



# The Royal Australian and New Zealand College of Ophthalmologists

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## OPHTHALMIC BASIC SCIENCE EXAMINATIONS PHYSIOLOGY 08 June 2010

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**Duration of paper:** 3 hours **Total Marks:** 150  
**Total No. of questions:** 15

- ◆ **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**
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**Question 1** (20 Marks)

What is the normal minimum resolvable angle? Explain:

- how it is measured
- what the physiological basis is for this value and its measurement

**Question 2** (20 Marks)

Define the concept of Amblyopia. Give an account of its physiologic basis, causes, effects on vision, and its neurophysiologic and neuroanatomic features.

**Question 3** (20 Marks)

The lens is a living structure with metabolic needs.

- a) Describe the functions of lenticular cells.
- b) List the oxidative stresses to which the lens is exposed to and describe the mechanisms that protect the lens from each of these.

**Question 4** (10 Marks)

Explain the concept of critical flicker fusion (CFF) frequency. List the variables that affect CFF and describe how each affects the CFF value.

**Question 5** (10 Marks)

Explain dark adaptation. Include an account of the different mechanisms that produce dark adaptation. Detailed biochemistry is not required.

**Question 6** (10 Marks)

How does the microcirculation of the optic nerve head differ from that of the choroid? Describe their differing responses to intraocular pressure fluctuations.

**Question 7** (10 Marks)

The discovery of the extraocular muscle pulley systems has led to a reconsideration of the actions of human extraocular muscles and how surgical interventions might influence them. Describe these muscle pulleys and explain how their presence affects oculomotor control.

**Question 8** (10 Marks)

Describe the types and action of the autonomic receptors found in the iris and ciliary body.

**Question 9** (10 Marks)

Describe the electroretinogram (ERG) and include in your answer the following:

- a) Method of testing
- b) Typical normal traces
- c) Cells of origin of the test response

**Question 10** (5 Marks)

Describe the physiology of uveoscleral outflow.

**Question 11** (5 Marks)

Describe the physiological basis of the difference in pupil size between sleep and wakefulness.

**Question 12** (5 Marks)

Describe the composition and functions of each layer of the tear film.

**Question 13** (5 Marks)

List the benefits of having a normal vitreous.

**Question 14** (5 Marks)

Draw a diagram of the rhodopsin cycle.

**Question 15** (5 Marks)

Describe the oxygenation of the cornea.

**END OF PAPER**