

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 : 03-MAY-05

TIME : 10.00

TIME ALLOWED : 3 Hours

PAPER ONE

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 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.

Part 1

Section A

6 questions from Theme A (Cellular and Molecular Neuroscience)

1. Discuss the differences in genetic aetiology between primary and secondary glioblastoma multiforme.
2. Discuss the genotype and phenotype of mitochondrial disease and the relationship between them.
3. Describe with examples how disruption of exocytosis can have implications for neuronal disease and neurotoxicity. Distinguish between mechanisms that cause disruption of calcium entry and those that cause disruption to the function of neurotransmitter uptake and vesicle release.
4. Discuss the role of altered axonal transport in the pathogenesis of motor neurone disorders.
5. Describe the possible mechanisms of demyelination in multiple sclerosis, and discuss their significance for therapeutic approaches to remyelination.
6. Compare and contrast parainfectious and paraneoplastic neurological disease giving examples.

Section B

6 questions from Theme B (Communication and Transmission)

7. What are the steps between a mutation in an ion channel gene and a non-functional ion channel protein? Give an example of a channelopathy that arises from one of these steps.

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9. What is meant by short-term and long-term use-dependent synaptic plasticity? What is their adaptive significance and what diseases are known to affect them?
10. Discuss the role of nitric oxide as a signalling molecule and neurotoxin.
11. Is inhibition decreased in epilepsy? Discuss.
12. Describe the spectrum of effects of chronic epilepsy on the brain.

Part 2

10 short-answer questions on Themes A and B

13. Within a family, what are the general characteristics that identify the following:
 - 1) An autosomal dominant disease
 - 2) An autosomal recessive disease
 - 3) An X-linked disease
 - 4) A Mitochondrial disease

Use figures to illustrate your answers and provide a typical example of each type.

14. Intercellular transport between astrocytes and neurones is critical to the maintenance of cerebral energy homeostasis. Discuss.
15. Explain how a single neurotransmitter molecule can elicit diverse effects within the central nervous system.
16. List contemporary criteria for defining a disease as being autoimmune.
17. Write short notes on the biology of Nogo A.
18. Define and distinguish between neuroinvasiveness, neurotropism, neuronotropism, and neurovirulence. Illustrate your definitions with examples of microbes that have a predilection for the human central nervous system.
19. What is meant by the safety factor for nerve conduction, and what can affect it?
20. Discuss the electromyographic features of myasthenia gravis and their sensitivity and specificity.
21. Describe the thalamocortical circuits that subserve sleep spindles and absence seizures.
22. Discuss the principles of curative surgical treatment of epilepsy.

[End of paper]