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CLASS 10 • PHYSICS • SOLVED MCQs



Chapter 12
Geometrical Optics

75 Solved MCQs with Detailed Explanations

Reflection | Refraction | Lenses | Human Eye

1 Topic 1: Reflection of Light

5 MCQs

1 **According to the dual nature of light, light consists of:**

A Only waves

B Only particles

C **Both waves and particles** ✔

D Neither waves nor particles

💡 **Explanation** Correct Answer: C

In the early 1700s, Newton suggested light was made of particles (corpuscular theory). Later, Maxwell and Thomas Young proved its wave nature. In 1900, Planck suggested it consists of small packets of energy (photons/particles). Modern physics confirms light behaves as both a wave and a particle.

2 **The angle between the incident ray and the normal is called the:**

A Angle of reflection

B Angle of refraction

C **Angle of incidence** ✔

D Angle of deviation

💡 **Explanation** Correct Answer: C

The normal is an imaginary line perpendicular to the mirror's surface at the point of incidence. The angle formed between the incoming light ray and this normal is defined as the angle of incidence.

3 **Which of the following is NOT a law of reflection?**

A The incident ray, normal, and reflected ray lie in the same plane

B The angle of incidence is equal to the angle of reflection

C Light travels in a straight line

D The angle of incidence is always greater than the angle of refraction ✔

💡 **Explanation** **Correct Answer: D**

The first two options are the fundamental laws of reflection. The straight-line propagation is a general property of light. However, comparing the angle of incidence to the angle of *refraction* belongs to the laws of refraction, not reflection.

4 **The reflection of light from a rough surface, where rays scatter in many directions, is called:**

A Regular reflection

B Irregular reflection ✔

C Total internal reflection

D Refraction

💡 **Explanation** **Correct Answer: B**

Rough surfaces (like a wooden table or road) have microscopic irregularities. When parallel light hits them, the normals at different points point in different directions, causing the reflected rays to scatter. This is irregular (or diffused) reflection.

5 **We can see a page of a book because:**

A It absorbs all light

B **It reflects light in all directions** ✔

C It emits its own light

D It refracts light

💡 **Explanation** **Correct Answer: B**

The page reflects light from a light source in all directions. Some of these reflected rays enter our eyes, allowing us to perceive the object. The printed words appear black because they absorb almost all light and reflect very little.

2 Topic 2: Spherical Mirrors — 7 MCQs

6 **A mirror whose polished reflecting surface is a part of a hollow sphere is called a:**

A Plane mirror

B **Spherical mirror** ✔

C Parabolic mirror

D Cylindrical mirror

💡 **Explanation** **Correct Answer: B**

By definition, a spherical mirror is created by taking a piece of glass or plastic in the shape of a sphere and coating one of its curved surfaces with a reflective layer (like silver).

7 **In a concave mirror, the reflection takes place from the:**

A Outer curved surface

B **Inner curved surface** ✔

C Flat surface

D Both inner and outer surfaces

💡 **Explanation** **Correct Answer: B**

A concave mirror is “caved in.” The reflective coating is on the inside of the spherical curve, so light hitting the inner, hollowed-out side is reflected.

8 **The center of the sphere of which the spherical mirror is a part is called the:**

A Pole

B Principal focus

C **Center of curvature** ✔

D Aperture

💡 **Explanation** **Correct Answer: C**

The center of curvature (C) is the geometric center of the imaginary complete sphere from which the mirror is cut.

9 **The distance from the pole to the principal focus of a spherical mirror is known as:**

A Radius of curvature

B **Focal length** ✓

C Aperture

D Principal axis

💡 **Explanation** **Correct Answer: B**

The focal length (f) is the distance between the pole (the center of the mirror's surface) and the principal focus (where parallel rays converge or appear to diverge from). It is mathematically half of the radius of curvature ($f = R/2$).

