

NC STATE BOARD OF OPTICIANS

Licensure Examination

STUDY and REFERENCE INFORMATION

Specific information follows on each of the Exam's components: topics that may be included, and textbook references specific to those topics.

In addition to the component-specific references there are other 'general' materials that could be considered excellent preparatory aids. (Many of these may already be resident in the training establishments.)

GENERAL REFERENCES

National Academy of Opticianry (NAO)'s *Ophthalmic Career Progression Program* - 3-volume set

NAO's *Exam Preparation for Opticians* (CDs)

NAO's *Beginning your Life as a Contact Lens Technician*

Durham Technical Community College's textbooks from *Optical Apprentices Program*

American Optometric Association (AOA)'s *Paraoptometric Section Education Library* and *Self-Study Course*

There is no such thing as 'too much review and study' for this professional license exam. Diligence during training, and continued review while awaiting the Exam, will adequately prepare you for *success and licensure!*

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OPHTHALMIC LENSES

REFERENCE:

Brooks, C.W., and Borish, I.M. *System for Ophthalmic Dispensing*.

Butterworth-Heinemann, Boston, 1996.

Brooks, C.W. *Essentials for Ophthalmic Lens Finishing*. Butterworth-Heinemann, 2003.

The North Carolina State Board of Opticians **OPHTHALMIC LENSES** examination may include but will not be limited to the following topics:

optical and physical properties of ophthalmic crown glass, flint, barium crown, CR-39, polycarbonate;
absorptive lenses and lens coatings;
physical characteristics of single vision and multifocal lenses;
aberrations and ophthalmic lens design;
formulas including the sagitta formula, formula relating to center and edge thickness, back vertex power, front vertex power, and oblique powers;
spotting of lenses, lens shapes and patterns;
centration, blocking, edging, deblocking, hand edging, and tinting of lenses;
lens insertion and standard alignment;
drilled, slotted, notched, nylon cord, and other groove mountings;
layout using boxing system;
base curve selection using applicable tables and formulas;
minimum blank size calculations;
the edging process;
use of the lensometer;
methods of grinding progressive, Franklin, and other styles of bifocals;
tool curves;
ANSI Standards;
methods for handling common ophthalmic materials;
lens and lens blank terminology and standards;

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ANATOMY OF THE EYE

REFERENCES:

Saude, ***Ocular Anatomy and Physiology***, Blackwell Scientific, 1993.

Contact Lens Society of America, ***Contact Lens Manual: A Comprehensive Study and Reference Guide***.

The North Carolina State Board of Opticians **ANATOMY OF THE EYE** examination may include but will not be limited to the following topics:

- corneal anatomy and physiology;
- identification of major ocular structures;
- identification and action of the intrinsic and extrinsic muscles;
- ocular terminology;
- ocular conditions and diseases;
- functions of the ocular glands;
- tear film;
- accommodative response.

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MEASUREMENTS OF THE FACE

REFERENCE:

Brooks & Borish, ***System for Ophthalmic Dispensing***. 2 ed. Butterworth-Heinemann, 1996

The North Carolina State Board of Opticians **MEASUREMENTS OF THE FACE** examination may include but will not be limited to the following topics:

- frame types and parts;
- frame measurements and markings;
- measuring the interpupillary distance;
- frame selection;
- reference point placement, multifocal height and blank size;
- frame adjustments.

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Rx INTERPRETATION

REFERENCES:

Brooks & Borish, *System for Ophthalmic Dispensing*. 2 ed. Butterworth-Heinemann, 1996
Fannin, T.E., and Grosvenor, T. *Clinical Optics*. Butterworth-Heinemann, Boston, 1987.

The North Carolina State Board of Opticians **Rx INTERPRETATION** examination may include but will not be limited to the following topics:

- Interpretation and application of current American National Standards Institute (ANSI) guidelines;
- determining reading and intermediate prescriptions;
- transposition to alternate cylinder notations and power cross;
- bifocal selection based on distance prescription and occupational needs;
- progressive addition lens styles;
- corrections for vertical imbalance in the reading portion;
- oblique meridian calculations;
- spherical equivalent;
- focal length;
- prism based on lens decentration;
- power compensation for vertex changes;
- center and edge thickness based on power and prism;
- resolving and resultant prism;
- image size calculations and corrections;
- lens reflections;
- and refractive errors including definitions, causes, amblyopia, diplopia and phorias.

