Optician ABO

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Practice Questions

Try all 30 first, then check the answer key at the back.

1. Which frame material is known for being the lightest commonly used in ophthalmic frames?

A. Titanium
B. Zyl acetate
C. Monel
D. Stainless steel

2. What is the refractive index of CR-39 plastic lens material?

A. 1.50
B. 1.60
C. 1.67
D. 1.74

3. When neutralizing a lens with a lensometer, what does the technician look for to confirm a sphere-only lens?

A. A single clear mire with no rotation needed
B. Two separate focal lines that must be crossed
C. A scissor reflex pattern
D. Distorted mires that cannot be focused

4. Pupillary distance (PD) is defined as the distance between the:

A. Centers of the two pupils
B. Outer edges of the two irises
C. Inner edges of the two corneas
D. Centers of the two lenses of the eye

5. When light passes from a less dense medium (air) into a more dense medium (glass), the light ray bends:

A. Away from the normal
B. Toward the normal
C. Parallel to the surface
D. It does not bend

6. In a spectacle prescription written as -2.00 -1.00 x 180, what does the number 180 represent?

A. The axis of the cylinder in degrees
B. The cylinder power
C. The sphere power
D. The add power

7. Which organization administers the ABO (American Board of Opticianry) certification exam for opticians in the United States?

A. American Board of Opticianry
B. American Optometric Association
C. National Contact Lens Examiners
D. Optical Retailers Association

8. What is the primary function of a lensometer (focimeter)?

A. To measure the power and axis of a spectacle lens
B. To measure the interpupillary distance
C. To measure the curvature of the cornea
D. To measure the thickness of a lens blank

9. Zyl (cellulose acetate) frames are best adjusted using which method?

A. Cold bending only
B. Warm air or salt pan heating
C. Pliers applied cold
D. Ultrasonic bath

10. Which lens material is known for being completely impact-resistant and is required by law for certain occupations?

A. CR-39 plastic
B. Polycarbonate
C. Glass
D. Trivex

11. On a manual lensometer, the sphere power is read when which condition is met?

A. The cylinder lines are sharpest
B. The sphere lines (spherical dots or thin lines) are in sharpest focus
C. The axis is set to 180 degrees
D. The prism bubble is centered

12. What is the typical average binocular PD for an adult?

A. 54 mm
B. 58 mm
C. 64 mm
D. 70 mm

13. The index of refraction of a material is defined as:

A. The ratio of the speed of light in a vacuum to the speed of light in the material
B. The ratio of the speed of light in the material to the speed of light in a vacuum
C. The angle of incidence divided by the angle of refraction
D. The focal length divided by the lens diameter

14. A prescription reads +1.50 -0.75 x 090. What is the sphere power?

A. -0.75 D
B. +1.50 D
C. +0.75 D
D. -1.50 D

15. Which certification specifically covers contact lens fitting competency?

A. ABO (American Board of Opticianry)
B. JCAHPO certification
C. NCLE (National Contact Lens Examiners)
D. ABOM (American Board of Optometry)

16. When using a manual lensometer, what does the mire (reticle) pattern look like when the lens power is neutralized?

A. The lines are blurry and spread apart
B. The lines form a double image
C. The lines appear sharp and clear in focus
D. The lines rotate automatically to the axis

17. A patient with a nickel allergy should be steered away from which frame material?

A. Titanium
B. Beta-titanium
C. Monel
D. Nylon

18. Which of the following lens materials has the HIGHEST Abbe value (least chromatic aberration)?

A. Polycarbonate
B. Trivex
C. Crown glass
D. 1.74 high-index

19. The cylinder power of a lens is determined by:

A. The axis drum reading minus 90 degrees
B. The difference between the two focal line readings
C. Subtracting the first focal line reading from the second focal line reading
D. Reading the power at 90 degrees to the axis

20. Monocular PD is the distance measured from the:

A. Center of the nose bridge to the outer edge of each pupil
B. Center of the nose bridge to the center of each pupil
C. Inner edge of one pupil to the inner edge of the other pupil
D. Outer edge of one pupil to the outer edge of the other pupil

21. CR-39 plastic has a refractive index of approximately 1.498. Which statement best explains why higher-index materials produce thinner lenses?

