

Model Question Paper 2

Ray Optics 2

11th Standard

Physics

Answer all the Questions

Reg.No. :

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Time : 00:50:00 Hrs

Total Marks : 45

5 x 1 = 5

Part A

- 1) If the velocity of light in a medium is $(2/3)$ times of the velocity of light in vacuum, then the refractive index of that medium is
(a) $3/2c$ (b) $2c/3$ (c) $2/3$ (d) 1.5
- 2) Two lenses of power +12 and -2 dioptre are placed in contact. The focal length of the combination is given by
(a) 8.33 cm (b) 12.5 cm (c) 16.6 cm (d) 10 cm
- 3) A converging lens is used to form an image on a screen. When the lower half of the lens is covered by an opaque screen then,
(a) half of the image will disappear (b) complete image will be formed (c) no image is formed (d) intensity of the image is high
- 4) Two small angled prism of refractive indices 1.6 and 1.8 produced same deviation, for an incident ray of light, the ratio of angle of prism
(a) 0.88 (b) 1.33 (c) 0.56 (d) 1.12
- 5) Rainbow is formed due to the phenomenon of
(a) refraction and absorption (b) dispersion and focussing (c) refraction and scattering (d) dispersion and total internal reflection

Part B

5 x 2 = 10

- 6) Prove the mirror formula for reflection of light from a concave mirror producing (i) real image, (ii) virtual image.
- 7) With the help of ray diagram explain the phenomenon of total internal reflection. Give the relation between critical angle and refractive index.
- 8) Write a note on optical fibre.
- 9) Explain Michelson's method of determining the velocity of light.
- 10) Give the importance of velocity of light.

Part C

5 x 3 = 15

- 11) Does a beam of white light disperse through a hollow prism?
- 12) Derive an equation for the dispersive power of a prism.
- 13) Describe a spectrometer.
- 14) Explain how will you determine the angle of the minimum deviation of a prism using the spectrometer.
- 15) Write a note on the formation of rainbows.

Part D

3 x 5 = 15

- 16) An object of size 3 cm is kept at a distance of 14 cm from a concave lens of focal length 21 cm. Find the position of the image produced by the lens?

Given data.

Size of the object (h_1) = 3 cm = 3×10^{-2} m

Object distance from a concave lens (u) = 14 cm = 14×10^{-2} m

Focal length of concave lens (f) = 21 cm = 21×10^{-2} m

- 17) What is the focal length of a thin lens if the lens is in contact with 2.0 dioptre lens to form a combination lens which has a focal length of -80 cm?

Given data.

One thin lens is in contact with another lens.

Let focal length of thin lens (I) = f_1

Let focal length of another lens (II) = f_2

Power of lens (II) = 2.0 dioptre

Focal length of the combination lens = -80 cm

$F = -80 \times 10^{-2}$ m

- 18) A ray passes through an equilateral prism such that the angle of incidence is equal to the angle of emergence and the lateral shift is equal to $3/4$ of the angle of prism. Find the angle of deviation.

Given data.

Given prism is an equilateral prism

Angle of incidence = Angle of emergence

Angle of emergence = $\frac{3}{4}$ of the angle of prism
