

**The University of Melbourne**

**Semester Two 2002**

**Department:** Anatomy and Cell Biology  
**Subject Number:** 516-208  
**Subject Title:** Structure and Function of the Brain (Optometry)

**Exam Duration:** 2 hours

**Reading Time:** 15 minutes

**This paper has 2 pages**

**Common content exam(s):** 512-975 Structure and Function of the Brain  
511-225 Oral Health Sciences 2B Neuroscience (Dental)  
516-305 Structure and Function of the Brain

**Authorized materials:**

None allowed

**Instructions to Invigilators:**

Script books: 1 x 14 page  
Exam paper may be removed from the exam room

**Instructions to Students:**

ALL questions should be attempted.  
ALL 6 questions have equal value.  
QUESTION 2 answer parts A **AND** B  
QUESTION 4: answer part A **OR** B  
QUESTION 6: answer parts A **AND** B  
DIAGRAMS should be used wherever possible.

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The University of Melbourne  
Semester 2 Assessment, 2002

Department of Anatomy and Cell Biology

Subject number: 516-208

Subject Title: Structure and Function of the Brain (Optometry)

**Question 1**

A normal healthy young man can distinguish a sound with a frequency of 1 kHz from a sound with a frequency of 1010 Hz. Explain the neural mechanisms that are the basis of this discrimination.

(20 minutes)

**Question 2**

Answer **BOTH** parts A **AND** B

- (A) A patient comes to see you who has recently had a skin infection of the face & scalp which was partially treated while on a trip to a Pacific Island. They complain of seeing double when looking in most directions. On examination, there is protrusion of the eyes (proptosis). Both eyelids are swollen & drooped (ptosis). There is marked venous congestion around both orbits & gross oedema of the conjunctivae. Both pupils are dilated and react poorly to light. The eyes move sluggishly in all directions. There is also sensory impairment over most of the face except the mandibular region. Explain the anatomical basis for the clinical symptoms & signs involving the eyes. List the cranial nerves you would like to examine and the reasons for your choice.

(10 minutes)

**AND**

- (B) A patient who has suffered a recent head injury after being involved in a high speed motor vehicle accident complains of double vision especially when reading. On examination, both eyelids are normal and both pupils are equal & reacting to light, but the right eye does not appear to move fully downwards when the eyeball is adducted (medially rotated). Diplopia is only present in this 'reading' position and the false image is tilted at an angle to the true image. Explain the anatomical basis for the eye signs in this case. Describe the effects of the lesion on ocular movements.

(10 minutes)

**Question 3**

What role do the basal ganglia and cerebellum play in the motor control hierarchy?

(20 minutes)

**Question 4**

Answer part A **OR** B

- A) In most individuals language is represented on one side of the brain. Discuss the evidence for this and with the aid of diagrams describe the regions of the brain involved in language processing and speech.

(20 minutes)

**OR**

- B) Discuss current views on the biological basis of schizophrenia.

(20 minutes)

**Question 5**

Describe the major events that occur during the development of the central nervous system.  
(20 minutes)

**Question 6**

Answer **BOTH** parts A **AND** B

A) Neurons are cells specialised for signalling to target cells, such as skeletal muscle cells or other neurons, at specialised structures called synapses. Describe a synapse and indicate how the various components present act together to pass a signal from a neuron to a target cell  
(10 minutes)

**AND**

B) With the aid of diagrams describe the production, flow, removal and function of cerebrospinal fluid.  
(10 minutes)

END of EXAM