

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

APPLIED PHYSICS DEPARTMENT

THE ABDOMEN - URINARY SYSTEM - SRA 2103

EXAMINATION

BSc HONOURS PART II: 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 the structure of a nephron. [5]
- (b) Define the following medical conditions of the urinary system:
 - (i) glomerulonephritis, [1]
 - (ii) renal failure, [1]
 - (iii) nephrotic syndrome, [1]
 - (iv) duplex kidney, [1]
 - (v) nephroblastoma. [1]
- (c) Outline relevant equipment and accessories for cystography examinations. [4]
- (d) Justify the selection of a named contrast agent for use during intravenous hrography. [5]
- (e) Justify a choice of exposure factors for abdominal radiography to demonstrate the urinary tract. [5]
- (f) Name *four* functions of the kidneys not associated with urine production. [2]
- (g) Outline the surface markings of the kidneys. [3]
- (h) Explain the evaluation criteria of an abdominal radiograph to demonstrate kidneys, ureters, bladder and urethra (KUBU). [5]
- (i) Describe how a patient would be prepared prior to having an intravenous urography [3]
- (j) Define the following examinations for the urinary system:
 - (i) renal cyst puncture,
 - (ii) percutaneous nephrolithotomy,
 - (iii) static scintigraphy. [3]

SECTION B

2. (a) Explain the process of urine formation. [8]
- (b) Describe how contrast agents are excreted by the urinary system and the radiological appearances demonstrated during this process. [7]
- (c) Explain how one pathological condition would affect the excretion process and the subsequent radiological appearances. [5]
3. (a) Describe the structure, histology and function of ureters. [10]
- (b) Name *two* pathologies that can affect the ureters. [2]
- (c) Compare and contrast *two* imaging methods that can be used to demonstrate the ureters. [8]
4. (a) How is the urinary bladder adapted for its function? [5]
- (b) Describe the act of micturation. [5]
- (c) With reference to micturating cystography,
- (i) state *two* clinical indications for the examination, [1]
- (ii) describe the procedure. [7]
- What are the advantages of a radionuclide imaging cystogram over the radiographic micturating cystogram [2]
5. (a) A young female patient is brought to the radiodiagnostic department on a trolley. She has sustained a crush injury to the abdomen and pelvis and has haematuria. It is decided by the casualty officer that this patient requires an urgent intravenous urogram to investigate the cause of haematuria.
- (i) State *four* possible causes of haematuria generally. [4]
- (ii) Explain how and why this examination would differ from a routine intravenous urogram. [7]
- (iii) Describe the care of the patient during this examination. [5]
- (iv) Explain the value of two of the imaging modalities that could be used to investigate the haematuria. [4]
6. Evaluate the role of *four* imaging modalities in the imaging of the urinary system. [20]

END OF EXAMINATION PAPER