UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For The Following Qualification:-

M.Sc.

M.Sc. Clinical Neuroscience: Paper 2

COURSE CODE   : **CLNEM002**

DATE   : **05-MAY-05**

TIME   : **10.00**

TIME ALLOWED   : **3 Hours**

TURN OVER

PAPER TWO

IMPORTANT:
- *WRITE ON ONE SIDE OF THE PAPER ONLY*
- *BEGIN EACH NEW QUESTION ON A FRESH PAGE*

Please ignore other instructions to the contrary

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 C (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.

Part 1

Section A

6 questions from Theme C (Systems Neuroscience), sub-themes C1, C2 (Nociception and Pain, Motor Control).

1.   Discuss the functional significance of differential control of the spinal processing of A- versus C-nociceptive inputs.

2.   To what extent do we understand the heritability and genetics of migraine, including its various sub-forms?

3.   What evidence is there that the corticospinal tract mediates skilled control of hand movements?

4.   Give three examples using different combinations of techniques which use transcranial magnetic stimulation to explore connectivity between structures in the human brain.

5.   How might sudomotor function be disturbed in the following patient groups; Pure Autonomic Failure, Multiple System Atrophy, Holmes Adie Syndrome, Spinal cord injury, post-sympathectomy at T2 and gustatory sweating.

6.   What are the causes of detrusor overactivity and how can the condition be treated?

Section B

6 questions from Theme C (Systems Neuroscience), sub-themes C3, C4 (Basal ganglia/movement disorders, Hearing, balance, vision and eye-movements).

7.   How useful is the Albin-Delong model of the basal ganglia?

8.   Is the hope of treating Parkinson's disease with stem cell therapy exaggerated? Discuss.

9.   Discuss the cellular mechanisms thought to underlie neurodegeneration in Huntington's disease.

10.   Describe some of the Positron Emission Tomography techniques that can be used to monitor disease progression in Parkinson's disease and Huntington's disease.

11.   Describe the generation of spontaneous vestibular nystagmus and discuss its clinical relevance.

12.   Describe the various types of human eye movement, their function, underlying anatomy & physiology. Outline possible clinical disorders of eye movements that each ocular motor system can have.

Section C

6 questions from Theme D (Higher Functions of the Brain)

13.   Discuss how an understanding of the mechanism of stroke has led to rational treatments, giving examples.

14.   Discuss the evidence for and against the idea that the hippocampus is necessary for new semantic learning.

15.   What does parietal neglect tell us about mechanisms of attention in the human brain?

16.   It is generally thought that forward connections are driving whereas backward connections are modulatory. Discuss the empirical evidence that would support this conjecture.

17.   Discuss whether the term dementia still useful.

18.   Explain carefully why BOLD fMRI image intensity changes are normally positive when there is increased neuronal activity. Describe the physiological factors that limit the temporal resolution of this technique.

Part 2

10 short-answer questions on Themes C and D

19.   How does a motoneurone integrate the many thousands of different synaptic inputs that it receives?

20.   Describe the pathological features of the α-synucleinopathies giving rise to parkinsonism.

21.   What are the surgical methods currently in use in treatment of Parkinson's disease, essential tremor, and dystonia?

22.   Give a definition for an "Auditory Processing Disorder" and name the main deficits associated with this disorder.

23.   Write short notes on the following:
   a) aphasia following stroke
   b) emotional effects of cortical damage due to stroke.

24.   Describe the different types of memory represented by the brain and list the brain regions thought to be involved.

25.   List the structures of the limbic system, and give an account of functions of each, illustrated where possible by a clinical disorder.

26.   What is meant by retinotopy, and how can it be measured in humans?

27.   What is meant by the term mild cognitive impairment (MCI)?

28.   Describe pharmacological options that are currently available for the treatment of Alzheimer's disease.

[End of paper]