10 **Which type of mirror always forms a virtual, erect, and diminished image?**

A Plane mirror

B Concave mirror

C **Convex mirror** ✓

D Parabolic mirror

💡 **Explanation** **Correct Answer: C**

A convex mirror (bulging outward) diverges light rays. Because the rays never actually meet after reflection, the image is virtual (formed behind the mirror), upright, and smaller than the object.

11 **Concave mirrors are also known as:**

A Diverging mirrors

B **Converging mirrors** ✔

C Plane mirrors

D Scattering mirrors

💡 **Explanation** **Correct Answer: B**

Parallel rays of light falling on a concave mirror reflect and actually converge (meet) at a single point called the focal point. Hence, they are converging mirrors.

12 **The focal length of a spherical mirror is related to its radius of curvature by the formula:**

A $f = R$

B $f = 2R$

C $f = R/2$ ✔

D $f = R^2$

💡 **Explanation** **Correct Answer: C**

The focal point lies exactly halfway between the pole and the center of curvature. Therefore, the focal length is half the radius of curvature.

3 Topic 3: Mirror Formula & Magnification

5 MCQs

13 **The mirror formula is given by:**

- **A** $1/f = 1/p + 1/q$ ✔
- **B** $f = p + q$
- **C** $1/f = 1/p - 1/q$
- **D** $f = pq / (p + q)$

💡 **Explanation** **Correct Answer: A**

The mirror formula relates the focal length (f), object distance (p), and image distance (q). The standard equation is $1/f = 1/p + 1/q$.

14 **According to sign conventions for mirrors, the focal length (f) of a convex mirror is taken as:**

- **A** Positive
- **B** **Negative** ✔
- **C** Zero
- **D** Infinite

💡 **Explanation** **Correct Answer: B**

The focus of a convex mirror lies behind the mirror. Since distances measured behind the mirror are considered negative in standard Cartesian sign conventions, the focal length is negative.

15 **An object is placed in front of a convex mirror. The image formed will always be:**

- A Real and inverted
- B Virtual and inverted
- C Real and erect
- D **Virtual and erect** ✔

💡 **Explanation** **Correct Answer: D**

A convex mirror always diverges the incoming light. The reflected rays appear to come from a point behind the mirror, forming a virtual, upright (erect), and diminished image.

16 **If the magnification (m) of a mirror is a positive value, it means the image is:**

- A Real and inverted
- B **Virtual and erect** ✔
- C Real and erect
- D Virtual and inverted

💡 **Explanation** **Correct Answer: B**

Magnification is defined as $m = h_i / h_o$. A positive magnification means the image height is in the same direction as the object height, which indicates an erect (upright) image. Erect images in mirrors are always virtual.

17 **A convex mirror is used as a security mirror in shopping centres because:**

A It forms a magnified image

B It has a large field of view ✔

C It forms a real image

D It is cheaper than other mirrors

💡 **Explanation** **Correct Answer: B**

Convex mirrors produce images that are smaller than the objects. Because the image is diminished, the mirror can capture light from a much wider angle, increasing the view for the observer to see the whole store.

4 Topic 4: Refraction of Light — 7 MCQs

18 **The bending of light as it passes from one transparent medium to another is called:**

A Reflection

B Refraction ✔

C Diffraction

D Dispersion

💡 **Explanation** **Correct Answer: B**

Refraction is the change in direction of a wave passing from one medium to another caused by its change in speed (e.g., from air into water or glass).

19 **The ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant. This is known as:**

A Law of reflection

B **Snell's Law** ✔

C Hooke's Law

D Law of dispersion

💡 **Explanation** **Correct Answer: B**

This is the second law of refraction, commonly known as Snell's Law. It is expressed mathematically as $\sin(i) / \sin(r) = n$, where n is the refractive index.

20 **The refractive index of a medium is defined as the ratio of the speed of light in a vacuum to the speed of light in the medium. Its formula is:**

A $n = v/c$

B $\boldsymbol{n = c/v}$ ✔

C $n = c \times v$

D $n = v^2/c$

💡 **Explanation** **Correct Answer: B**

Refractive index (n) is a measure of how much a medium slows down light. Since light is fastest in a vacuum (c), the ratio c/v is always greater than 1.