A. Higher index materials are lighter in weight
B. Higher index materials have greater Abbe values
C. Higher index materials refract less light overall
D. Higher index materials bend light more per unit of thickness, requiring less material to achieve the same power

22. Which component of a spectacle prescription corrects astigmatism?

A. Sphere
B. Add power
C. Cylinder
D. Prism

23. How often must ABO-certified opticians complete continuing education to maintain their certification?

A. Every year
B. Every two years
C. Every three years
D. Every five years

24. When reading a bifocal lens on the lensometer, where should the lens be positioned to measure the add power?

A. At the optical center of the distance portion
B. With the segment in the lens stop so the near portion is in the aperture
C. With the prism compensator fully engaged
D. Flipped 180 degrees from the distance reading position

25. Which frame material is most commonly used for rimless and semi-rimless mountings because of its high tensile strength?

A. Zyl acetate
B. Optyl
C. Monel
D. Titanium

26. Which lens material is the lightest available for ophthalmic use?

A. CR-39
B. Polycarbonate
C. 1.67 high-index
D. Trivex

27. The axis of a cylindrical correction is recorded as the orientation of which focal line in manual lensometry?

A. The more powerful focal line
B. The focal line that is focused last
C. The horizontal focal line
D. The least powered focal line (the axis meridian)

28. When monocular PDs are used, the sum of the right and left monocular PDs equals the:

A. Near PD
B. Half PD
C. Distance between the outer canthi
D. Binocular distance PD

29. Using Snell's Law (n■ sin θ■ = n■ sin θ■), if light travels from glass (n=1.5) into air (n=1.0) at an angle of incidence of 30°, the angle of refraction is approximately:

A. 19.5°
B. 48.6°
C. 30°
D. 60°

30. What is the valid range for axis notation in a spectacle prescription?

A. 0 to 90 degrees
B. 1 to 90 degrees
C. 0 to 180 degrees
D. 1 to 180 degrees

Answer Key & Explanations

1. A — Titanium
Titanium is one of the lightest metals used in ophthalmic frames, offering an excellent strength-to-weight ratio. This makes it ideal for patients sensitive to heavy eyewear.

2. A — 1.50
CR-39 (allyl diglycol carbonate) has a refractive index of approximately 1.50, making it the baseline standard plastic lens material.

3. A — A single clear mire with no rotation needed
A pure spherical lens produces a single, clear, unbroken mire target that comes to focus without any rotation of the axis wheel. Two separate lines indicate cylinder power.

4. A — Centers of the two pupils
PD is measured from the center of one pupil to the center of the other. This measurement ensures optical centers of lenses are aligned with the visual axes.

5. B — Toward the normal
Snell's Law states that when light enters a denser medium (higher index of refraction), it slows and bends toward the normal (the perpendicular to the surface at the point of incidence).

6. A — The axis of the cylinder in degrees
The axis indicates the meridian of the cylinder correction and is always expressed in degrees from 1 to 180. In this prescription, 180 is the axis.

7. A — American Board of Opticianry
The American Board of Opticianry (ABO) administers the National Opticianry Competency Examination (NOCE), which is the primary certification exam for opticians. Passing this exam leads to the ABO certification credential.

8. A — To measure the power and axis of a spectacle lens
A lensometer (focimeter) is used to verify the prescription of a spectacle lens by measuring its spherical power, cylindrical power, axis, and prism. It cannot measure interpupillary distance or corneal curvature.

9. B — Warm air or salt pan heating
Zyl frames must be heated before adjustment to prevent cracking or breaking. A warm-air frame heater or salt pan softens the material so it can be bent without damage.

