



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2013/2014

**FOURTH YEAR SECOND SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN MEDICAL
LABORATORY SCIENCE AND PHARMACEUTICAL SCIENCE
WITH INFORMATION TECHNOLOGY**

(MAIN CAMPUS)

PMT 417: MEDICAL IMAGING TECHNIQUES

Date: 2nd April, 2014

Time: 2.45 – 5.00 p.m.

INSTRUCTIONS:

- Answer **ALL** questions in Section A and **ANY THREE** Questions in Section B.



PMT 417: MEDICAL IMAGING TECHNIQUES

Bachelors in Medical Laboratory Science and Pharmaceutical Science with IT

INSTRUCTIONS:

This paper consists of two sections, A & B.

Answer ALL questions in SECTION A and THREE questions in SECTION B.

SECTION A: (Each question is 4 marks)

- 1) Name four commonly used imaging modalities in medicine and state the different forms energies used.
- 2) By use of a simple labeled diagram, explain an electromagnetic spectrum.
- 3) List five different application areas for X-ray imaging.
- 4) a) What is Radioactive Decay?
b) Explain Half- life ($T_{1/2}$) of a Radionuclide
c) What is the importance of Half-life in Radionuclide imaging?
- 5) Give two main reasons (AIMS) for radiation protection.
- 6) List and explain the three categories of radiation exposure.
- 7) MRI is judged to be a safe method of medical examination. Explain.
- 8) Define the following terms in relation to ultrasound imaging.
 - a) Acoustic boundary
 - b) Refraction
 - c) Specular reflection.
 - d) Coupling gel
- 9) Define and give an example of :
 - a) Gamma emission
 - b) α - decay
 - c) β - minus decay
 - d) β - plus decay
- 10) What is Tungsten? Explain why it is the metal of choice for use as an X-ray Target.

SECTION B: (Each question is 10 marks)

- 1) Discuss the production (generation) and detection of ultrasound.
- 2) With the help of a simple diagram, describe the basic principles of X-ray production.
- 3) Explain the SAFETY measures around MRI Units
- 4) In regard to Biological Effects of Ionizing Radiation, explain with examples;
 - a) Stochastic effects
 - b) Deterministic effects
- 5) With the help of a simple diagram, explain the Band Theory of Thermoluminescence.