21 **When light travels from air into glass, it:**

A Speeds up and bends away from the normal

B Slows down and bends towards the normal ✔

C Speeds up and bends towards the normal

D Slows down and bends away from the normal

💡 **Explanation** **Correct Answer: B**

Glass is an optically denser medium than air, so light slows down. When a ray enters a denser medium, it bends toward the normal line.

22 **Which of the following has the highest refractive index?**

A Water

B Glass (crown)

C Diamond ✔

D Air

💡 **Explanation** **Correct Answer: C**

Based on the provided table, Diamond has a refractive index of 2.42, which is higher than water (1.33), crown glass (1.52), and air (1.00).

23 **The speed of light in a vacuum is approximately:**

- **A** **3.0×10^8 m/s** ✔
- **B** 3.0×10^6 m/s
- **C** 2.0×10^8 m/s
- **D** 1.5×10^8 m/s

💡 **Explanation** **Correct Answer: A**

The universal speed of light in a vacuum, denoted by c, is exactly 299,792,458 m/s, which is approximately 3.0×10^8 m/s.

24 **When light passes through a medium, its frequency:**

- **A** Increases
- **B** Decreases
- **C** **Remains the same** ✔
- **D** Becomes zero

💡 **Explanation** **Correct Answer: C**

While the speed of light and its wavelength change depending on the medium, the frequency is determined by the source of the light and remains constant as it crosses boundaries.

5 Topic 5: Total Internal Reflection (TIR)

6 MCQs

25 **Total internal reflection can only occur when light travels from:**

A A rarer medium to a denser medium

B **A denser medium to a rarer medium** ✔

C A vacuum to a medium

D Any medium to any other medium

💡 **Explanation** Correct Answer: B

TIR requires light to be moving from a medium with a higher refractive index (denser) to a lower refractive index (rarer). If it goes from rare to dense, it bends toward the normal and can never exceed 90 degrees.

26 **The angle of incidence for which the angle of refraction becomes 90° is called the:**

A **Critical angle** ✔

B Right angle

C Angle of deviation

D Polarizing angle

💡 **Explanation** Correct Answer: A

As the angle of incidence increases for light going from dense to rare, the refracted ray bends further away from the normal. At the specific "critical angle," the refracted ray grazes the surface at exactly 90°.

27 **What happens if the angle of incidence is greater than the critical angle?**

A Light refracts normally

B Light is completely absorbed

C **Light undergoes total internal reflection** ✔

D Light splits into colors

💡 **Explanation** **Correct Answer: C**

If the angle of incidence exceeds the critical angle, the light cannot exit the denser medium. Instead, the boundary acts like a perfect mirror, reflecting all the light back into the denser medium.

28 **Optical fibres work on the principle of:**

A Refraction

B **Total internal reflection** ✔

C Regular reflection

D Diffraction

💡 **Explanation** **Correct Answer: B**

Light entering the core of an optical fibre strikes the boundary with the cladding at an angle greater than the critical angle. It reflects internally all the way to the other end with minimal loss.

29 **An endoscope uses which phenomenon to view inside the human body?**

- **A** **Total internal reflection** ✔
- **B** Irregular reflection
- **C** Refraction
- **D** Dispersion

💡 **Explanation** **Correct Answer: A**

An endoscope uses bundles of optical fibres. Light travels down the fibres via TIR to illuminate the organ, and the reflected light travels back up other fibres to form an image for the doctor.

30 **A totally internal reflecting prism is used in periscopes to reflect light by an angle of:**

- **A** 45°
- **B** **90°** ✔
- **C** 180°
- **D** 360°

💡 **Explanation** **Correct Answer: B**

When light enters a right-angled prism perpendicular to one face, it strikes the hypotenuse at 45°. Since 45° is greater than the critical angle of glass (approx. 42°), it undergoes TIR and is reflected by 90°.