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APPLICATION OF OPTICAL MANUFACTURING

REFERENCES:

- Brooks & Borish, *System for Ophthalmic Dispensing*, 2nd ed Butterworth-Heinemann, 1996.
- Stoner & Perkins, *Optical Formulas Tutorial*, Butterworth-Heinemann, 1996.
- Brooks, C.W. *Essentials for Ophthalmic Lens Finishing*. Butterworth-Heinemann, 2003.

The North Carolina State Board of Opticians **Application of Optical Manufacturing** examination may include but will not be limited to the following topics:

metric system and conversions;
reflection;
refraction;
Snell's Law;
total internal reflection;
optical prism;
index of refraction;
lens concepts and characteristics;
vergences;
surface power;
focal length;
lens form and analysis;
special lens designs;
spotting of lenses, lens shapes and patterns;
centration, blocking, edging, deblocking, hand edging, and tinting of lenses;
drilled, slotted, notched, nylon cord, and other groove mountings;
how to specify prism base direction;
bicentric grinding computations and application;
base curve selection using applicable tables and formulas;
the edging process;
creation of prism;
use of the lensometer;
methods of grinding progressive, Franklin, and other styles of bifocals;
tool curves;
lens thickness calculations;
ANSI Standards;
methods for handling common ophthalmic materials;
lens clock;
lens and lens blank terminology and standards;
surfacing procedures;
power and prism calculations including: compensation of nominal and true power, calculating changes in vertex distance for sphere and spherocylinder lenses, calculation of oblique axes power using tables and the sine-squared formula, resultant prism, spherical equivalence, optical power cross, and optical characteristics of ophthalmic lenses.

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CONTACT LENS - PRACTICAL
AND
CONTACT LENS - WRITTEN

REFERENCES:

Contact Lens Society of America, ***Contact Lens Manual: A Comprehensive Study & Reference Guide***

Contact Lens Society of America, **Test Review for Contact Lens Technicians**

Contact Lens Society of America, **Photo Atlas CD**

Johnson & Johnson (Vistacon) has a contact lens chart that may also be helpful for the Contact Lens Slides.

The North Carolina State Board of Opticians **CONTACT LENS - PRACTICAL AND CONTACT LENS - WRITTEN** examinations may include but will not be limited to the following topics:

Basic design and fitting of rigid & soft contact lens;
Lens materials;
Troubleshooting and problem solving

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EYEGASSES – PRACTICAL

REFERENCES:

Brooks, C.W. *Essentials for Ophthalmic Lens Work*. Butterworth-Heinemann, 1983.
Brooks & Borish, *System for Ophthalmic Dispensing*. 2 ed. Butterworth-Heinemann, 1996.
Z-80.1 American. *American National Standard for Ophthalmics-Prescription Ophthalmic Lenses - Requirements*. New York: American National Standards Institute.
Optical Laboratories Association, *Progressive Identifier*. 2010.

The North Carolina State Board of Opticians **EYEGASSES - PRACTICAL** examination may include but will not be limited to the following topics:

From a pair of mounted progressive addition lenses:

- neutralize the distance portion of the lenses;
- determine the add power;
- measure the base curve;
- quote and apply ANSI Z80.1 standards;
- identify the manufacturer's product name using the hidden identifying logo;
- identify the manufacturer's recommended minimum height;
- measure fitting cross height;
- measure prism reference point height;
- measure prism thinning;
- analyze the lenses for unwanted vertical prism;
- measure monocular P.D.

From a pair of mounted bifocal lenses:

- neutralize the distance portion of the lenses;
- determine the add power;
- measure the base curve;
- measure the distance between optical centers;
- measure the "near P.D."
- measure the seg height;
- identify the seg width;
- analyze the lenses for unwanted vertical prism;
- measure the lens center thickness;
- quote and apply ANSI Z80.1 standards.

From two pairs of mounted single vision lenses:

- neutralize the distance portion of the lenses;
- measure the distance between optical centers;
- measure the lens center thickness;
- analyze the lenses for possible vertical prism;
- measure the base curve;
- quote and apply ANSI Z80.1 standards.