

BHARATIYA VIDYA BHAVAN'S V M PUBLIC SCHOOL, VADODARA

**QUESTION PAPER
PHYSICS**

CLASS XII

RAY OPTICS

MARKS : 70 TIME : 3h

- 1 Does critical angle depend on wavelength used? 1
- 2 Name the phenomenon responsible for mirage formation. 1
- 3 Does a prism displace or deviate an incident ray? 1
- 4 What are the factors on which light reflected from a surface depends? 1
- 5 A thin prism of 60° gives deviation of 30° . what is the refractive index of the material of the prism?
1
- 6 For what angle of incidence the lateral shift produced by a parallel sided glass slab is maximum?
1
- 7 What will be the colour of the sky in the absence of atmosphere? 1 8 You are provided with four lenses of focal lengths 1cm, 3cm, 10cm and 100 cm . Which two would 1
you prefer for a microscope and which two for a telescope?
- 9 How deep will a 4m tank appear when seen in air due to optical illusion. Refractive index of water 2 is $4/3$.
- 10 Name the colour having the (i) minimum speed (ii) maximum speed through a prism. 2
- 11 What do you mean by spherical aberration of a mirror ? How can it be minimized? 2
- 12 Yellow light of wavelength 589nm is incident on a boundary separating air and glass . Find the 2
speed , wavelength and frequency for (i) reflected light (ii) refracted light . Refractive index of glass
for yellow light is 1.5
- 13 Two thin lenses having focal lengths having focal lengths +20cm and -30cm are put in contact . 2 The
doublet behaves as an achromatic lens. Find the focal length of this doublet. What will be the
converging power if the focal length of the two lenses is made the same?
- 14 Derive mirror formula for concave mirror forming virtual image. 2 15 (i) The refractive index of
glass is 1.5. What is the time taken by light to travel 1m thickness of the 2 glass ? the speed of light
in vacuum is 3×10^8 m/s .
- 16 Where should an object be placed from a converging lens of focal length 20cm so as to obtain a 2 real
image of magnification 2?
- 17 Show that angle of deviation depends on angle of incidence. 2
- 18 Write the difference between dispersive and non dispersive medium with examples. 2
- 19 Show that lateral displacement is directly proportional to t and i_1 . 3
- 20 What is the main requirement in the fabrication of optical fibres? How it can be achieved? Write
3 two examples
- 21 Obtain a relation for refraction from a rarer to denser medium at a convex spherical surface 3
forming real image.
- 22 Derive thin lens formula for a concave lens . 3
- 23 What is myopia? What are its causes? How can it be corrected? 3
- 24 Describe an astronomical telescope .Derive an expression for its magnifying power when final 3
image is at (a) infinity (b) at D
- 25 Compound microscope has an objective lens of focal length 2cm and eye lens of focal length 5cm.

If an object is placed 3cm from the objective and final image is formed at the least distance of distinct vision, find the magnification produced.

- 26 A double convex lens made of glass of refractive index 1.5 has both curvatures of radii 20cm. An object 2cm high is placed 2cm from this lens, find the position, nature and size of the image.
- 27 The angle of minimum deviation for yellow light in a prism of refractive index 1.6 is found to be 34° . Calculate refracting angle of the prism.
- 28 Derive lens makers formula. 5 29 Give the construction and working of a compound microscope. Define and derive an equation for its magnifying power.
- 30 For refraction through prism derive prism formula.