



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) Name any TWO sources of clinical wastes in a region or country. (2 marks)
- (b) Describe the process incineration as used in waste management (2 marks)
- (c) Describe the following groups of clinical waste
 - i) group 1
 - ii) group 2 (6 marks)
- (d) Name TWO distinct categories of electromagnetic radiation (2 marks)
- (e) Explain the danger of ionising radiation (2 marks)
- (f) Describe the following natural sources of radiation
 - i) External Sources
 - ii) Internal Sources (6 marks)
- (g) Define the following terms as applied to electrical safety
 - i) Patient Leakage Current
 - ii) Functional Earth Terminal
 - iii) Applied Part
 - iv) Patient Auxiliary Current. (4 marks)
- (h) State the TWO factors contributing to leakage current (2 marks)
- (j) Explain the following types of electrical safety tests
 - i) Type tests

ii) routine tests (4 marks)

Question TWO

- (a) What is meant by Radiation Burn (2 marks)
- (b) i) Name the THREE most effective method of radiation protection
ii) Describe EACH of the method named in 2b(i) (12 marks)
- (c) Explain any THREE protection measures against radioactive material contamination. (6 marks)

Question THREE

- (a) i) What is meant by single fault condition as applied to electrical safety tests.
ii) Explain why single fault conditions are important in electrical safety testing
iii) Explain the precaution to be observed when carrying out single fault conditions. (8 marks)
- (b) With the aid of diagrams explain how measurement of insulation resistance is carried out for class II medical equipment, giving the allowable values. (12 marks)

Question FOUR

- (a) It is a basic biosafety principle that all contaminated materials be decontaminated prior to disposal. State any FIVE methods of decontamination. (5 marks)
- (b) Outline any FOUR advantages of incineration (4 marks)
- (c) List any THREE observations that prevent the spread of biological hazard in the hospital. (3 marks)
- (d) Describe TWO general requirements for packaging clinical waste (6 marks)
- (e) Explain the need for biological safety cabinets (2 marks)

Question FIVE

- (a) i) With the aid of a diagram explain the relationship between the level of perception and the let-go currents as a functions of frequency.
ii) Using the diagram in 5(a) explain why electrosurgical systems can be used on a patient without causing ventricular fibrillation. (12 marks)
- (b) Explain FOUR design features of a piece of equipment that ensure electrical safety within hospital (8 marks)