EMT

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Practice Questions

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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. 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

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

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

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4. 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

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5. Optyl is a proprietary epoxy resin frame material. What is its primary advantage over standard cellulose acetate?

A. It has shape-memory and returns to its original form when reheated
B. It is softer and easier to adjust cold
C. It accepts soldering better than acetate
D. It is the most hypoallergenic plastic available

6. In the boxing system, what does the 'A measurement' represent?

A. The vertical height of the lens opening
B. The horizontal width of the lens opening
C. The distance between lenses
D. The total frame width

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7. The distance between lenses (DBL) is measured from which points?

A. Outer edges of each lens
B. Optical centers of each lens
C. Nearest inner edges of each lens opening
D. Geometric centers of each lens opening

8. A frame has an A measurement of 52 mm, a DBL of 18 mm, and a temple length of 140 mm. What is the total frame width (A + DBL + A)?

A. 104 mm
B. 108 mm
C. 118 mm
D. 122 mm

9. The B measurement in the boxing system refers to:

A. The vertical height of the lens opening
B. The horizontal width of the lens opening
C. The diagonal measurement of the lens
D. The distance between the geometric centers

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10. A frame's effective diameter (ED) is 58 mm and the patient's PD is 62 mm. The frame has a DBL of 16 mm and an A measurement of 52 mm. What is the minimum uncut blank size needed?

A. 60 mm
B. 64 mm
C. 68 mm
D. 72 mm

11. Which bridge type distributes the weight of the frame across a wide area of the nose?

A. Keyhole bridge
B. Saddle bridge
C. Pad bridge (nose pads)
D. W-bridge

12. Adjustable nose pads on a metal frame allow the optician to customize which fitting parameter?

A. Temple spread
B. Frame wrap angle
C. Pantoscopic tilt
D. Vertex distance and nose bearing surface

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13. A patient complains that their frame continuously slides down. Their nose has a low bridge. Which bridge design change would BEST prevent slippage?

A. Fit a frame with a keyhole bridge or widely spaced nose pads for better grip
B. Choose a heavier frame to increase downward pressure
C. Select a saddle bridge frame with no pads
D. Adjust the temples to a wider spread

14. A skull temple is designed to curve:

A. Over the top of the ear
B. Around the back and down behind the ear
C. Straight back without any curve
D. Down the side of the face only

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15. Which temple style is most appropriate for a child or patient who requires maximum retention, such as during active sports?

A. Library (straight) temple
B. Skull (hockey-stick) temple
C. Cable temple
D. Riding-bow temple

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16. When adjusting a library (straight) temple, the bend point should be positioned:

A. At the hinge
B. At the midpoint of the temple
C. At the tip of the temple
D. Just past the back of the ear (at the mastoid area)

17. Pantoscopic tilt refers to the angle of the frame front in which direction?

A. The bottom of the frame tilted toward the face
B. The top of the frame tilted toward the face
C. The frame rotated horizontally
D. The frame tilted laterally

18. The standard recommended pantoscopic tilt for most ophthalmic frames is approximately:

A. 0–2 degrees
B. 8–12 degrees
C. 15–20 degrees
D. 25–30 degrees

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19. Vertex distance is defined as the distance from:

A. The front of the cornea to the spectacle plane
B. The back of the lens to the center of the pupil
C. The back surface of the spectacle lens to the front surface of the cornea
D. The optical center of the lens to the pupil

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20. Face-form (wrap) angle describes which frame characteristic?

A. The downward tilt of the lens relative to the frame front
B. The angle between the temples and the frame front
C. The curve of the lens surface
D. The horizontal curve of the frame front that follows the face

21. Increasing pantoscopic tilt effectively moves the optical center in which direction relative to the pupil?

A. Downward (away from pupil, requiring the OC to be raised to compensate)
B. Upward toward the pupil
C. Inward toward the nose
D. Outward toward the temple

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22. A frame has 10 degrees of pantoscopic tilt. Using the 0.5 mm per degree rule, how far below the pupil center should the optical center be placed to be optically equivalent to a zero-tilt fit?