6 Topic 6: Lenses

6 MCQs

31 **A lens which is thicker in the middle and thinner at the edges is called a:**

A Concave lens

B **Convex lens** ✔

C Diverging lens

D Cylindrical lens

💡 **Explanation** Correct Answer: B

The shape of a convex lens causes parallel rays to converge to a focal point, which is why it is also called a converging lens.

32 **The point on the principal axis of a lens through which light passes without any deviation is called the:**

A Principal focus

B Center of curvature

C **Optical center** ✔

D Pole

💡 **Explanation** Correct Answer: C

A ray passing through the optical center (the exact middle of the lens) is perpendicular to the lens surfaces at the point of entry and exit, so it goes straight through without bending.

33 **A concave lens is also known as a:**

A Converging lens

B Magnifying lens

C **Diverging lens** ✔

D Focusing lens

💡 **Explanation** **Correct Answer: C**

A concave lens is thinnest in the middle and thickest at the edges. It causes parallel light rays to spread out (diverge) as if they are coming from a focal point behind the lens.

34 **The focal length of a convex lens is taken as:**

A **Positive** ✔

B Negative

C Zero

D Infinite

💡 **Explanation** **Correct Answer: A**

For a convex lens, a real image is formed on the opposite side of the lens. By sign convention, distances measured in the direction of incident light (right side) are positive. Since the focus is on the right, f is positive.

35 **The power of a lens is defined as the reciprocal of its:**

A Radius of curvature

B **Focal length in meters** ✔

C Image distance

D Object distance

💡 **Explanation** **Correct Answer: B**

Power ($P = 1/f$) measures a lens's ability to bend light. A shorter focal length means the lens bends light more strongly, resulting in higher power. The SI unit is the Diopter (D), which is m^{-1}.

36 **If a lens has a focal length of 0.5 m, its power is:**

A 0.5 D

B **2 D** ✔

C 5 D

D 50 D

💡 **Explanation** **Correct Answer: B**

Power $P = 1/f$. Since $f = 0.5$ m, $P = 1 / 0.5 = 2$ Diopters.

7 Topic 7: Lens Formula & Magnification

5 MCQs

37 **The lens formula is:**

- **A** $1/f = 1/p + 1/q$ ✔
- **B** $f = pq$
- **C** $1/f = p + q$
- **D** $1/f = 1/p - 1/q$

💡 **Explanation** **Correct Answer: A**

Similar to the mirror formula, the thin lens formula relates the focal length, object distance (p), and image distance (q) with this standard equation.

38 **According to sign conventions for lenses, the object distance (p) is always taken as:**

- **A** **Positive** ✔
- **B** Negative
- **C** Zero
- **D** Infinite

💡 **Explanation** **Correct Answer: A**

In the textbook's sign convention for lenses, the object is a real object placed in front of the lens, and its distance p is taken as positive.

39 **A magnifying glass is a:**

A Concave lens

B **Convex lens** ✔

C Plane mirror

D Concave mirror

💡 **Explanation** **Correct Answer: B**

A simple microscope or magnifying glass uses a convex lens. When an object is placed within the focal length of a convex lens, it forms a virtual, erect, and magnified image.

40 **The magnification (m) produced by a lens is given by the ratio:**

A p/q

B q/p ✔

C f/p

D q/f

💡 **Explanation** **Correct Answer: B**

Linear magnification is the ratio of image height to object height (h_i/h_o). By similar triangles in ray diagrams, this is geometrically equal to the ratio of image distance to object distance (q/p).

41 **If the magnification of a lens is negative, the image is:**

- A Virtual and erect
- **B Real and inverted** ✔
- C Real and erect
- D Virtual and inverted

💡 **Explanation** **Correct Answer: B**

A negative magnification indicates that the image height is negative compared to the object (it is upside down). Real images formed by single lenses are always inverted.

8 Topic 8: Optical Instruments

7 MCQs

42 **In a simple camera, the image formed on the film is:**

- A Virtual and erect
- **B Real, inverted, and diminished** ✔
- C Real, erect, and magnified
- D Virtual and magnified

💡 **Explanation** **Correct Answer: B**

A camera uses a convex lens. The object is placed beyond $2F$, which produces a real, inverted, and smaller (diminished) image on the film/sensor.

