



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

JANUARY – APRIL 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF NATURAL SCIENCES (BIOLOGY)

REGULAR PROGRAMME

BIO 107: INTRODUCTION TO LABORATORY TECHNIQUES IN BIOLOGY

Date: April 2015	Duration: 2 Hours
Instructions: Answer Question ONE and any other TWO Questions.	

- Q1. a) By virtue of research being performed each laboratory is unique, the equipment in use and the physical utilization of space. Regardless of all these factors, teaching and research laboratories must adhere to basic safety policies.
- i) List and explain briefly the major laboratory safety guidelines. **(7 marks)**
 - ii) How does one identify potential hazards, under hazard awareness. **(3 marks)**
 - iii) Explain who is ultimately responsible for your safety in the laboratory. **(1 mark)**
 - iv) In case of a fire emergency the acronym RACE is used, explain what it represents. **(4 marks)**
 - v) List four personal protective equipment in a laboratory. **(2 marks)**
 - vi) How does one ensure their health and hygiene in the lab. **(3 marks)**
 - vii) List safety equipment found in the laboratory. **(2 marks)**
- b) i) List and explain the various microscopic techniques giving examples. **(4 marks)**
- ii) Give TWO examples of optical microscope and explain their principle. **(7 marks)**

- iii) Explain the difference between Darkfield and Bright field microscopy. **(1 mark)**
- iv) Give TWO examples of optical microscope and explain their principle. **(2 marks)**
- v) In electron microscopy TWO principles are exploited name them. **(1 mark)**
- Q2. Media, Sterilization and disinfectants.
- a) What is disinfection and sterilization. **(4 marks)**
- b) What are chemosterilants and give 3 examples. **(4 marks)**
- c) List the Basic requirement of culture media giving examples **(4 marks)**
- d) Describe the classification of culture media **(4 marks)**
- e) Explain the difference between simple and complex media giving examples. **(4 marks)**
- Q3. Sectioning and staining
- a) Define staining and explain difference between In Viro and In Vitro staining. **(5 marks)**
- b) Describe the gram staining technique and explain the meaning of positive and negative aspects of staining. **(5 marks)**
- c) List FIVE techniques of staining. **(5 marks)**
- d) List SIX common biological stains and explain the colour they elicit on intended target. **(6 marks)**
- Q4. Spectrophotometry and Centrifugation
- a) Draw a well labeled diagram of a spectrophotometer. **(5 marks)**
- b) Describe the principle of a spectrophotometer and state the Beer's law. **(5 marks)**
- c) Describe how a centrifuge works **(5 marks)**
- d) List the different types of centrifuge and state the main use of centrifuges. **(5 marks)**
- Q5. DNA typing techniques and their uses.
- a) Describe what is DNA and RNA and outline the major differences. **(4 marks)**
- b) Describe briefly the process of obtaining DNA. **(4 marks)**
- c) Briefly explain what a PCR is and its entire process. **(4 marks)**
- d) List and explain the different DNA typing techniques. **(4 marks)**
- f) Briefly explain the process of southern blotting. **(4 marks)**

END