



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
DEPARTMENT OF MEDICAL ENGINEERING

DIPLOMA IN MEDICAL ENGINEERING
(DME Y2 S2)

ECL 2202
CLINICAL SAFETY

SPECIAL/SUPPLEMENTARY EXAMINATIONS

SERIES: JULY, 2014

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- Question **ONE** is **COMPULSORY** questions
 - Attempt any other **TWO** questions
 - You are required to carry a scientific calculator for this paper
- This paper consists of **3 PRINTED** pages

QUESTION ONE (COMPULSORY)

(a) (i) Define the following terms as applied to biological waste.

(I) _____ Biohazard waste

(II) Contaminated waste

(III) Infectious waste

(IV) Biological safety cabinets

(ii) Explain the electrophysiology of ventricular fibrillation in patient monitoring options.

(10

marks)

(b) (i) Describe the various methods of protection against ionizing radiations in X-ray imaging applications.

(ii) Describe **FOUR** late effects of radiation exposure.

(12 marks)

Describe **FOUR** levels of risk group of an organism in biological safety.

(8 marks)

QUESTION TWO

(a) Explain any **FOUR** methods of minimizing the risk of electric shock in medical equipment.

(8

marks)

(b) With the aid of a diagram, describe how you can perform insulation test on a class I medical electrical equipment according to HEI95

(12 marks)

QUESTION THREE

(a) (i) Describe the causes of scatter radiation and their effects.

(ii) State the methods of minimizing the scatter radiation in a(i)

(8 marks)

(b) (i) Describe a method of testing for earth continuity after the installation is complete.

(ii) Differentiate between circuit-operated and voltage operated earth leakage circuit breaker.

(12 marks)

QUESTION FOUR

- (a) Explain the factors that will determine the choice of disposal system in planning and designing a hospital. **(8 marks)**
- (b) Explain the principle of operation for the following types of protection devices for patients connected machines.
- (i) Earth lead monitor type
 - (ii) Core balances. **(12 marks)**

QUESTION FIVE

- (a) Outline any **FOUR** design recommendation that ensures electrical safety within the hospitals. **(8 marks)**
- (b) (i) Distinguish between type BF and type CF in medical electrical equipment.
- (ii) Explain the major components of an incineration system. **(12 marks)**