



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY
SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE
IN MICROBIOLOGY
FIRST YEAR FIRST SEMESTER 2018/2019 ACADEMIC YEAR
MAIN CAMPUS - REGULAR

COURSE CODE:	SBT 801
COURSE TITLE:	EXPERIMENTAL TECHNIQUES AND METHODOLOGIES
EXAM VENUE:	STREAM: (MSC)
DATE:	EXAM SESSION:
TIME: 2 HOURS	

Instructions:

- 1. Answer ALL questions in Section A and Any two questions in Section B**
 - 2. Candidates are advised not to write on question paper**
 - 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**
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QUESTION ONE (Compulsory) (30 MARKS)

- a) Distinguish between absolute and differential calibration (2 marks).
- b) Explain the need for regular “matching” of IRGAS during measurements (1 mark)
- c) Explain the following components of a PCR reaction
- (i) Denaturation (3 Marks)
 - (ii) Annealing (3 Marks)
 - (iii) Extension (3 Marks)
- a) Which enzyme can make a DNA copy using an RNA template? State its advantage to the microorganisms in which it occurs (3 Marks)
- b) Explain the disadvantages of agarose gels in DNA quantification (3 Marks)
- c) Outline important considerations when designing a microbiology laboratory (3 Marks)
- d) Explain three possible sources of contamination in a microbiology laboratory (3 Marks)
- e) What are the advantages of using Class II laboratory safety cabinets in microbiological research? (3 Marks)
- f) Distinguish between transmission and scanning electron microscopes (3 marks)

QUESTION TWO (15 MARKS)

- a) Discuss five methods of sterilization of media and equipment in a microbiology laboratory (7 Marks)
- b) Outline the procedure for using a named differential stain for microscopy (8 Marks)

QUESTION THREE (15 MARKS)

Infra-Red Gas Analysis (IRGA) is a technique used to analyze concentrations of CO₂ and H₂O in a volume of air. Explain the principle behind the success of the technique and how the technique can be applied in soil microbiology research.

QUESTION FOUR (15 MARKS)

- a) Discuss the principle behind rt-PCR technique in detecting and measuring DNA concentration (8 marks)
- b) Discuss spectrophotometry techniques used in determining the concentration and purity DNA (7 marks)

QUESTION FIVE (15 MARKS)

- a) Explain key precautions that need to be taken into consideration before deciding on an appropriate location for the installation of a weather station. (7 marks)
- b) Discuss key weather variables measured by an automatic climate station and how they apply to the general microbiology research. (8 marks)