A. 3 mm below
B. 5 mm below
C. 10 mm below
D. 2 mm below

23. If a metal frame temple is pressing uncomfortably on the top of the ear, the optician should:

A. Replace the temple with a longer one
B. Widen the temple spread
C. Move the bend point further back (toward the temple tip)
D. Tighten the hinge screw

24. To increase the pantoscopic tilt of a metal frame, the optician should:

A. Widen the nose pads
B. Tighten the end pieces
C. Adjust the temple bend angle
D. Angle the endpiece or frame front downward at the bottom

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25. A patient's frame sits higher on the left side than the right when viewed from the front. Which adjustment corrects this?

A. Bend the temple on the higher side downward at the bend point
B. Widen the nose pad on the lower side
C. Shorten the temple on the lower side
D. Bend the frame front to add face-form

26. When adjusting nose pads to correct a frame that sits too close to the face (too short vertex distance), the optician should:

A. Move the pads closer together
B. Move the pads farther apart (outward)
C. Move the pads closer to the lens
D. Tilt the pads to reduce face contact

27. A patient reports the frame is loose laterally and the lenses are not centered on the pupils. The temples appear to splay out. The BEST first adjustment is:

A. Increase pantoscopic tilt
B. Add face-form to the frame front
C. Reduce the temple spread by bending the temples inward
D. Widen the nose pads

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28. After heating and reshaping an Optyl frame, it does not hold the new adjustment. What is the most likely cause?

A. The frame was not heated long enough to allow adjustment
B. The frame was overheated and the material degraded
C. Optyl cannot be permanently adjusted
D. Optyl was reheated after adjustment, reverting to its original shape

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29. For a high minus prescription, the optician should generally recommend a frame with:

A. Small eye size to minimize lens thickness and weight
B. Large eye size to show less edge
C. High wrap angle for best optics
D. Deep B measurement for segment placement

30. For a high plus prescription, the optician should recommend a frame that is:

A. Large and widely spaced to spread thickness
B. Small and positioned to minimize center thickness
C. Rimless to reduce weight
D. Wide with a large DBL

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Answer Key & Explanations

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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. 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.

3. 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.

4. 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.

5. A — It has shape-memory and returns to its original form when reheated
Optyl's cross-linked epoxy structure gives it thermal shape-memory: when reheated it returns to the factory shape. This is a key adjustment consideration — overcorrection can be undone simply by reheating.

6. B — The horizontal width of the lens opening
The A measurement (also called the eye size) is the horizontal width of the lens opening measured in the boxing system. It is one of the three key frame measurements (A, B, DBL).

7. C — Nearest inner edges of each lens opening
The DBL (distance between lenses) is measured from the nearest inner edge of one lens opening to the nearest inner edge of the other lens opening. It defines the bridge span.

8. D — 122 mm
Total frame width = A + DBL + A = 52 + 18 + 52 = 122 mm. This represents the span from the outermost edge of one lens opening to the outermost edge of the other.

9. A — The vertical height of the lens opening
The B measurement is the vertical height of the lens opening, measured in the boxing system from the top to the bottom of the lens shape. It is important for determining segment height in bifocal prescriptions.

10. B — 64 mm
Minimum blank = ED + 2 × decentration. Decentration per eye = (A + DBL)/2 – PD/2 = (52+16)/2 – 62/2 = 34 – 31 = 3 mm inward. Minimum blank = 58 + 2(3) = 64 mm.

11. C — Pad bridge (nose pads)
A saddle bridge rests against the entire top of the nose, distributing frame weight over a broad area. This is ideal for patients with low nose bridges or wide noses.

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12. D — Vertex distance and nose bearing surface
Adjustable nose pads let the optician change the vertex distance and position the frame on the nose for proper fit and comfort. They also affect the frame's height on the face but do not directly change pantoscopic tilt or temple spread.

