



Technical University of Mombasa

Faculty of Engineering and Technology
DEPARTMENT OF MEDICAL ENGINEERING

DIPLOMA IN MEDICAL ENGINEERING
(DME Y2 S2)

ECL 2203
CLINICAL SAFETY

END SEMESTER EXAMINATIONS

SERIES: DECEMBER, 2013
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- This paper consists of **FIVE** questions
 - Question **ONE** is **COMPULSORY**
 - Attempt any **TWO** questions.
- This paper consists of **3 PRINTED** pages

QUESTION ONE (COMPULSORY)

- (a) (i) The degree of protection against electric shock places medical equipment in three categories. State the **THREE** categories.
(ii) Explain the **THREE** medical equipment categories in a (i). **(9 marks)**
- (b) (i) Distinguish between capacitive and resistive leakage current
(ii) With the aid of a labeled diagram, explain how earth leakage circuit can be measured in electrical medical equipment stating the typical values. **(11 marks)**
- (c) (i) Differentiate between biosecurity and biosafety as used in clinical safety.
(ii) Distinguish between infectious waste and pathological waste as applied in clinical safety **(10 marks)**

QUESTION TWO

- (a) Distinguish between class I and class II electro-medical equipment **(4 marks)**
- (b) With the aid of a labeled diagram, explain how the following tests can be carried out on a class I medical equipment
(i) Protective earth continuity
(ii) Enclosure leakage circuit **(12 marks)**
- (c) Explain the term health-care waste. **(4 marks)**

QUESTION THREE

- (a) (i) Explain how preventive maintenance can reduce electrical hazards in medical equipment and systems.
(ii) Define electrical safety as applied to medical institutions. **(6 marks)**
- (b) (i) State any **FOUR** methods of minimizing the risk of electric shock in medical equipment
(ii) With the aid of a labeled diagram, explain how a core balanced earth leakage circuit protector operates. **(14 marks)**

QUESTION FOUR

- (a) State **FOUR** precautions to be taken to make medical equipment safe from earth leakage circuit
(4 marks)
- (b) Outline **FOUR** types of late effect radiation.
(8 marks)
- (c) (i) State any **THREE** properties of electromagnetic waves.
(ii) Explain the following terminologies of applied in x-ray.
(I) x - ray intensity
(II) Dose - rate
(8 marks)

QUESTION FIVE

- (a) Explain the following terminologies as applied to medical safety.
(i) Patient functional circuit
(ii) Type testing
(iii) Patient axially circuit.
(6 marks).
- (b) (i) State the properties a disinfectant should possess for safe use on human tissue.
(ii) Describe the causes of scatter radiation and their effects.
(iii) State the methods of minimizing the radiation in b (ii)
(14 marks)