

**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 : 07–MAY–04**

**TIME : 10.00**

**TIME ALLOWED : 3 Hours**

## PAPER TWO

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.

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

### Part 1

#### Section A

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

1. What treatments would you recommend for a patient suffering from severe post-herpetic neuralgia affecting a mid-thoracic dermatome, and in what order should the treatments be tried?
2. Why are patients with Parkinson's disease particularly impaired at self-initiated movements?
3. What are the possible computational benefits of predicting the sensory consequences of your actions?
4. Explain the concept of a "virtual lesion" experiment using transcranial magnetic stimulation. What are the principles underlying the effect? Give two examples of how the method has been used in the past.
5. How far has our understanding of the respiratory central pattern generator changed in the last 15 years?
6. Classify autonomic disorders and give two examples of each category, with a brief description of the autonomic deficit.

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## **Section B**

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

7. Describe what is currently known about the pathogenesis of Parkinson's disease.
8. Discuss the long term complications of l-dopa therapy in Parkinson's disease and possible approaches to their prevention and treatment.
9. What is dystonia and how can it be surgically treated?
10. Compare and contrast Huntington's disease with Alzheimer's disease.
11. Describe the sequence of transduction by which sound energy arriving at the tympanic membrane is transmitted through the middle ear, converted into electrical energy in the cochlea and transmitted cranially via the VIIIth nerve.
12. What symptoms would be experienced by a patient (a) with a destructive lesion in the vestibular labyrinth and (b) with a brainstem lesion involving the vestibular nuclei? Explain the underlying anatomical and physiological basis of such symptoms and of any signs that an external observer might see.

## **Section C**

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

13. Effective rehabilitation of neurological disorders arises from an understanding of the basic mechanisms underlying disability. Discuss.
14. List the different types of memory systems in humans, their functional properties, and their putative neuroanatomical substrates.
15. Does the human hippocampus play a role in navigation?
16. "The concept of the limbic system should be discarded" J LeDoux, 1996. Discuss the historical and functional neuroanatomical validity of the limbic system concept.
17. What are the consequences of parietal damage for vision? What is visual attention?
18. What is the evidence for prion strains, and that variant CJD represents a new strain of prion disease derived from BSE?

**PLEASE TURN OVER**

## **Part 2**

### *10 short-answer questions on Themes C and D*

19. Describe the main clinical features of Complex Regional Pain Syndrome.
20. List the major clinical symptoms and signs of cerebellar lesions, including where possible the differences expected with lesions in medial and lateral areas of the cerebellum.
21. What computational mechanisms can the brain use to estimate the configuration of the body, that is its state?
22. Spinal cord damage is likely to have a marked effect on sexual function – describe what the pathophysiological consequences may be.
23. List 15 symptoms of Parkinson's disease or its treatment that can affect a patient's everyday life.
24. Why does measuring blood flow tell us anything about neural activity in the brain?
25. Which neural systems are engaged in tool recognition and semantic processing?
26. Describe the International Classification of Function.
27. How relevant is the lateral geniculate nucleus to higher visual function?
28. What are the physical and physiological limitations on the temporal resolution of functional magnetic resonance imaging?

[End of paper]