13. A — Fit a frame with a keyhole bridge or widely spaced nose pads for better grip
A keyhole bridge or adjustable pads spread wide grip the sides of a low nose bridge, providing the friction needed to prevent slipping. A saddle bridge tends to slide on flat, low bridges.

14. B — Around the back and down behind the ear
A skull (or hockey-stick) temple curves downward behind the auricle, gripping the skull. It provides secure retention without depending on the temple tip to hook over the ear.

15. C — Cable temple
Cable temples coil around the ear for maximum retention, making them ideal for children, active patients, and anyone needing secure fit. They are harder to remove quickly but rarely slip off.

16. D — Just past the back of the ear (at the mastoid area)
The bend in a skull or library temple should begin just past the posterior edge of the ear at the mastoid region. Bending too early causes the temple to press on the ear; bending too late reduces retention.

17. A — The bottom of the frame tilted toward the face
Pantoscopic tilt means the bottom rim of the frame is closer to the face than the top. This aligns the optical axis of the lens perpendicular to the line of sight for near vision tasks.

18. B — 8–12 degrees
Most ophthalmic frames are fitted with 8–12 degrees of pantoscopic tilt. This positions the lens plane to match the average downward gaze angle used in reading and near vision.

19. C — The back surface of the spectacle lens to the front surface of the cornea
Vertex distance is measured from the back (ocular) surface of the spectacle lens to the front (anterior) surface of the cornea. Standard vertex distance is typically 12–14 mm.

20. D — The horizontal curve of the frame front that follows the face
Face-form angle (also called wrap) is the horizontal curvature of the frame front so it follows the contour of the face. Proper face-form reduces lateral light entry and improves cosmesis.

21. A — Downward (away from pupil, requiring the OC to be raised to compensate)
Each degree of pantoscopic tilt moves the effective optical center approximately 0.5 mm downward from the pupil center. To maintain proper optical alignment, the OC should be positioned higher to compensate for the tilt.

22. B — 5 mm below
At 0.5 mm per degree: 10° × 0.5 = 5 mm. The OC should be placed 5 mm below the pupil center when 10° of pantoscopic tilt is used, to maintain correct effective optical positioning.

23. C — Move the bend point further back (toward the temple tip)
Pressure on the top of the ear means the temple is bending too early. Moving the bend point posteriorly (further toward the tip) eliminates the pressure point on the ear.

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24. D — Angle the endpiece or frame front downward at the bottom
Pantoscopic tilt is increased by pushing the bottom of the frame front closer to the face, typically by adjusting the endpiece or bending the frame front downward at the bottom rim.

25. A — Bend the temple on the higher side downward at the bend point
If the left side sits high, the left temple is bending the frame up. Adjusting the bend on the higher-side temple to angle it downward will level the frame.

26. B — Move the pads farther apart (outward)
Moving the nose pads outward (away from the center) pushes the frame away from the face, increasing vertex distance. Bringing pads together has the opposite effect.

27. C — Reduce the temple spread by bending the temples inward
Lateral looseness with splayed temples indicates excessive temple spread. Reducing the spread (bending temples inward at the hinge area) pulls the frame back onto the face and re-centers the lenses over the pupils.

28. D — Optyl was reheated after adjustment, reverting to its original shape
Optyl's epoxy shape-memory means reheating causes it to return to the factory-molded shape. If the frame was reheated after adjustment (e.g., to seat nose pads), the adjustment is lost. Always complete all heating steps before final adjustment.

29. A — Small eye size to minimize lens thickness and weight
High minus lenses are thicker at the edges. A smaller eye size reduces the edge thickness, improving cosmesis and reducing weight. This is a fundamental frame selection principle for minus Rx.

30. B — Small and positioned to minimize center thickness
Plus lenses are thickest in the center. A small frame reduces center thickness and weight. Rimless designs are generally avoided for high plus because the thick lens edge may crack at drill points.

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