



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 19 May 2009

Duration of paper:	3 hours	Total Marks: 120
Total No. of questions:	12 (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

The electromagnetic spectrum spans a wide range of wavelengths. Draw a diagram of the EM spectrum and explain its components including UV rays, visible light and IR rays. Also locate on this scale the laser wavelengths that are relevant to ophthalmology.

Question 2

A patient post cataract surgery complains about glare. He/she was asking you about wearing dark or Polaroid sunglasses. Explain the phenomena of light polarization, transmission and filtering as they apply to ophthalmology.

Question 3

- a) How is laser light produced?
- b) Explain laser modes, mode locking and Q switching.

Question 4

The phenomenon of total internal reflection can cause reflection in a prism. Define and explain TIR and give examples of different ways of using prisms as reflectors. Also discuss the relevance of TIR to the examination of the eye. Use well labelled diagrams.

Question 5

Define and explain with well labelled diagrams Prentice's position of prisms and Prentice's rule.

Question 6

What is chromatic aberration? What are the main achromatic aberrations? How can aberrations be minimized in an ophthalmic instrument and in the human eye?

Question 7

With diagrams draw the axes of the eye and explain what is meant by angles Alpha and Kappa.
What are their clinical significance?

Question 8

Define hypermetropia. How is it classified and measured?
Use a simple diagram to illustrate the image of a distant object formed by the eye of a patient with refractive error of +5.00DS/+2.50DC x 180.

Question 9

- a) Define Back vertex distance.
- b) How is it measured?
- c) How do alterations in BVD affect magnification?
- d) What is aniseikonia and how is it minimised?

Question 10

How is the anterior corneal curvature measured?
What are the two main types of manual keratometer and how do they differ?

Question 11

- a) What types of lenses can be used to visualise the fundus at the slit lamp?
- b) How do they differ?
- c) Draw a diagram of the image produced by a 90D lens.

Question 12

- a) How can the refractive power of a spectacle lens be measured?
- b) What are the optical principles?
- c) Draw a diagram of the optics of a manual focimeter.

END OF PAPER