43 **A slide projector uses a convex lens to form a:**

- **A** **Real, enlarged, and inverted image** ✔
- **B** Virtual, enlarged, and erect image
- **C** Real, diminished, and erect image
- **D** Virtual, diminished, and inverted image

💡 **Explanation** **Correct Answer: A**

To project an image onto a screen, a real image is required. The slide is placed between F and $2F$ of the projection lens, creating a real, magnified, and inverted image on the screen.

44 **In a compound microscope, the objective lens has a:**

- **A** **Short focal length** ✔
- **B** Long focal length
- **C** Negative focal length
- **D** Infinite focal length

💡 **Explanation** **Correct Answer: A**

To get high magnification, the objective lens of a compound microscope must have a very short focal length ($f_o < 1$ cm) so it can be placed very close to the tiny object.

45 **The magnifying power of a compound microscope is given by:**

- **A** $M = L/f_o\ (1 + d/f_e)$ ✔
- **B** $M = f_o/f_e$
- **C** $M = 1 + d/f$
- **D** $M = f_e/f_o$

💡 **Explanation** **Correct Answer: A**

This formula shows that magnification depends on the tube length (L), the focal length of the objective (f_o), the focal length of the eyepiece (f_e), and the least distance of distinct vision (d).

46 **A refracting telescope uses which lenses?**

- **A** Two concave lenses
- **B** **Two convex lenses** ✔
- **C** One convex and one concave lens
- **D** One plane and one convex lens

💡 **Explanation** **Correct Answer: B**

A refracting telescope consists of an objective lens (convex, large focal length) to form a real image of a distant object, and an eyepiece (convex) to magnify that image.

47 **The magnification of a refracting telescope is given by:**

- **A** $M = f_o / f_e$ ✔
- **B** $M = f_e / f_o$
- **C** $M = f_o \times f_e$
- **D** $M = 1 + d/f_e$

💡 **Explanation** **Correct Answer: A**

The angular magnification of a telescope is the ratio of the focal length of the objective lens (f_o) to the focal length of the eyepiece (f_e). To get high magnification, you need a long f_o and a short f_e.

48 **Why can a telescope not make stars look bigger, even though it has high magnification?**

- **A** **Stars are too far away and appear as point sources** ✔
- **B** Stars emit too much light
- **C** The telescope is too small
- **D** Stars are not real

💡 **Explanation** **Correct Answer: A**

A telescope can increase the angle a star subtends, but because stars are so incredibly far away, their angular size is essentially zero. They remain point sources. However, a telescope gathers more light, making dim stars appear brighter.

9 Topic 9: The Human Eye

6 MCQs

49 **The part of the human eye that controls the amount of light entering it is the:**

A Cornea
B Retina
C **Iris** ✔
D Lens

💡 **Explanation** Correct Answer: C

The iris is the colored part of the eye. It acts like a camera aperture, expanding and contracting the pupil to regulate light levels.

50 **The light-sensitive layer at the back of the eye where the image is formed is the:**

A Cornea
B **Retina** ✔
C Sclera
D Ciliary muscle

💡 **Explanation** Correct Answer: B

The retina contains photoreceptor cells (rods and cones) that convert light into electrical signals sent to the brain. It acts like the film or sensor in a camera.

51 **The ability of the eye to change the focal length of its lens to focus on objects at different distances is called:**

- **A** **Accommodation** ✓
- **B** Adaptation
- **C** Refraction
- **D** Resolving power

💡 **Explanation** **Correct Answer: A**

The ciliary muscles control the curvature of the eye lens. When looking at near objects, the lens becomes thicker (shorter focal length). When looking far, it flattens.

52 **The minimum distance from the eye at which an object can be seen clearly is called the:**

- **A** Far point
- **B** **Near point** ✓
- **C** Focal point
- **D** Principal focus

💡 **Explanation** **Correct Answer: B**

For a normal young adult, the near point is about 25 cm. Closer than this, the eye cannot accommodate enough to keep the image focused on the retina.

