KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE BIOLOGY, EDUCATION, ENVIRONMENTAL
SECOND SEMESTER 2022/2023
[JANUARY-APRIL, 2023]

BIOC 122/BFBT 113: LABORATORY BIOTECHNIQUES I

STREAM: Y1S2 **TIME: 2 HOURS**

DAY: MONDAY, 12:00 – 2:00 PM **DATE: 03/04/2023**

INSTRUCTIONS

1. **Do not write anything on this question paper.**
2. ***Answer question ONE and any other TWO questions.***

SECTION A 30 MARKS (ANSWER ALL QUESTIONS)

Question 1

a) Explain why it is important to fix a specimen before viewing it under a light microscope. (1 mark)

b) Why is it important to dehydrate cells before examining them under an electron microscope? (1 mark)

c) Name the device that is used to create thin sections of specimens for electron microscopy. (1 mark)

d) What colour are gram-positive and gram-negative cells, respectively, after the Gram stain procedure? (2 marks)

e) Differentiate between simple and differential staining. (2 marks)

Question 2

Sate two applications of each of the following types of compound light microscopes

a) Phase contrast (2 marks)

b) Dark field (2 marks)

c) Fluorescence (2 marks)

Question 3

a) Explain four factors to consider when choosing a buffer for a particular biological reaction or biological sites. (3 marks)

b) State the importance of buffers in pharmaceuticals industries (3 marks)

Question 4

State three uses of High-pressure liquid chromatography (HPLC) (3 marks)

Question 5

State the importance of having accurate pH control (3 marks)

Question 6

State three principles of safe storage of chemicals in laboratories (3 marks)

Question 7

a) State four types of radiations which Geiger-Muller counter does not detect. (4 marks)

b) Name any four types of Scintillation Counter commonly used (4 marks)

Question 8

Outline the sequential steps followed when performing in vivo autoradiography (4 marks)

SECTION B: (ANSWER ANY TWO QUESTIONS)

Question 8

Discuss in details chemical storage under the following subheadings

a. Principles of safe storage (9 marks)

b. Storage facilities (6 marks)

Question 9

a. Describe the steps involved in preparation of specimens for Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM). (8 marks)

b. Describe the mechanism of SEM. (7 marks)

Question 10

Explain in details various steps conducted during DNA electrophoresis. (15 marks)