MT EDUCARE LTD.

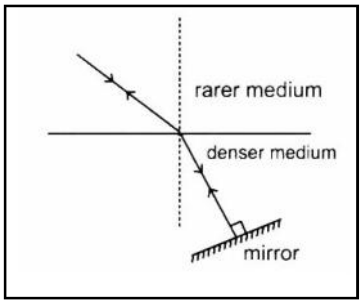
ICSE X SUBJECT : **PHYSICS**

Refraction of light at plane surface, Refractraction Through lenses, Spectrum (Board papers & Numericals)

Assignment Sheet

STEP UP ANSWERSHEET

59. (i)



(ii) Principle of reversibility of light. **[ICSE 2013]**

60. (i) $_{a}\mu_{g} = 1.5$

$$_{g}\mu_{a} = \frac{1}{_{g}\mu_{a}}$$

$$= \frac{1}{1.5} = 0.666 = 0.67$$

(ii) $\angle i = 0°$ **[ICSE 2013]**

61. (i) Infrared radiations.
(ii) X-rays.
(iii) UV radiations. **[ICSE 2013]**

62. No, the absolute refractive index of a medium can not be less than one because speed of light in any medium is always less than that of in vacuum. **[ICSE 2013]**

63. Let, Real depth $= x$
Refractive Index, $\mu =$

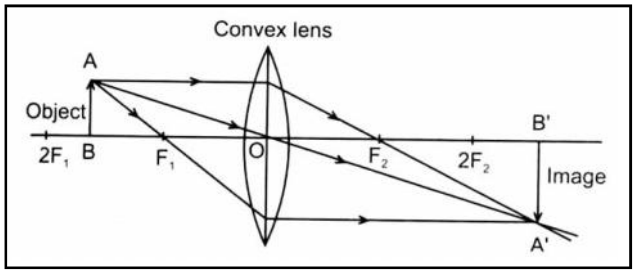
$$\Rightarrow \quad \frac{4}{3} = \frac{x}{x-4}$$

$$\Rightarrow \quad 4x - 16 = 3x$$

$$\therefore \quad x = 16\text{cm}$$

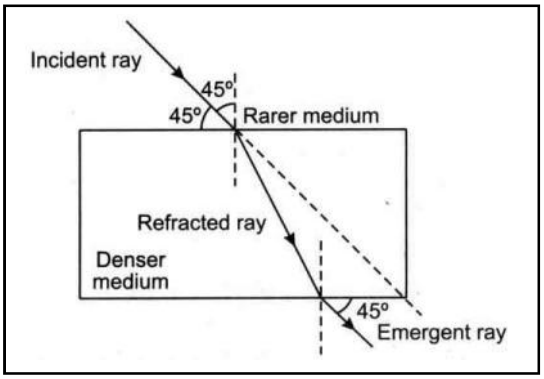
[ICSE 2013]

64.



[ICSE 2013]

65.



[ICSE 2014]

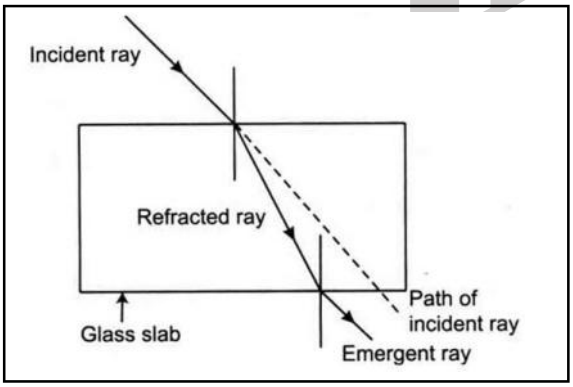
66. (i) When light passes from water to air i.e., from denser to rarer mediurh, its speed increases.
(ii) Red light travels fastest. **[ICSE 2014]**