53 **For a normal eye, the far point is located at:**

- **A** 25 cm
- **B** 1 meter
- **C** **Infinity** ✓
- **D** 5 meters

💡 **Explanation** **Correct Answer: C**

A normal eye can relax its ciliary muscles completely and focus parallel light rays from distant objects (infinity) perfectly onto the retina.

54 **In bright light, the iris:**

A Enlarges the pupil

B **Contracts the pupil** ✔

C Stops working

D Changes color

💡 **Explanation** **Correct Answer: B**

To protect the retina from too much light, the iris constricts, making the pupil smaller. In dim light, it does the opposite to let more light in.

10 Topic 10: Defects of Vision — 7 MCQs

55 **Nearsightedness is also known as:**

A Hypermetropia

B **Myopia** ✔

C Presbyopia

D Astigmatism

💡 **Explanation** **Correct Answer: B**

Myopia (nearsightedness) is the condition where a person can see near objects clearly but distant objects appear blurry.

56 **In a nearsighted eye, the image of a distant object is formed:**

A Behind the retina

B On the retina

C **In front of the retina** ✔

D On the blind spot

💡 **Explanation** **Correct Answer: C**

The eyeball is too long, or the lens is too curved, causing the light rays to converge and focus before they reach the retina.

57 **Nearsightedness is corrected by using a:**

A Convex lens

B **Concave (diverging) lens** ✔

C Cylindrical lens

D Bifocal lens

💡 **Explanation** **Correct Answer: B**

A concave lens diverges the incoming light rays before they enter the eye, pushing the focal point back onto the retina.

58 **Farsightedness (hypermetropia) means a person has difficulty seeing:**

A Distant objects

B **Near objects** ✔

C In the dark

D Colors

💡 **Explanation** **Correct Answer: B**

In hypermetropia, the eye cannot focus on nearby objects because the image is formed behind the retina.

59 **In a farsighted eye, the image of a nearby object is formed:**

A In front of the retina

B On the retina

C **Behind the retina** ✔

D At the optic nerve

💡 **Explanation** **Correct Answer: C**

The eyeball is too short, or the lens is too flat, so the light rays from a close object have not converged enough by the time they reach the retina.

60 **Which lens is used to correct farsightedness (hypermetropia)?**

A Diverging lens

B Concave lens

C **Converging (convex) lens** ✔

D Plane lens

💡 **Explanation** **Correct Answer: C**

A convex lens converges the light rays slightly before they enter the eye, pulling the focal point forward so it lands exactly on the retina.

61 **The near point of a person suffering from hypermetropia:**

A Is at infinity

B Is closer than 25 cm

C **Is farther than 25 cm** ✔

D Is exactly 25 cm

💡 **Explanation** **Correct Answer: C**

Because the eye cannot focus on close objects, the closest point they can see clearly (near point) recedes further away from the standard 25 cm.

11 Topic 11: General Principles & Laws (Comprehensive)

14 MCQs

62 **The unit of the power of a lens is:**

A Newton

B **Diopter** ✔

C Meter

D Watt

💡 **Explanation** Correct Answer: B

Power is the reciprocal of focal length in meters (1/m). This unit is specifically named the Diopter.

63 **If the refractive index of a medium is 1.5 and light enters it from air, the speed of light in the medium will be:**

A 3.0×10^8 m/s

B **2.0×10^8 m/s** ✔

C 1.5×10^8 m/s

D 4.5×10^8 m/s

💡 **Explanation** Correct Answer: B

Using $n = c/v$, we get $v = c/n$. So, $v = (3.0 \times 10^8) / 1.5 = 2.0 \times 10^8$ m/s.

64 **A ray of light parallel to the principal axis of a concave mirror, after reflection, passes through:**

A The center of curvature

B The pole

C **The principal focus** ✔

D The optical center

💡 **Explanation** **Correct Answer: C**

This is the fundamental definition of the principal focus for a converging mirror. All rays parallel to the principal axis converge at this point.

