. Why?
Solution: Polaroid absorbs only that part of the light which produces a dazzling effect in the eye. But colored glasses absorb more light incident on them. This makes the image appears to be dim.

Question 7 Why does the intensity of a secondary maximum become less as compared to the central maximum?
Solution: The intensity of light of a secondary maxima decreases with the order of maximum. This happens because, the intensity of central maximum is due to wavelets from all parts of the slit. First secondary maxima is formed due wavelets from one third parts of the slit and second secondary maxima is due to wavelets from one fifth part of the slit and so on. This is the reason why intensity of secondary maxima becomes less as compared to central maxima.

Question 8 Will ultrasonic big show any polarization? Give a reason for your answer.

Solution: No ultrasonic waves are longitudinal in nature so they cannot be polarized.

Question 9 Why longitudinal waves cannot be polarized?
Solution: In polarization vibrations perpendicular to the direction of propagation is restricted to just one direction this is possible in transverse waves that have such vibrations. in longitudinal waves, vibrations occur along the direction of propagation. So their polarization is not possible.

Question 10 Is there any difference between the colors emerging from a prism and the colors of a soap film seen in sunlight?
Solution: Yes. In the prism, colors are produced due to the dispersion of light. The colors of a soap film are due to the interference of light.