



<b><u>PROGRAM</u></b>	: OPTOMETRY III
<b><u>SUBJECT</u></b>	: OCULAR PHYSIOLOGY
<b><u>CODE</u></b>	: OAF03B3
<b><u>DATE</u></b>	: NOVEMBER EXAMINATION 16 NOVEMBER 2017
<b><u>DURATION</u></b>	: 180 minutes
<b><u>WEIGHT</u></b>	: 50: 50
<b><u>TOTAL MARKS</u></b>	: 100
<b><u>EXAMINERS</u></b>	: MR. T.T. NYAKUDYA : MRS P.C. DE LANGE-JACOBS
<b><u>MODERATORS</u></b>	: MRS P.C. DE LANGE-JACOBS : MR. T.T. NYAKUDYA
<b><u>NUMBER OF PAGES</u></b>	: 4 PAGES

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<b><u>INSTRUCTIONS</u></b>	: THIS QUESTION PAPER MUST BE RETURNED WITH THE EXAMINATION SCRIPTS
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<b><u>REQUIREMENTS</u></b>	: 1 X EXAMINATION SCRIPT
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**INSTRUCTIONS TO CANDIDATES:**

1. THIS PAPER CONSISTS OF TWO SECTIONS.

**SECTIONS A** MUST BE ANSWERED IN A **SEPARATE** EXAMINATION SCRIPT.

**SECTIONS B** MUST BE ANSWERED IN A **SEPARATE** EXAMINATION SCRIPTS

2. PLEASE LABEL THE COVER OF EACH EXAMINATION SCRIPT AS **SECTION A AND SECTION B**
3. THIS QUESTION PAPER MUST BE RETURNED WITH YOUR EXAMINATION SCRIPTS.

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## SECTION A

Answer this section in a *SEPARATE* answer script. Ensure that you number your answers exactly as the questions are numbered.

### QUESTION ONE – THE EYELIDS

- 1.1 Describe the **FIVE** main functions of the eyelids. (5)
- 1.2 Differentiate between essential blepharospasm and reflex blepharospasm. (2)
- [7]

### QUESTION TWO – LACRIMAL APPARATUS

- 2.1 The tear film is made up of **THREE** layers. Identify the **middle layer** of the tear film and describe its composition, functions and source. (7)
- 2.2 Use the Holy and Lemp mechanism to explain tear film thinning and breaking. (4)
- [11]

### QUESTION THREE – OCULAR BLOOD FLOW

- 3.1 Identify any **FOUR** techniques that are used to assess ocular blood flow. ( $4 \times \frac{1}{2} = 2$ )
- 3.2.1 Define autoregulation of ocular blood flow. (1)
- 3.2.2 Describe the **THREE** main problems that can be caused by defective autoregulation of ocular blood flow. (3)
- 3.3 List **SIX** factors that determine ocular blood flow ( $6 \times \frac{1}{2} = 3$ )
- [9]

### QUESTION FOUR – PHYSIOLOGY OF THE CORNEA

- 4.1 List the **SIX** characteristics of the cornea that enables it to perform its functions. ( $6 \times \frac{1}{2} = 3$ )
- 4.2 Describe any **THREE** factors that affect the thickness of the cornea. (3)
- 4.3 Identify and describe the role of the factors that affect water equilibrium in the cornea. (8)
- 4.4.1 Describe the **FOUR** main effects that result from corneal wounds. (2)
- 4.4.2 Briefly discuss the chemical composition of the **TWO** corneal layers closest to the tear film. (2)
- 4.4.3 Corneal wound healing is essential for restoring the structural integrity and functioning of the cornea. Describe the **FIVE** processes involved in corneal wound healing. (5)
- [23]

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**SUBTOTAL SECTION A: 50**

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## SECTION B

Answer this section in a *SEPARATE* answer script. Ensure that you number your answers exactly as the questions are numbered.

### QUESTION 1

- 1.1 Discuss the basic structural adaptations of the lens to maintain transparency. (5 x 1 = 5)
- 1.2 Use **only** an annotated diagrammatic drawing of the lens to **explain** the pathways of water and electrolytes movement in the lens. (10 x ½ = 5)
- 1.3 Describe the basic biochemical changes in the lens that lead to senile cataracts. (10 x ½ = 5)
- [15]**

### QUESTION 2

Provide the main function for each of the following substances in the aqueous humor **and** for each substance explain the transport mechanism (process) involved in their movement into the aqueous humor. (10 x ½ = 5)

**[5]**

### QUESTION 3

- 3.1 Discuss the different flow paths of the aqueous humour that influence the intra –ocular pressure (IOP). Please note that NO equations are required. (10 x ½ = 5)
- 3.2 Explain the physiological basis of the treatment of high IOP. (3)
- 3.3 Distinguish between only the **physiological cause, symptoms and the optometric implication** of primary angle-closure glaucoma (close-angle glaucoma) and primary open-angle glaucoma. (8 x ½ = 4)
- [12]**

### QUESTION 4

- 4.1 Name **TWO** cell types that occur in the vitreous humour. (2 x ½ = 1)
- 4.2 Name the **TWO** components of the vitreous that are responsible for its structure, volume and transparency. (2 x ½ = 1)

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4.3 Write short notes on the following:

4.3.1 Cloquet's canal and Mittendorfs dots. (4 x ½ = 2)

4.3.2 The two compartments of the vitreous humour. (2 x ½ = 1)

4.3.3 The clinical significance of the fact that the vitreous humour is almost stagnant.

(2)

[7]

### **QUESTION 5**

Describe in detail the physiological effect of depolarising blocking agents on the extra-ocular muscles.

(6 x ½ = 3)

[3]

### **QUESTION 6**

6.1 Explain **THREE** physical factors that affect colour vision. (3)

6.2 Use ONLY a diagrammatic drawing with explanatory annotations to explain the physiological events during the **resting state** of photoreception. (10 x ½ = 5)

[8]

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**SUBTOTAL SECTION B: 50**  
**TOTAL: 100**

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