

UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For the following qualifications :-

M. Sc.

M.Sc. Clinical Neuroscience: Paper 2

COURSE CODE : **CLNEM002**

DATE : **08-MAY-02**

TIME : **10.00**

TIME ALLOWED : **3 hours**

02-N0029-3-40

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PAPER TWO

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

You must answer:

two questions from Section A (25 marks each)

one question from Section 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 WRITE ON ONE SIDE OF EACH PAGE IN THE ANSWER BOOK AND ANSWER EACH QUESTION ON A FRESH SHEET OF PAPER.

Part 1

Section A

12 questions from Theme C (Systems Neuroscience)

1. Describe the principles of management of neurogenic sexual dysfunction.
2. Describe the major neurophysiological changes that occur during a migraine attack. What evidence is there for changes in sensory processing between attacks?
3. How do the different descending pathways differ in terms of their functional contribution to movement?
4. What are the possible computational benefits of predicting the sensory consequences of your motor command.
5. How can TMS be used to explore plasticity in the motor system?
6. How is the cerebellar cortex thought to function as a "learning machine"?
7. Explain how the use of *in vitro* preparations has advanced our understanding of the probable mechanisms for the generation of respiratory rhythms.
8. The development of surgery for Parkinson's disease has benefited from our knowledge of the basal ganglia and in turn surgery has helped our understanding of the basal ganglia. Please comment and provide examples.
9. Discuss the relationship between dementia and Parkinson's disease.
10. Give the possible differential diagnosis and investigations of a young adult presenting with a choreic disorder.
11. Describe the anatomical and physiological basis of binaural hearing in the central auditory pathway.
12. How do motoneurons function as the 'final common path' (Sherrington)?

TURN OVER

Section B

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

13. Discuss the role of the frontal cortex in executive function.
14. Explain the origins of the signal used in BOLD contrast fMRI. Discuss the limitations on spatial resolution of this technique when used for functional brain mapping.
15. Are "episodic" and "semantic" useful distinctions in the neuropsychology of human memory?
16. Discuss whether neuroimaging has been helpful in informing cognitive theories of developmental dyslexia?
17. Why is it not possible to explain unilateral spatial neglect in terms of elementary sensory or motor disturbances?
18. How have mouse models clarified the role of prion protein in health and disease?

Part 2

10 short-answer questions on Themes C and D

1. Spinal cord damage is likely to have a marked effect on bladder control – describe what the pathophysiological consequences may be.
2. Which brain centres are critical for the ability to sense visual motion?
3. What are the distinguishing anatomical and physiological features of the primary motor cortex?
4. Explain how transcranial magnetic stimulation over the hand area of motor cortex may activate corticospinal neurones.
5. Describe the major clinical symptoms of cerebellar lesions, including where possible the differences expected from lesions in medial and lateral areas of the cerebellum.
6. Explain three distinct roles for inhibition in the production of a respiratory rhythm.

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7. How does levodopa improve bradykinesia in Parkinson's disease?
8. What are the main considerations in using PET as a functional imaging tool?
9. List the causes of cerebral infarction.
10. Write short notes on the somatic marker hypothesis for emotional experiences.

[End of paper]