1 Mark Questions

1. Why do stars appear twinkling?

Ans: Stars appear twinkling due to multiple refractions of light through different atmospheric layers with different refractive indices.

2. Among objects made of glass and diamond, which one shines more. Why?

Ans: Diamond shines more because of lower critical angle of 24.4^0

3. What are applications of total internal reflection?

Ans: Brilliance of diamond, optical fibres, formation of mirages etc

4. What is Snell's Law?

Ans: The ratio of sine of the incident angle and the sine of the refracted angle is constant for a given pair of media.

5. On what factor does the refractive index of a medium depend?

Ans: Refractive index depends on 1)Nature of material 2)Wavelength of light used.

6. What is total internal reflection?

Ans: When the angle of incidence is greater than critical angle, the light ray reflected into denser medium at interface. This phenomenon is called total internal reflection.

7. How Light ray moves when it enters from rarer medium to denser medium

Ans: The light bends towards normal

8. Write the laws of refraction?

Ans: 1) The incident ray,the refracted ray and the normal to interface of two transparent media at the point of incidence all lie in the same plane.

2)During refraction light follows Snell's law

$$n_1 \sin i = n_2 \sin r$$

9. Define Critical angle

Ans: The angle of incidence at which the light ray propagates from denser to rarer graze along interface is called critical angle

10. What is mirage?

Ans: Mirage is an optical illusion where it appears that water has collected on the road at a distant place but when we get there, we don't find any water.

11. Can you take a photo of mirage?

Ans: Yes, I can take a photo of a mirage

12. Find the speed of light in a transparent medium, whose refractive index is 3/2

Ans: $n = 3/2$ $C = 3 \times 10^8 m/s$

We know that $V = C/n = \dfrac{3 \times 10^8}{3/2} = 2 \times 10^8 \ m/s$

13. Refractive index of glass relative to water is 9/8. What is the refractive index of water relative to glass?

Ans: Given $n_{gw} = 9/8$

$n_{wg} = 1/n_{gw} = 8/9$

14. Determine the refractive index of benzene if the critical angle is 42⁰

Ans: Given $C = 42^0$

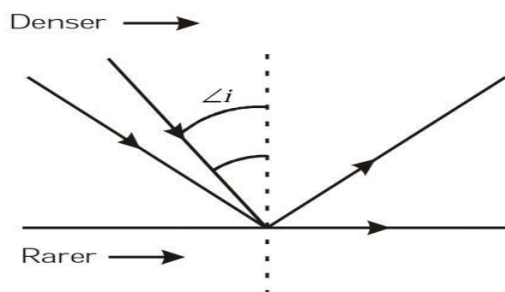$n = 1/\sin C = 1/\sin 42^0 = 1/0.6691 = 1.49$

15. The refractive index of water is 4/3. The Speed of light is 3×10^8 m/s. Find the speed of light in water.

Ans: $n = 4/3$ $C = 3 \times 10^8 m/s$

Speed of light in water $(V) = C/n = 3 \times 10^8 \times 3/4 = 9/4 \times 10^8 = 2.25 \times 10^8 \ m/s$

16. Which phenomenon do you observe from the figure?

Ans: Total internal reflection