



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MEDICAL ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MEDICAL ENGINEERING

ECL2202: CLINICAL SAFETY

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: 9 May 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other **TWO** questions.

Do not write on the question paper.

Question ONE

- a) List the TWO categories of Natural Radiation Sources (2 marks)
- b) List any TWO factors:
 - i) under the control of the staff themselves
 - ii) which fixed that govern the exposure of staff to X-ray radiation (4 marks)
- c) Explain the following categories of radiation exposures.
 - i) Occupational exposures
 - ii) Medical exposures (4 marks)
- d) State FOUR factors that influence how the body will react to current flow it. (4 marks)
- e)
 - i) Distinguish between class and type of medical electrical equipment
 - ii) List the FOUR classes of medical electrical equipment (6 marks)
- f) Outline any TWO practices required for all laboratories handling infectious substances. (4 marks)
- g) Describe the following methods of decontaminating materials prior to disposal.
 - i) Liquid Effluent Treatment Systems
 - ii) Irradiation (6 marks)

Question TWO

- a) Explain the need and use of biological safety cabinets (2 marks)
- b) Satisfactory mechanical performance is a prerequisite of microbiological safety in the use of laboratory centrifuges. State any TWO. (2 marks)
- c) Explain the start-up procedures when preparing for work in the Biological Safety Cabinet (16 marks)

Question THREE

- a) Explain why the risk of exposure to spurious electric currents is potentially greater for the electrically sensitive patient. (3 marks)
- b) With the aid of a diagram, explain why Isolated Power Systems are used in the hospital environment as a means of reducing the risk of explosions in operating rooms and any other area where flammable anaesthetizing agents are used. (10 marks)
- c) With the aid of a diagram, explain the measurement of enclosure leakage current (7 marks)

Question FOUR

- a) Explain how X-rays and γ -rays differ from particle radiations (4 marks)
- b) Describe the FOUR natural sources of ionising radiation. (12 marks)
- c) Outline FOUR methods of radiation safety of hospital workers and the public (4 marks)

Question FIVE

- a) Outline FOUR types of Late effects of radiation (4 marks)
- b) Define the following terms as applied to biological waste.
 - i) Biohazard waste
 - ii) Infectious waste (2 marks)
- c) i) State any FOUR methods of minimizing the risk of electric shock in medical equipment
ii) With the aid of a labelled diagram, explain how a core balanced earth leakage circuit breaker operates (14 marks)