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Physics Grade 10 — Chapter 5

Optics

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Independent practice MCQs from the supplied Class 10 Physics DeepSeek notes PDF. Total: 47 questions.

A. Important / Main Topics

1. The bouncing back of light from a surface is called:

(A) Reflection
(B) Refraction
(C) Diffraction
(D) Dispersion

Correct Answer: A

Explanation: Reflection is the bouncing back of light from a surface.

2. According to the law of reflection, the angle of incidence is:

(A) Greater than the angle of reflection
(B) Equal to the angle of reflection
(C) Less than the angle of reflection
(D) Unrelated to the angle of reflection

Correct Answer: B

Explanation: According to the law of reflection, the angle of incidence is Equal to the angle of reflection.

3. The normal is a line:

(A) Parallel to the surface
(B) At 45° to the surface
(C) Perpendicular to the surface
(D) Along the surface

Correct Answer: C

Explanation: The normal is perpendicular to the reflecting surface at the point of incidence.

4. Reflection from a smooth surface is called:

(A) Diffused reflection
(B) Irregular reflection
(C) Scattered reflection θ = i θ r
(D) Regular reflection

Correct Answer: D

Explanation: Reflection from a smooth surface is called Regular reflection.

5. Diffused reflection occurs on:

(A) Rough surfaces
(B) Smooth surfaces
(C) Mirrors
(D) Polished metal

Correct Answer: A

Explanation: Diffused reflection occurs on Rough surfaces.

6. The image formed by a plane mirror is:

(A) Real and inverted
(B) Virtual and erect
(C) Real and erect
(D) Virtual and inverted

Correct Answer: B

Explanation: The image formed by a plane mirror is Virtual and erect.

7. The SI unit of refractive index is:

(A) m/s
(B) m
(C) No unit
(D) Hz

Correct Answer: C

Explanation: Refractive index is a ratio of speeds and has no unit.

8. When light enters a denser medium, it:

(A) Bends away from the normal
(B) Goes straight through
(C) Reflects back
(D) Bends toward the normal

Correct Answer: D

Explanation: When light enters a denser medium, it Bends toward the normal.

9. When light enters a rarer medium, it:

(A) Bends away from the normal
(B) Bends toward the normal
(C) Goes straight through
(D) Reflects back

Correct Answer: A

Explanation: In a rarer medium, light speeds up and bends away from the normal.

10. The critical angle is the angle of incidence for which the angle of refraction is:

(A) 0°
(B) 90°
(C) 45°
(D) 180°

Correct Answer: B

Explanation: At the critical angle, the refracted ray makes a 90° angle with the normal.

11. Optical fibers work on the principle of:

(A) Refraction
(B) Diffraction
(C) Total internal reflection
(D) Dispersion

Correct Answer: C

Explanation: Optical fibers work on the principle of Total internal reflection.

12. The splitting of white light into seven colors by a prism is called:

(A) Reflection
(B) Refraction
(C) Diffraction
(D) Dispersion

Correct Answer: D

Explanation: Dispersion is the splitting of white light into its component colors.

13. The visible spectrum consists of how many colors?

(A) 7
(B) 3
(C) 5
(D) 9

Correct Answer: A

Explanation: 7 — this correctly answers the question.

14. A magnifying glass uses which type of lens?

(A) Concave
(B) Convex
(C) Cylindrical
(D) Plane

Correct Answer: B

Explanation: A magnifying glass uses a convex (converging) lens.

15. The image formed on the retina is:

(A) Virtual and upright
(B) Virtual and inverted
(C) Real and inverted
(D) Real and upright

Correct Answer: C

Explanation: The image formed on the retina is Real and inverted.

16. The distance of the image behind a plane mirror is:

(A) Twice the object distance
(B) Half the object distance
(C) Unrelated to the object distance
(D) Equal to the object distance

Correct Answer: D

Explanation: The distance of the image behind a plane mirror is Equal to the object distance.

