HW

(12) a) $n_{flint} = \frac{S_v}{S_{fg}} = \frac{2\times10^8}{1.86\times10^8} = 1.61$

$n_{crown} = \frac{S_v}{S_{cgo}} = \frac{3\times10^8}{1.97\times10^8} = 1.52$

b) $n_f = \frac{V_{cg}}{V_{fg}} = \frac{1.97\times10^8}{1.86\times10^8} = 1.059$

(13) a) $a_{in}\, n_m = \frac{S_a}{S_{mm}}$

$= \frac{3\times10^8 \text{ m/s}}{2\times10^8 \text{ m/s}}$

$= 1.5$

b) $a_{in}\, n_{dy} = \frac{\text{'S' of light in air}}{\text{'S' of light in medium}}$

$= \frac{2\times10^8 \text{ m/s}}{2.5\times10^8 \text{ m/s}} = 1.2$

c) $n_{my} = \frac{\text{'S' of light in medium}}{\text{'S' of light in medium}}$

$$x_{my} = \frac{2 \times 10^8 \text{ m/s}}{2.5 \times 10^8 \text{ m/s}}$$

$$= 0.8$$

(14) RI of the medium

$$= \frac{\text{speed of light in air}}{\text{speed of light in medium}}$$

$$1.2 = \frac{3000}{\text{speed of light in medium}}$$

'S' of light in medium = 250000 km/s

(15) RI of glass = 1.5

'S' of light in air = 3×10^8 m/s

$$\text{RI of glass} = \frac{\text{'S' of light in air}}{\text{'S' of light in glass}}$$

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

(16) 'c' in vacuum = 3×10^8 m/s

'c' in water = 2.25×10^8 m/s

RI of water = $\frac{3 \times 10^8}{2.25 \times 10^8} = 1.33$

(17) RI of diamond = 2.42

'c' in air = 3×10^8 m/s

'c' in diamond = $\frac{3 \times 10^8}{2.42}$

$= 1.239 \times 10^8$ m/s

MCQ's

(19) RI of y = $\frac{\text{'c' of light in x}}{\text{'c' of light in y}}$

(d) c

(20) Refraction is minimum in the material with minimum refractive index (c) material c

(21) The refractive index of light going from air to glass $= \frac{3}{2}$

The refractive index of light going from glass to air $= \frac{1}{RI \text{ of glass for light going from air to glass}}$

$(C) = \frac{2}{3} = \frac{4}{6}$ ✓

(22) The $\angle$ of reflection in a medium with more refractive index (C) ✓

(23) v of light in substance $n = 1.25 \times 10^8$ m/s

v of light in vacuum $= 3 \times 10^8$ m/s

$$RI = \frac{3 \times 10^8}{1.25 \times 10^8} = 2.4$$

(A) ✓

(24) Critical fraction will be the maximum for substance with minimum refractive index

(d) Substances

(25) The refractive index of water is 1.33.

(A) —

(26) RI of air with respect to water

$$= \frac{1}{\text{RI of } H_2O \text{ with respect to air}}$$

$$= \frac{3}{4} = 0.75 \quad (C) —$$

(27) The light travels slowest in material with maximum RI

(d) carbon dioxide

(28) RI of glass wrt air $= \frac{3}{2}$

RI of water wrt air $= \frac{4}{3}$

RI of glass wrt water $= \frac{\frac{3}{2}}{\frac{4}{3}} = \frac{9}{8} = 1.125$

(d) 1.125