

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

APPLIED PHYSICS DEPARTMENT

IMAGING OF THE NEURO-ENDOCRINE SYSTEM - SRA 3106

EXAMINATION

BSc HONOURS PART III : DECEMBER 2004 DURATION : 3 HOURS

ANSWER ALL QUESTIONS IN SECTION A AND ANY THREE QUESTIONS FROM SECTION B. SECTION A CARRIES 40 MARKS AND SECTION B CARRIES 60 MARKS.

SECTION A

1. (a) Describe and explain the radiographic appearances of raised intra - cranial pressure on plain skull radiographs of:
- (i) an infant, [2]
 - (ii) an adult, [2]
 - (iii) indicate *two* causes of raised intra-cranial pressure. [1]
- (b) With reference to magnetic resonance imaging (MRI),
- (i) state *three* reasons why this method of imaging may be preferred to plain radiography in demonstrating cerebral hemispheres. [3]
 - (ii) Explain *two* circumstances when MRI would be contra-indicated [2]
- (c) Define the following pathologies of the neuro-endocrine system and for each indicate one imaging method which may be used to demonstrate it:
- (i) hydrocephalus,
 - (ii) hyperthyroidism,
 - (iii) anencephaly,
 - (iv) spina bifida,
 - (v) meningitis. [5]
- (d) Distinguish between the following intra-cranial haematomas and for each indicate radiological appearances:
- (i) extradural haematoma,
 - (ii) subdural haematoma,
 - (iii) intracerebral haematoma. [3]
- (e) Briefly evaluate *two* imaging modalities that may be used to demonstrate pituitary pathology. [4]

- (f) Describe the typical radiographic appearances of the following:
 - (i) a prolapsed intervertebral disc on a computed tomography study of the spinal cord
 - (ii) a cerebral artery aneurysm on a contrast study of the brain. [4]
- (g) Describe equipment suitable for myelography. [4]
- (h) Outline the imaging methods which may be used to demonstrate a neuroblastoma indicating the significant radiological appearances. [3]
- (i) With respect to imaging of the eye:
 - (i) explain the term exophthalmos, [1]
 - (ii) indicate *two* possible causes of exophthalmos, [2]
 - (iii) state *two* imaging methods for the condition. [1]
- (j) A patient presents with a history of carpal tunnel syndrome. Describe one radiographic projection to demonstrate the condition. [3]

SECTION B

- 2. (a) Outline the role of plain skull radiographs in demonstrating central nervous trauma. [10]
- (b) Describe a projection to demonstrate a fracture to the base of the skull using the following headings:
 - (i) position of patient and film, [3½]
 - (ii) direction and centering of the x-ray beam. [1½]
- (c) State the clinical signs and symptoms you would expect and the observations you would make for (b) above. [2]
- (d) Justify your choice of x-ray tube for skull radiography. [3]
- 3. Other than plain radiography, evaluate the role of four imaging modalities in the diagnosis of brain pathology. [20]
- 4. (a) Distinguish between myelography and radiculography. [1]
- (b) Outline the radiographic myelography procedure including the care of the patient before and after examination. [8]

- (c) What are the advantages of CT myelography? [2]
(d) State one contraindication for myelography. [1]
(e) Discuss other imaging modalities used in demonstrating the spinal cord. [8]
5. (a) Define a retrosternal goitre. [1]
(b) Indicate the causes of such a goitre as defined in (a) above. [2]
(c) Describe *two* projections which can be taken to demonstrate a retrosternal goitre using the following headings:
(i) position of the patient and film, [7]
(ii) direction and centring of the x-ray beam. [3]
(d) With respect to one of the projections described in (c), justify your choice of kV_p . [2]
(e) Describe the radiographic appearance of a retrosternal goitre as demonstrated on the projections above. [3]
(f) State and explain a practical problem which may occur during this examination of the retrosternal goitre. [2]
6. State two clinical indications for imaging each of the following endocrine glands:
(a) adrenal,
(b) parathyroid,
(c) thyroid,
(d) pancreas. [4]
(ii) For each of the above glands, briefly compare the imaging modalities available to image it. [16]