



# The Royal Australian and New Zealand College of Ophthalmologists

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## OPHTHALMIC BASIC SCIENCE EXAMINATIONS PHYSIOLOGY 10 June 2008

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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)  
Explain the physiological basis for the functions of the retinal pigment epithelium (RPE).

**Question 2** (20 Marks)  
A significant component of visual perception involves the visual system responding to temporal variations in light information (ie: changes in the radiant energy as a function of time). Describe the physiological basis of temporal responses of vision.

**Question 3** (20 Marks)  
Describe the features and control of saccadic and pursuit eye movements.

**Question 4** (10 Marks)  
Describe how the three cone types of the human retina respond to different parts of the visible spectrum and how these responses are processed within the retina.

**Question 5** (10 Marks)  
Describe aqueous dynamics as it applies to the human eye using the Goldmann equation as a basis.

**Question 6** (10 Marks)  
Describe the changes that occur in the human crystalline lens as a result of ageing.

**Question 7** (10 Marks)

Explain corneal transparency and how it is maintained (diagrams of ion transportation are not required).

**Question 8** (10 Marks)

Describe motor fusion (fusional vergence). Include in your answer typical amplitude values and describe how they are measured.

**Question 9** (10 Marks)

The primary visual cortex organises retinogeniculate visual input. Explain how this information is organized into functional modules.

**Question 10** (5 Marks)

Briefly describe axonal transport within the optic nerve.

**Question 11** (5 Marks)

Briefly describe the functions of the human tear film.

**Question 12** (5 Marks)

Scleral permeability is an important variable in the transportation of periocular drugs. Explain the factors that affect scleral permeability.

**Question 13** (5 Marks)

Explain the physiological basis of Vernier acuity.

**Question 14** (5 Marks)

Define contrast and contrast sensitivity. Draw the normal human contrast sensitivity function and its components (label the axes).

**Question 15** (5 Marks)

Draw and label a graph that demonstrates the relationship between IOP and blood flow in the retina, ciliary body, and choroid. Explain why these curves are different.

**END OF PAPER**