10. B — Polycarbonate
Polycarbonate is virtually unbreakable and meets ANSI Z87.1 high-impact standards; it is mandated for safety eyewear in many industrial and safety-sensitive occupations.

11. B — The sphere lines (spherical dots or thin lines) are in sharpest focus
In manual lensometry, the power wheel is turned until the spherical reticle element (fine lines or dots) comes

into sharpest focus; this reading gives the sphere power.

12. C — 64 mm
The average adult binocular PD is approximately 64 mm, though individual measurements commonly range from 54 to 74 mm.

13. A — The ratio of the speed of light in a vacuum to the speed of light in the material
Index of refraction (n) = c/v, where c is the speed of light in a vacuum and v is the speed in the material. A higher n means light slows more in that medium.

14. B — +1.50 D
The sphere power is always written first in a prescription. Here, +1.50 D is the spherical component of the correction.

15. C — NCLE (National Contact Lens Examiners)
The NCLE (National Contact Lens Examiners) administers the Contact Lens Registry Examination (CLRE), which certifies opticians in contact lens fitting. This is separate from the ABO spectacle dispensing certification.

16. C — The lines appear sharp and clear in focus
The mire is neutralized (in focus) when the drum is rotated to the correct power, causing the target lines to appear sharp and clear. A blurry or doubled image means the power has not been fully neutralized.

17. C — Monel
Monel is a nickel-copper alloy and contains significant nickel content, making it unsuitable for patients with nickel sensitivity. Titanium and beta-titanium are nickel-free alternatives.

18. C — Crown glass
Crown glass has an Abbe value around 58–59, the highest of common lens materials, meaning it produces the least chromatic dispersion and clearest peripheral vision.

19. C — Subtracting the first focal line reading from the second focal line reading
Cylinder power equals the algebraic difference between the two principal meridian readings (second meridian power minus first meridian power). The result carries the sign of the cylinder form being used.

20. B — Center of the nose bridge to the center of each pupil
Monocular PD measures from the center of the nose bridge to the center of each pupil separately, giving a right PD and a left PD.

21. D — Higher index materials bend light more per unit of thickness, requiring less material to achieve the same power
A higher refractive index means more bending per unit thickness. Therefore, the same optical power can be achieved with less lens material (thinner lens), which reduces lens thickness, especially at higher prescriptions.

22. C — Cylinder
The cylinder component corrects astigmatism by addressing the difference in refractive power between two principal meridians of the eye.

23. B — Every two years
ABO certification must be renewed every two years. During each renewal cycle, certified opticians must complete approved continuing education (CE) credits to demonstrate ongoing professional competency.

24. B — With the segment in the lens stop so the near portion is in the aperture
To measure the add power, the near segment must be positioned within the lensometer aperture. The add power is then found by subtracting the distance sphere from the near sphere reading.

25. D — Titanium
Titanium's high tensile strength allows it to withstand the stresses of drill-mount and rimless designs without cracking around the lens holes. It is the dominant metal for rimless mountings.

26. D — Trivex
Trivex has a specific gravity of approximately 1.11, making it the lightest ophthalmic lens material, slightly lighter than polycarbonate (1.20).

27. D — The least powered focal line (the axis meridian)
The axis meridian carries no cylinder power; it is identified by the focal line that first comes into focus (corresponding to the sphere power), and the axis drum reading at that position is recorded as the cylinder axis.

28. D — Binocular distance PD
The right monocular PD plus the left monocular PD together equal the full binocular distance PD.

29. B — 48.6°
n■ sin θ■ = n■ sin θ■ → 1.5 × sin 30° = 1.0 × sin θ■ → 1.5 × 0.5 = sin θ■ → sin θ■ = 0.75 → θ■ ≈ 48.6°. Light bends away from normal when going into a less dense medium.

30. D — 1 to 180 degrees
The axis of a cylinder is expressed in degrees from 1 to 180. Zero degrees is not used; 180 is equivalent to 0 in clinical convention.

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