

**UNIVERSITY COLLEGE LONDON**

*University of London*

**EXAMINATION FOR INTERNAL STUDENTS**

*For The Following Qualification:-*

*M.Sc.*

**M.Sc. Clinical Neuroscience: Paper 1**

**COURSE CODE : CLNEM001**

**DATE : 01-MAY-03**

**TIME : 14.30**

**TIME ALLOWED : 3 Hours**

## **PAPER ONE**

In *Part 1* of the paper, *answer three essay questions.*

You must answer:

*one question* from Section A (25 marks)

*one question* from Section B (25 marks)

*one question* from Section A or B (25 marks)

Allow yourself approx. 45 min per question.

In *Part 2* of the paper, *answer three short-answer questions* (8 marks each)

Allow yourself approx. 15 min per question.

***PLEASE IGNORE NOTE 2. ON THE FRONT COVER OF THE ANSWER BOOK AND WRITE ON ONE SIDE OF THE PAPER ONLY, BEGINNING EACH NEW QUESTION ON A FRESH PAGE.***

### **Part 1**

#### **Section A**

*6 questions from Theme A (Cellular and Molecular Neuroscience)*

- 1 Describe the molecular mechanisms of tumour suppressor (TS) gene inactivation, giving examples of TS genes that are important in astrocytoma development.
- 2 Energy homeostasis is vital for brain function. Describe the energy “fuels” which are metabolised by the brain under physiological conditions, and the mechanisms with which possible alternative sources can be used in pathophysiological situations to support brain function.
- 3 Describe the clinical manifestations of Alzheimer’s disease. What are characteristic macroscopic and microscopic findings in Alzheimer brains? Explain the role of the “secretases” in APP cleavage and their possible role in Alzheimer’s disease.
- 4 Why are gliomas so difficult to treat and what molecular advances are finding their way into the clinical arena to improve treatments?
- 5 Describe the neuropathology of one viral encephalitis of your choice, mentioning whether it is an acute/subacute/chronic process and whether it affects predominantly the grey or white matter (or both).
- 6 What prevents damaged adult central neurons regenerating?

#### **Section B**

*6 questions from Theme B (Communication and Transmission)*

- 7 Describe the events that take place when motoneurones interact with their target muscle fibres. How does this interaction influence the survival of developing motoneurones?

- 8 Describe the variety of peripheral nerve complications that may be encountered in diabetic patients.
- 9 How does glutamate cause neurons to depolarise?
- 10 Discuss how calcium can act as a signalling molecule but can also be cytotoxic in the brain.
- 11 What factors influence the incidence and prevalence of epilepsy.
- 12 Describe the major mechanisms of antiepileptic drug action and discuss how knowledge of these mechanisms can help in the management of patients with epilepsy.

## **Part 2**

### *10 short-answer questions on Themes A and B*

- 13 Describe the major categories of brain tumours.
- 14 Explain why dopamine meets the criteria to be called a neurotransmitter.
- 15 What are the clinical and pathological features of patients with amyotrophic lateral sclerosis (ALS, also known as motor neurone disease, MND)?
- 16 Briefly discuss the physiological process and molecules involved in the trafficking of lymphocytes into the CNS
- 17 Discuss the immune parameters that initiate inflammation and bring about demyelination in multiple sclerosis.
- 18 What is meant by saltatory conduction? Under what circumstances can the safety factor for conduction in a nerve fibre become critical?
- 19 Discuss the differential diagnosis of myasthenia gravis.
- 20 What is an ionotropic receptor?
- 21 Explain the difference between the isoforms of nitric oxide synthase found in neurons (nNOS) and microglia/macrophages (iNOS).
- 22 What brain abnormalities causing epilepsy may be shown on brain imaging?

[End of paper]