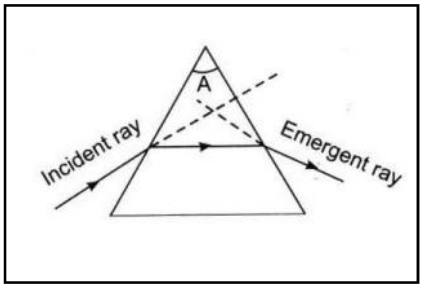
67. Factors affecting the critical angle :
(i) Wavelength of light.
(ii) Temperature (on changing the temperature of medium, its refractive index changes). **[ICSE 2014]**

68. (i) Quartz prism
(ii) Infrared radiations. **[ICSE 2014]**

69. Red colour is used as sign of danger due to its longest wavelength and lesser deviation (scattering). Therefore, it can reach to a longer distance. **[ICSE 2014]**

70. (i)



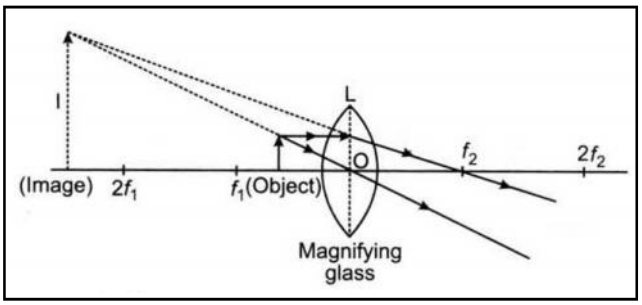


In a glass slab, the emergent ray is laterally displaced because the two refracting surfaces are parallel to each other whereas in case of prism the emergent ray is deviated because two refracting surfaces are inclined at an angle A.

(ii) No, he is not correct because concave lens always forms virtual, erect and diminished image. **[ICSE 2014]**

71. (i) Convex lens.

(ii)



[ICSE 2014]

72. (i) X-rays.
(ii) Speed of the wave in Vacuum is 3×10^8 m/s.
(iii) X-rays are used for determining fracture of bones, hidden objects in customs at Airports. **[ICSE 2014]**

73. Given,

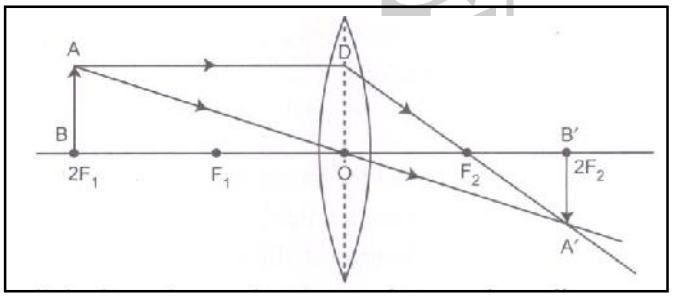
Speed of light = 2×10^5 km/s

Refractive index of glass = $\dfrac{\text{Speed of light in vaccum}}{\text{Speed of light in glass}}$

$= \dfrac{3 \times 10^8}{2 \times 10^5 \times 10^3} = 1.5$ **[ICSE 2015]**

74. (i) The object must be placed on the principal axis of a convex lens at distance twice the focal length of the lens i.e., at $2F_1$.

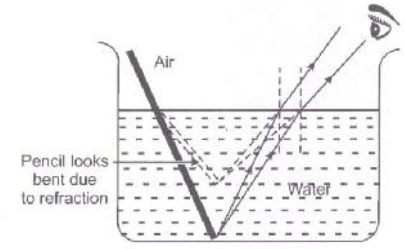
(ii)



[ICSE 2015]

75. (i) At sunrise, light from the sun has to travel a very long distance to reach the observer on earth. The light while travelling from sun loses blue light due to scattering while the red light is scattered very little because of its long wavelength. So the sun looks red during sunrise.
(ii) **Colour** is the light subjective property of light related to its wavelength. **[ICSE 2015]**

76. (i) He sees that the pencil appears to be bent.
(ii) The bending is due to the phenomenon of **refraction of light**.
(iii)



