

Short Answer Type

Q12) a) Absolute refractive index of flint glass =
 $3 \times 10^8 \text{ m/s} / 1.86 \times 10^8 \text{ m/s} = 1.61$

Absolute refractive index of crown glass =
 $3 \times 10^8 \text{ m/s} / 1.97 \times 10^8 \text{ m/s} = 1.52$

b) Relative index of flint glass with respect to crown glass = $1.61 / 1.52 = 1.059$.

Q13) Speed of light in air = $3 \times 10^8 \text{ m/s}$

In medium X = $2 \times 10^8 \text{ m/s}$

In medium Y = $2.5 \times 10^8 \text{ m/s}$

So a) $n_{X \text{ air}} = 3 \times 10^8 \text{ m/s} / 2 \times 10^8 \text{ m/s} = 1.5$

b) $n_{Y \text{ air}} = 3 \times 10^8 \text{ m/s} / 2.5 \times 10^8 \text{ m/s} = 1.2$

c) $n_{Y \text{ X}} = 1.5 / 1.2 = 0.8$

Q14) Refractive index = $6/5 = 1.2$

speed of light in air = $3 \times 10^8 \text{ m/s}$

So speed of light in that medium = $\frac{3 \times 10^8 \text{ m/s}}{1.2}$
 $= 2.5 \times 10^8 \text{ m/s}$.

Q15) Refractive index of glass = 1.5

Speed of light in air = $3 \times 10^8 \text{ m/s}$

So speed of light in glass = $\frac{3 \times 10^8 \text{ m/s}}{1.5}$
 $= 2 \times 10^8 \text{ m/s}$

Q16) Speed of light in water = $2.25 \times 10^8 \text{ m/s}$
 Refractive index = $3 \times 10^8 \text{ m/s} / 2.25 \times 10^8 \text{ m/s}$
 = $1.\bar{3}$

Q17) Refractive index = 2.42
 Speed of light in diamond = $\frac{3 \times 10^8 \text{ m/s}}{2.42}$
 = $1.2 \times 10^8 \text{ m/s}$

M/CQ's

Q19) d) S, because the less the refractive index will be, the maximum will be the speed of light.

Q20) c) material C, because the refractive index is a crucial factor and decides the amount of light reflected.

Q21) c) $4/6 = 2/3$, because
 air μ glass = μ of air / μ of glass
 glass μ air = μ of glass / μ of air

Q22) c) medium C, the magnitude of refractive index is inversely proportional to the angle of refraction.

Q23) Speed of light in substance X = $1.25 \times 10^8 \text{ m/s}$

In Air = $3 \times 10^8 \text{ m/s}$

$$\text{So } \mu = 3 \times 10^8 \text{ m/s} / 1.25 \times 10^8 \text{ m/s} = 2.4$$

a) 2.4

Q24) d) substance S, the magnitude of refractive index is inversely proportional to the angle of refraction.

Q25) a) $1.\bar{3}$, because $3 \times 10^8 \text{ m/s} / 2.5 \times 10^8 \text{ m/s}$

Q26) c) 0.75, because $2.5 \times 10^8 \text{ m/s} / 3 \times 10^8 \text{ m/s}$

Q27) d) carbon disulphide, the magnitude of refractive index is inversely proportional to the speed of light.

Q28) c) 1.425, because $1.5 \times 10^8 \text{ m/s} / 2.5 \times 10^8 \text{ m/s}$