

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF MEDICINE

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY DEGREE
PART 2 EXAMINATIONS

MBM 2203 : NEUROSYSTEMS AND BRAIN (A & P)

DATE : **DECEMBER 2006**

TIME : **3 HOURS**

Instructions to Candidates

Answer all questions

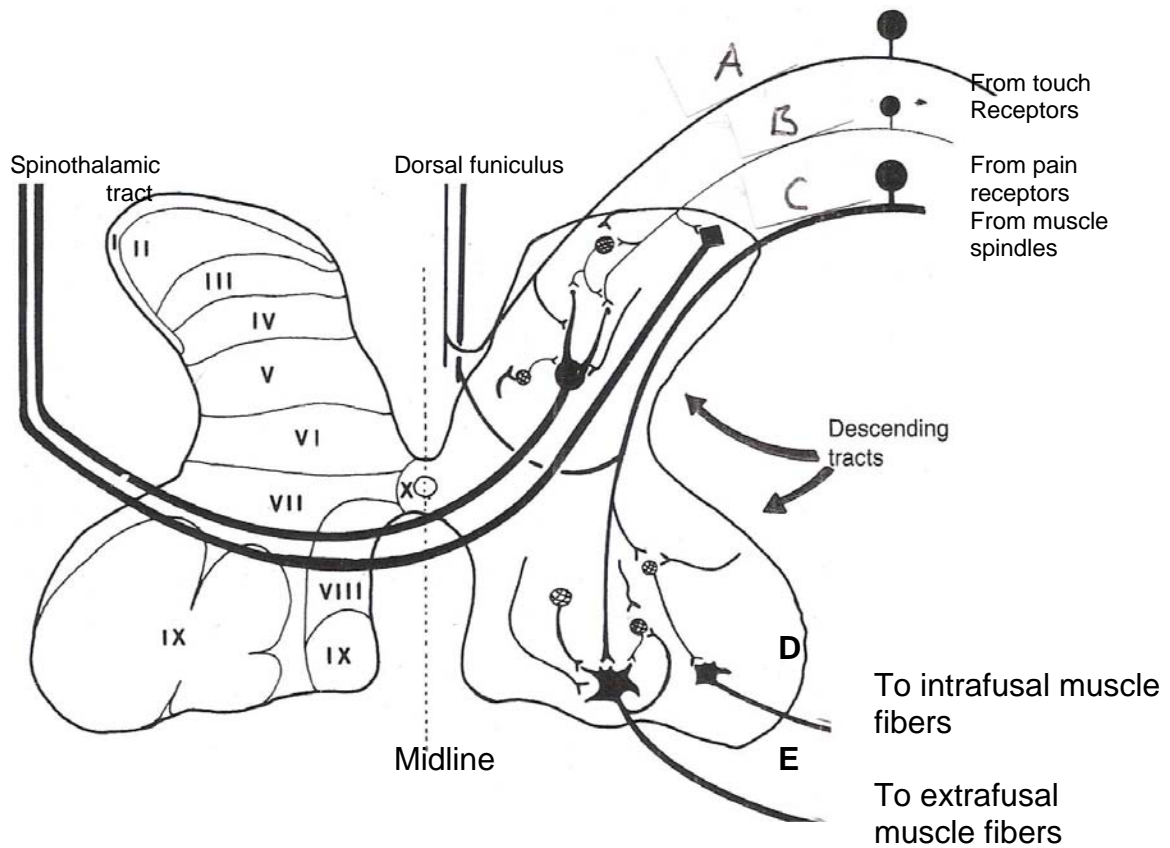
SECTION A (40 MARKS)

1. Write an essay on the arteries of the central nervous system that is the brain and the spinal cord. (*note form accepted*) (20)
2. Using short notes and annotated diagrams, describe pain modulation at the spinal level. (20)

SECTION B (60 MARKS)

3. a) Describe chemo and auto regulation of cerebral blood flow. (4)
 b) Complete the equation

$$\text{Cerebral blood flow} = \frac{\text{Systemic BP} - \text{?}}{\text{Cerebral vascular resistance.}}$$
 (1)
4. a) Describe the positional changes of the developing spinal cord. (2,5)
 b) Briefly compare and contrast the final exit of spinal nerves from the vertebral column in the cervical and lumbosacral regions. (2,5)
5. Fig 1 shows a cross-section of the lumbar spinal grey matter. The left shows the laminae of Rexed and the right some of the principal cells; inter neurons and their connections.



- a) Name the fibre types (physiological classification) labeled A,B,C,D,E (2.5)
- b)
 - (i) What is the range of sizes in terms of diameter, of nerve fibres. What does this mean in terms of speed of transmission of information? (2)
 - (ii) What type of fibers are most numerous in the nervous system; to what possible advantage? (2)
 - (iii) Briefly describe the anatomy of the muscle spindle or neuromuscular spindle. (2)
 - (iv) List the fibres that would take part in a spinal reflex. (1,5)
6. Briefly describe the embryological differentiation of nerve cells and their supporting cells. (5)
7. Describe the connections and activities of
 - a) the cerebellum (2,5)
 - b) the Basal ganglia. (2,5)

8. a) Briefly outline the various reactions of nerve cells to injury and disease. (2,5)
b) Briefly describe the process of myelination. (2,5)
9. Using short notes and diagrams describe the following:
a) the formation, circulation and absorption of cerebrospinal fluid. (2,5)
b) neuromuscular transmission. (2,5)
c) intracranial pressure. (2,5)
10. What are the effects of the sympathetic mass discharge or the fight or flight response? (3,5)
11. What are the effects of the sympathetic and parasympathetic nerves in
a) the pupil (1)
b) heart muscle (2)
c) bronchi (1)
d) gall bladder and the bile ducts. (1)
12. a) What are the differences between the actions of circulating norepinephrine and epinephrine secreted by the adrenal medulla. (3)
c) how is norepinephrine destroyed after secretion by the terminal nerve ending. (1)
13. Briefly describe the embryological development of the neurocoele (cavity of the nervous system) and its derivatives in the adult nervous system. (5)

END OF EXAMINATIONS