

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

APPLIED PHYSICS DEPARTMENT

SRA 3211 –ULTRASOUND

BSc HONOURS PART III: JULY 2014
SUPPLEMENTARY EXAMINATION

DURATION: 3 HOURS

ANSWER **ALL** PARTS OF QUESTION **ONE** 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) Explain why it is important for imaging that ultrasound speed varies in various soft tissues . [5]
- (b) Identify and explain two hazards associated with the use of diagnostic medical ultrasound equipment. [6]
- (c) Discuss resolution in ultrasound imaging. [6]
- (d) Compare two approaches that can be used to visualise pelvic organs in the female. [6]
- (e) Describe the ultrasound appearances of fibroids. [5]
- (f) Describe the ultrasound parameters used to estimate gestational age in the 1st trimester. [5]
- (g) Explain the application of TGC in ultrasound imaging. [5]
- (h) State four necessary methodical movements of the abdominal probe in obstetric scanning. [2]

SECTION B

2. (a) Describe the appearance of an ultrasound image of a fluid-filled cyst containing debris. [5]
- (b) Explain why a woman must have a full bladder for a trans-abdominal pelvic ultrasound examination . [5]
- (c) Identify and describe early pregnancy complications. [10]
3. Evaluate the role of ultrasound imaging;
- a) in the first trimester of pregnancy [10]
- b) in the second trimester of pregnancy (10)
4. a) Giving specific examples, evaluate the use of at least four probes that may be found as part of an ultrasound unit. [12]
- b) With appropriate examples, illustrate how the ultrasound beam properties can be manipulated to optimise image quality. [8]
- 5) Discuss the categorized origin of ultrasound image artefacts [20]
6. (a) Differentiate between axial and lateral resolution in ultrasound imaging. [5]
- (b) Compare and contrast near-field and far-field beam characteristics. [6]
- (c) Compare and contrast A-mode, B-mode and M-mode scanning modes. [9]

END OF EXAMINATION