65 **A ray of light passing through the principal focus of a convex lens, after refraction, will:**

A Pass undeviated

B **Become parallel to the principal axis** ✔

C Converge at the optical center

D Diverge away

💡 **Explanation** **Correct Answer: B**

This is a reverse of the focal point definition. A point source at the focus will emit rays that the lens bends into a parallel beam.

66 **A prism disperses white light because:**

- **A** **Different colors have different speeds in glass** ✔
- **B** The prism is curved
- **C** Light reflects inside the prism
- **D** The prism absorbs white light

💡 **Explanation** **Correct Answer: A**

Dispersion occurs because different wavelengths (colors) of light refract by slightly different amounts when passing through a medium, due to their differing speeds in the medium.

67 **In a compound microscope, the image formed by the objective lens acts as a:**

- **A** Final image
- **B** Virtual object for the eyepiece
- **C** **Real object for the eyepiece** ✔
- **D** Real image for the eye

💡 **Explanation** **Correct Answer: C**

The objective lens creates a real, inverted, magnified image inside the tube. The eyepiece is then positioned to use this real image as its object to create the final virtual, highly magnified image.

68 **The resolving power of an instrument is its ability to:**

A Magnify objects

B Distinguish between two closely placed objects ✔

C Change the focal length

D Absorb light

💡 **Explanation** **Correct Answer: B**

Resolution is about clarity and detail. High resolving power means the instrument can show fine details and distinguish two points that are very close together as separate.

69 **A virtual image cannot be formed on a screen because:**

A Light rays actually converge at the image location

B Light rays do not actually converge at the image location ✔

C It is always upright

D It is always inverted

💡 **Explanation** **Correct Answer: B**

A real image is formed by actual intersecting light rays. A virtual image is formed by the *apparent* intersection of diverging rays extended backwards; no real light energy is focused at that spot.

70 **When an object is placed at the center of curvature of a concave mirror, the image formed is:**

A At the focus, inverted, small

B At the center of curvature, inverted, same size ✔

C At infinity, highly magnified

D Behind the mirror, virtual

💡 **Explanation** **Correct Answer: B**

Ray diagrams show that placing an object at C results in an image of the exact same size and inverted, forming exactly at C.

71 **Which part of the eye is responsible for the 'blind spot'?**

A The fovea

B The optic nerve attachment ✔

C The cornea

D The pupil

💡 **Explanation** **Correct Answer: B**

The blind spot is the point where the optic nerve leaves the eyeball. There are no light-sensitive cells (rods or cones) at this location.

72 **A totally internal reflecting prism is used in binoculars to:**

A Increase magnification

B Invert the image by 180° ✔

C Filter colors

D Reduce light intensity

💡 **Explanation** **Correct Answer: B**

The objective lenses produce an inverted image. By using two prisms in an arrangement that reflects light by 180 degrees, the image is flipped back to being upright and correctly oriented for the user.

73 **The focal length of a plane mirror is:**

A Zero

B Infinite ✔

C Equal to its radius

D Negative

💡 **Explanation** **Correct Answer: B**

A plane mirror has an infinite radius of curvature, so its focal length ($f = R/2$) is also infinity. This is why parallel rays remain parallel after reflection.

74 **Optical fibers are preferred over copper wires in telecommunications because:**

A They are cheaper

B They have a very high loss of energy

C **They carry signals with very low loss of energy** ✔

D They are thicker and stronger

💡 **Explanation** **Correct Answer: C**

Light traveling via total internal reflection inside the fibre core does not escape, leading to minimal signal loss, which allows data to travel over vast distances without significant degradation.

75 **A converging lens has a focal length of 10 cm. What is its power?**

A 0.1 D

B 1.0 D

C **10 D** ✔

D 100 D

💡 **Explanation** **Correct Answer: C**

First convert f to meters: 10 cm = 0.1 m. Power $P = 1/f = 1/0.1 = 10$ Diopters.

★ ★ ★

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