Q1.Ans.

$$n_{ia} = \frac{n_i}{n_a} = 1.31 \ldots\ldots(i)$$

$$n_{ra} = \frac{n_r}{n_a} = 1.54 \ldots\ldots(ii)$$

$$n_{ri} = \frac{n_r}{n_i} = \frac{n_r}{\dfrac{n_a}{\dfrac{n_i}{n_a}}}$$

$$n_{ri} = \frac{n_r}{n_a} \times \frac{n_a}{n_i} = \frac{1.54}{1.31} = 1.175$$

Q2. **Ans.** l/f=l/v-l/u

V=?

F=-70 cm

$$u = -\infty$$

$$1/-70 = l/v - 1/-\infty$$

1/v=1/-70 v=-70 cm

Q3 Ans.

$$n = \frac{\sin i}{\sin r} = \frac{\sin 30°}{\sin r_1}$$

$$n = \frac{\sin 45°}{\sin r_2}$$

$$\therefore \sin r_2 = \frac{\sin 45°}{\sin 30°} \sin r_1$$

$$\sin r_2 = \frac{1}{\sqrt{2}} \times (2) \sin r_1$$

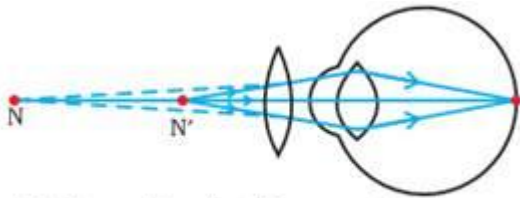$$= \sqrt{2} \sin r_1$$

Q4. **Ans.** -U=-25 cm V=-l5O cm.

1/f= 1

1/f=1/ - 1/(-25)

f=3Ocm.

f being +ve, lense used is convex lens.

Hypermetropia

Cause: Shortening of eye ball

(c) Correction for Hypermetropic eye

Q5. **Ans. (a)** It is incorrect as length of the day in space would be about four minutes shorter than that on the earth.

(b) It is correct because in space we cannot observe scattering of light because of absence of atmosphere.

(c) It is incorrect because twinkling of stars is due to atmospheric refraction but in space we do not have atmosphere and atmospheric particles.

Q6.u=-40cm

m1=1/3   m2=1/2

m=v/u

1/3=v/-40

V=-40/3

1/f=3/-40 +1/40 = -2/40

F=-20cm

m=v/u   u=2v

1/f=1/v-1/u

1/-20= 1/v-1/2v

1/-20 = 1/2v

V=-10

U=-20cm

Q7. V=60cm

M=3/2 = -3/2

-3/2=60/u

U= -40cm

1/f=1/v -1/u

1/f = 1/60 +1/40

** = 5/120**

f=24 cm

P=100/24 = 4.16 D

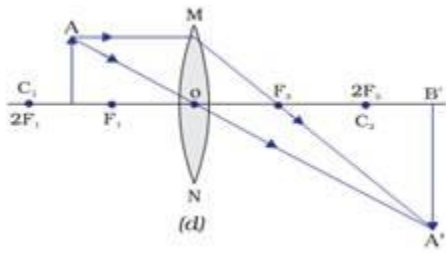**Q8. Ans. (a)** for $u = \dfrac{a}{2} \quad f = a$

Position   of   the   object   –Between   O   &   F
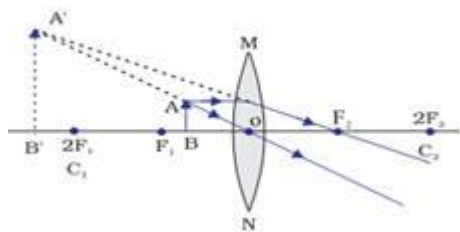
(b) $u = \left(\dfrac{3}{2}\right) a \quad f = a$ For

Position of the object – Between F and 2F

(d)

Q9. (a) Refraction of light , when a ray of light travel from denser medium to rare medium it band away from normal as a result they appear to meet higher than its actual position.

(b) n=1.50

N=Real depth/apparent depth

1.50=x/50

X=50×1.50 = 75cm

(c) n=1.50

C=3×10⁸ m/s

N=c/v

1.50 = 3×10⁸/v

V= 3×10⁸/1.50 =2×10⁸m/s

(d)