

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

APPLIED PHYSICS DEPARTMENT

SRA 3101 – RADIOGRAPHIC IMAGING II

BSc HONOURS PART II: APRIL 2014

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) State the possible causes and changes that may occur in radiographic appearance due to the following malfunctions in an automatic processor
 - i) intermittent rotation of development of rack rollers
 - ii) fixer outlet blocked [5]

- b) Explain how and why each of the following factors may alter radiographic contrast;
 - i) the use of a tissue displacement band,
 - ii) increase in developer temperature,
 - iii) a change in kV_p . [6]

- c) Explain the features of a film that make it suitable for automatic processing [5]

- d) A patient presenting for extremity radiography is adequately immobilised and a small focus selected for the examination.
Discuss why there may still be visible image unsharpness on the image. [5]

- e) Define the term visual acuity and explain its significance in image viewing. [5]

- f) Explain the impact of automatic film handling on the operation of a modern imaging department. [5]

- g) Explain the principles involved in two methods used in drying radiographs in a modern automatic processor. [5]

- h) Explain the advantages of microprocessor control in a modern automatic processor [4]

SECTION B

2. The radiograph is a legal document requiring adequate identification.
- a) Explain why the radiographer should take full responsibility for film identification. [5]
 - b) Evaluate the methods that are used in film identification. [15]
3. a) Discuss the main features of a modern automatic processor which help conserve resources [10]
- b) Illustrate how the design of a modern automatic processor ensures consistency in image quality. [10]
4. The advent of digital technology has rendered the individual patient' film packets and departmental film archive unnecessary.
- a) Discuss this statement [15]
 - b) Differentiate between computed radiography and direct digital radiography [5]
5. You have a six (6) roomed imaging department with the following modalities: general radiography, fluoroscopy, computed tomography and an accident and emergency room
The department is in the process of introducing digital equipment while still retaining part of the conventional film radiography.
- a) Justify the design and construction of appropriate processing facilities for this department. [10]
 - b) Discuss health and safety considerations in the processing area. [10]
- 6.a) Silver is a diminishing world resource. Discuss how radiographers may help conserve silver. [8]
- b) For a busy central hospital imaging department, evaluate the methods can be used to recover silver. [12]

END OF EXAMINATION

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BSc HONOURS PART III: JULY 2014 DURATION: 3 HOURS
SUPPLEMENTARY EXAMINATION

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) Evaluate two methods that could be used for storage and archiving of radiographic images [10]
b) Explain the effect of fog on image contrast [5]
c) Indicate the functions and explain the advantages of microprocessor control in a modern automatic processor [5]
d) Justify the need for standardising viewing conditions throughout the hospital. [5]
e) Explain why the selection of a small focal spot might not reduce visible image unsharpness even when the patient is adequately immobilised. [5]
f) Justify the action you would take in solving the following processing faults
i) Film coming out of the processor wet, [2]
ii) Overall high density and [2]
iii) Brown stain on storage. [1]
g) Explain why the radiographer should assume responsibility for identifying radiographs [5]
h) Discuss how the following factors have contributed to reducing patient dose and/or improving image quality
(i) advancements in film grain technology
(ii) cassette designs [5]
i) With reference to image quality discuss any two handling and storage artefacts on radiographs [5]

SECTION B

2. a) Discuss the impact of automated film handling on the operation of an imaging department [5]
b) Evaluate the methods that could be used to recover silver from used fixer in a busy one of Central hospital imaging department. [15]
3. a) Discuss the main features of a modern automatic processor which help reduce wastage of resources and maintain consistent image quality. [12]
b) Discuss the different ways by which adequate washing of the film in an automatic processor may be achieved [8]
- 4 a) Discuss the considerations you would take into account in coming up with an appropriate darkroom in a district hospital in Zimbabwe. [10]
b) Discuss health and safety considerations in the processing area [10]
5. You have employed a new lady to work in the darkroom.
a) Justify the orientation you would give the new employee. [10]
b) Discuss the factors to be taken into account in coming up with the safe film handling time of a particular darkroom [10]
6. Discuss the effect of the following exposure factors on image quality
i) kV_p
ii) mAs
iii) focus size
iv) screens [4x5]

END OF EXAMINATION