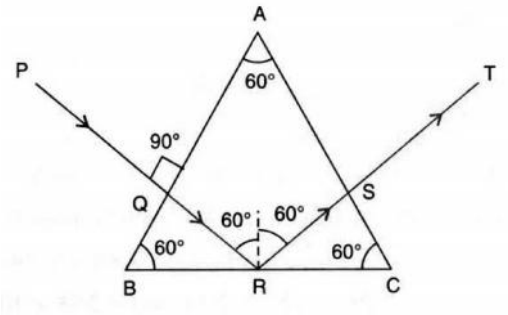
[ICSE 2015]

77. The refractive index will be different.
Reason : The speed of blue light in glass is less than that of red light and refractive index of glass is

$$\mu = \frac{c}{\text{speed of light in glass}} \qquad \therefore \mu_{blue} > \mu_{red=}$$

[ICSE 2016]

78. The completed diagram is given below.

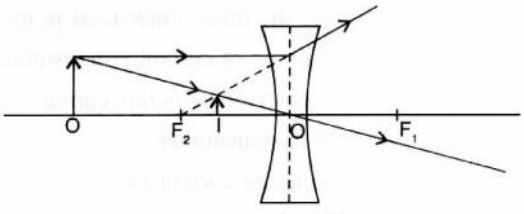


[ICSE 2016]

79. (i) Angle of deviation increases with the increase in refractive index of the material of the prism.
(ii) Angle of deviation decreases with the increase in wavelength of the light. **[ICSE 2016]**

80. (i) $\frac{\text{sine of angle of incidence}}{\text{sine of angle of refraction}}$ = refractive index of the media.
(ii) The bending is due to change in speed of light when it passes from one medium to the other medium of different optical density.
(iii) When angle of incidence is zero (i.e., when light is normally incident on the boundary of two media). **[ICSE 2016]**

81. (i) Concave lens.
(ii) The ray diagram is given alongside in which I is the image for the object O.



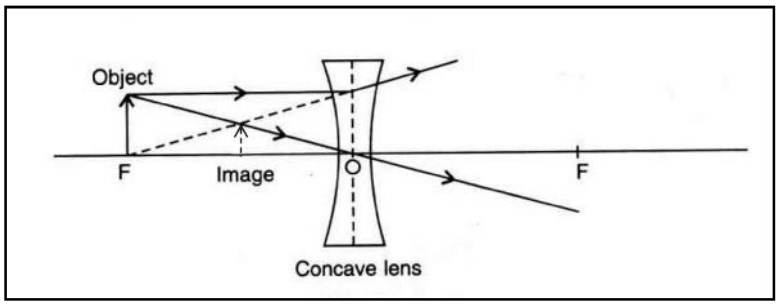
[ICSE 2016]

82. Scattering of light is the process of absorption and then re-emission of light energy by the air molecules of size smaller than the wavelength of incident light.
The red colour light is scattered the least because the intensity of scattered light I $\alpha 1/\lambda^4$ and the wavelength λ of red light is maximum.
[ICSE 2016]

83. The greenhouse gases in the earth's atmosphere absorb the low energy infrared radiations. **[ICSE 2017]**

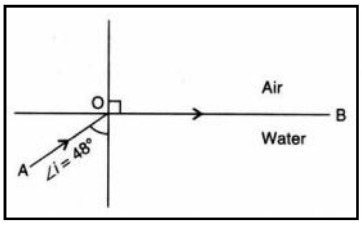
84. Infrared radiation. **[ICSE 2017]**

85. (i) The lens is concave.
(ii) The ray diagram showing the image formation is show in figure.



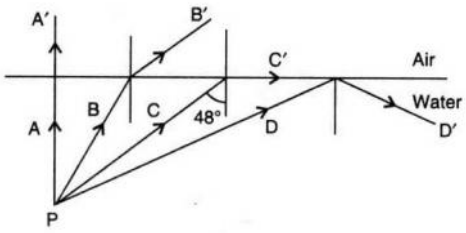
[ICSE 2017]

86. (i) The following figure shows the path of the ray AO after refraction as OB.
(ii) For total internal reflection, the angle of incidence i of incident ray AO must be more than 48° (i.e. $\angle i > 48°$).



[ICSE 2017]

87. (i)



(ii) The ray B exhibits refraction while the ray D exhibits total internal reflection. **[ICSE 2017]**

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