



The Royal Australian and New Zealand College of Ophthalmologists

A.C.N. 000 644 404

94 – 98 Chalmers Street,
SURRY HILLS NSW 2010 AUSTRALIA
Telephone 61 2 9690 1001 Facsimile 61 2 9690 1321
E-mail: ranzco@ranzco.edu
<http://www.ranzco.edu>

OPHTHALMIC BASIC SCIENCE EXAMINATIONS OPTICS 06 May 2008

Duration of paper:	3 hours	Total Marks: 180
Total No. of questions:	18 (10 marks each)	

- ◆ **Candidates must attempt all questions**
- ◆ **Write your answers in the answer pad using CLEAR and LEGIBLE writing, use diagrams and point form where appropriate**
- ◆ **Start a new page for each question, do not write on the reverse of any answer page. Make sure to put your candidate number on each page**
- ◆ **If you cross out an area of your own writing, it will not be considered by the examiners**

Question 1

Describe diffraction and its applications in clinical ophthalmology.

Question 2

Describe the wave theory of light with diagrams. How does it explain the phenomenon of interference?

Question 3

Draw the light rays coming from an infinitely distant light source, encountering a -4.0 D thin lens, then a $+5.0$ D thin lens separated by 25cm.

Indicate the vergence on either side of each lens.

What type of image is formed and where?

Question 4

Describe the elements of a laser with examples. How does a laser generate coherent light?

Question 5

What is plane polarised light?

- What other types of polarisation are there?
- How can it be produced?
- What are its applications?

Question 6

Prisms are used extensively in ophthalmic instruments and in clinical ophthalmology.

- Draw a diagram showing the image formed by a prism.
- Explain factors determining angle of deviation by a prism.
- With diagrams describe 2 important positions when using a prism in assessment of ocular deviation.

Question 7

With diagrams describe reflection by a concave spherical mirror when the object is:

- a) at infinity
- b) outside centre of curvature
- c) inside principle focus

Question 8

With a diagram describe the cardinal points of an optical system. How do they apply to a thin lens in air?

Question 9

With diagram/s explain the optics of a simple magnifier.

Question 10

Describe the optical aberrations of the human eye.

Question 11

Astigmatism is a common refractive error that may require correction. Describe ocular astigmatism and explain its types.

Question 12

Jackson cross cylinder is used extensively in clinical refraction. With a diagram describe this instrument and its optical principles. How is it used to refine refraction?

Question 13

Presbyopia is a very common refractive error, which an ophthalmologist has to deal with on a daily basis. Describe accommodation and methods of its measurements.

Question 14

Define Stereopsis. How may it be measured?

Question 15

Describe the features of a compound microscope. How is it adapted as an operating microscope?

Question 16

Describe the principles of Goldman Applanation tonometry and optical doubling. Also discuss sources of error in measurement.

Question 17

Describe using diagrams the principles of direct and indirect gonioscopy, and describe the types of gonioscopes available in clinical practice.

Question 18

Describe using diagrams how the Galilean system can be used as a Low Vision Aids (LVA). Include a description of some of its disadvantages.

END OF PAPER