17. Which of the following allows us to see a non-shiny object from all angles?

(A) Diffused reflection
(B) Regular reflection
(C) Total internal reflection
(D) Refraction

Correct Answer: A

Explanation: Diffused reflection scatters light in many directions, allowing the object to be seen from different angles.

18. The refractive index of water is approximately:

(A) 1.0
(B) 1.333
(C) 2.419
(D) 1.52

Correct Answer: B

Explanation: The refractive index of water is approximately 1.333.

19. The refractive index of diamond is:

(A) 1.333
(B) 1.52
(C) 2.419
(D) 1.0

Correct Answer: C

Explanation: The refractive index of diamond is 2.419.

20. When light enters a medium along the normal, it:

(A) Bends toward the normal
(B) Bends away from the normal
(C) Reflects back
(D) Passes straight through without bending

Correct Answer: D

Explanation: When light is along the normal, the angle of incidence is 0°, so it passes straight through.

21. The broken pencil illusion is due to:

(A) Refraction
(B) Reflection
(C) Diffraction
(D) Dispersion

Correct Answer: A

Explanation: The broken pencil illusion is due to Refraction.

22. Total internal reflection occurs when light travels from:

(A) Rarer to denser medium
(B) Denser to rarer medium
(C) Any medium to vacuum
(D) Any medium to any medium

Correct Answer: B

Explanation: TIR occurs when light travels from a denser medium to a rarer medium.

23. For total internal reflection, the angle of incidence must be:

(A) Equal to the critical angle
(B) Less than the critical angle
(C) Greater than the critical angle
(D) Equal to 0°

Correct Answer: C

Explanation: TIR occurs when the angle of incidence is greater than the critical angle.

B. Less Important / Secondary Topics

24. The core of an optical fiber has:

(A) Higher refractive index than the cladding
(B) Lower refractive index than the cladding
(C) Same refractive index as the cladding
(D) No refractive index

Correct Answer: A

Explanation: The core of an optical fiber has Higher refractive index than the cladding.

25. Which of the following is NOT an advantage of optical fibers?

(A) High bandwidth
(B) High signal loss over long distances
(C) Resistance to electrical interference
(D) Low power consumption

Correct Answer: B

Explanation: Optical fibers have low signal loss over long distances, which is an advantage.

26. The critical angle of a material with refractive index 2.0 is:

(A) 45°
(B) 60°
(C) 30°
(D) 90°

Correct Answer: C

Explanation: The critical angle of a material with refractive index 2.0 is 30°.

27. At the critical angle, the refracted ray travels:

(A) Perpendicular to the boundary
(B) Back into the denser medium
(C) Through the rarer medium at 45°

(D) Along the boundary

Correct Answer: D

Explanation: At the critical angle, the refracted ray travels Along the boundary.

28. A converging lens is:

(A) Thicker at the center
(B) Thinner at the center
(C) Flat on both sides
(D) Always made of plastic

Correct Answer: A

Explanation: A converging (convex) lens is thicker at the center.

29. The focal length of a diverging lens is:

(A) Positive
(B) Negative
(C) Zero
(D) Infinite

Correct Answer: B

Explanation: The focal length of a diverging (concave) lens is negative.

30. A ray passing through the optical center of a lens: sin θ = c 1/n = 1/2.0 = 0.5 θ = c sin (0.5) = −1 30°

(A) Bends toward the focus
(B) Bends away from the focus
(C) Passes straight through without deviation
(D) Reflects back

Correct Answer: C

Explanation: Rays through the optical center are undeviated.

31. A ray parallel to the principal axis after passing through a converging lens:

(A) Passes straight through
(B) Reflects back
(C) Bends away from the principal axis
(D) Refracts through the focal point

Correct Answer: D

Explanation: A ray parallel to the principal axis after passing through a converging lens Refracts through the focal point.

32. When an object is placed at 2F from a converging lens, the image is formed at:

(A) 2F
(B) F
(C) Infinity
(D) The same side as the object

Correct Answer: A

Explanation: The image is formed at 2F, real, inverted, and the same size as the object.

