



# THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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**MAIN EXAMINATION**

**SEPTEMBER –DECEMBER 2021**

**FACULTY OF SCIENCE**

**DEPARTMENT OF BIOLOGY**

**REGULAR PROGRAMME**

**BIO 107: INTRODUCTORY TO BIOLOGY TECHNIQUES**

**Date: DECEMBER 2021**

**Duration: 2 Hours**

**INSTRUCTIONS: Answer Question ONE and any TWO Questions**

- Q1. a) Gas chromatography is ideal for detecting drug abuse at Olympics; explain the **three** key components it has **(6 marks)**
- b) When identifying a herbarium to carry out research on plant identification, state **four** factors you are likely to consider to achieve this objective **(4 marks)**
- c) Describe the three types of fixatives that are used in tissue preparation process **(6 marks)**
- d) John sterilized mackonkey agar using an autoclave, describe the principle behind the process and methods he used to determine complete sterilization **(10 marks)**
- e) Differentiate a document from a record **(1 mark)**
- f) i) Define a calibrant/standard
- ii) What type of reagent would you select as a standard, explain your choice **(3 marks)**

Q2.a) You are required to assemble electrophoresis apparatus during RNA isolation. Explain the importance of all the components you have assembled **(12 marks)**

b) Describe four different types of light microscopes and explain under which circumstances each is used. **(8 marks)**

Q3. Calculate the following volumes and concentration of reagents as used in most clinical laboratories

- i) Calculate the dilution of urine using 0.5 ml of urine and 8.5 ml of diluting fluid (physiological saline): Total volume of urine and diluting fluid:
- ii) To convert a 4% w/v sodium hydroxide (NaOH) solution into a mol/l solution
- iii) To convert 0.1 N (N/10) hydrochloric acid (HCl) into a mol/l solution
- iv) To make 1 litre of sodium chloride (NaCl), 1 **mol/l** **(20 marks)**

Q4. a) What is a scientific investigation; describe key steps on how to report a scientific investigation **(10 marks)**

b) Describe five types of chemical disinfectants used in the laboratory **(10marks)**

Q5. The following equipment's were purchased for biology laboratory teaching and research facility at CUEA.

- i) Spectrophotometer
- ii) Biosafety cabinet level III
- iii) Thermo cycler
- iv) Microtomes
- v) Flow cytometer

Which assays/tasks will they be used to perform, explain principle of each function and operation, and how they will be taken care of and maintained

**(20 marks)**

**\*END\***