33. When an object is placed inside the focal point of a converging lens, the image is:

(A) Real and inverted
(B) Virtual and upright
(C) Real and upright
(D) Virtual and inverted

Correct Answer: B

Explanation: The image is virtual, upright, and enlarged (magnifying glass).

34. If , the image is:

(A) Smaller than the object
(B) The same size as the object

(C) Larger than the object
(D) Inverted

Correct Answer: C

Explanation: means the image is larger than the object.

35. A negative magnification indicates:

(A) An upright image
(B) A virtual image
(C) A real image
(D) An inverted image

Correct Answer: D

Explanation: Negative magnification means the image is inverted.

36. The center of curvature of a lens is located at a distance of:

(A) from the lens
(B) from the lens
(C) from the lens
(D) from the lens

Correct Answer: A

Explanation: The center of curvature is twice the focal length from the lens.

37. If an object is placed at 10 cm from a convex lens having focal length 5 cm, the linear magnification is:

(A) 0.5
(B) 2
(C) 1
(D) 5

Correct Answer: B

Explanation: Using : ; . Wait — this gives , not 2. However, the textbook's answer key lists 2 as the answer. Let me recheck: , with , : . Then . The correct magnification is 1, not 2. The textbook answer key appears to contain an error. I will keep the option values as listed but note the discrepancy. Correct Answer (as per textbook): C. 2 Explanation: The textbook lists the answer as 2. (Note: using the lens formula, and . The textbook answer key appears to be incorrect.).

38. A glass slab is dipped in a transparent liquid having the same refractive index as that of the glass slab. We cannot see the boundary of the two media due to ___ refraction.

(A) Maximum
(B) Minimum
(C) Zero
(D) Unit

Correct Answer: C

Explanation: When the refractive indices are equal, there is no refraction at the boundary, so the boundary becomes invisible.

39. An incident ray makes an angle of 45° with a plane mirror. The angle of reflection is:

(A) 30°
(B) 60°
(C) 90°
(D) 45°

Correct Answer: D

Explanation: The angle of incidence (with the normal) is 45°, so the angle of reflection is also 45°.

40. Two plane mirrors are arranged parallel facing each other. The number of images formed may be:

(A) Infinite
(B) One
(C) Two

(D) Four

Correct Answer: A

Explanation: Two plane mirrors are arranged parallel facing each other. The number of images formed may be Infinite.

41. The apparent flattening of the Sun at dawn and dusk is due to the phenomenon of:

(A) Reflection
(B) Refraction
(C) Dispersion
(D) Polarization

Correct Answer: B

Explanation: The apparent flattening of the Sun at dawn and dusk is due to the phenomenon of Refraction.

42. On summer days, you see reflections on roads (mirage). This is due to:

(A) Refraction
(B) Reflection
(C) Total internal reflection
(D) Dispersion

Correct Answer: C

Explanation: A mirage is caused by total internal reflection of light in layers of hot air near the road.

43. The colors in a rainbow are formed by:

(A) Refraction
(B) Reflection
(C) Total internal reflection
(D) Dispersion

Correct Answer: D

Explanation: Rainbows are formed by dispersion of sunlight by water droplets.

44. The working principle of optical fibers is:

(A) Total internal reflection
(B) Refraction
(C) Diffraction
(D) Reflection

Correct Answer: A

Explanation: The working principle of optical fibers is Total internal reflection.

45. Non-luminous matter which can be studied with the help of gravitational lensing is called:

(A) Visible matter
(B) Dark matter
(C) Red matter
(D) White matter

Correct Answer: B

Explanation: Gravitational lensing is used to study dark matter.

46. Einstein rings are seen due to the phenomenon of:

(A) Converging lensing
(B) Diverging lensing
(C) Gravitational lensing
(D) Acoustic lensing

Correct Answer: C

Explanation: Einstein rings are a manifestation of gravitational lensing.

47. The phenomenon used in non-destructive testing of materials for voids and cracks in opaque materials is:

(A) Converging lensing

(B) Diverging lensing
(C) Gravitational lensing
(D) Acoustic lensing

Correct Answer: D

Explanation: Acoustic lenses are used for non-destructive testing of materials. Answer.