

**BIOENERGY**  
22WSD536

Semester 1 2022

In-Person Exam paper

This examination is to take place in-person at a central University venue under exam conditions. The standard length of time for this paper is **1.5 hours**.

You will not be able to leave the exam hall for the first 30 or final 15 minutes of your exam. Your invigilator will collect your exam paper when you have finished.

Help during the exam

Invigilators are not able to answer queries about the content of your exam paper. Instead, please make a note of your query in your answer script to be considered during the marking process.

If you feel unwell, please raise your hand so that an invigilator can assist you.

You may use a calculator for this exam. It must comply with the University's Calculator Policy for In-Person exams, in particular that it must not be able to transmit or receive information (e.g. mobile devices and smart watches are **not** allowed).

**BIOENERGY**  
(22WSD536)

January 2023

1.5 Hours

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Answer **ALL THREE** questions.

All questions carry equal marks.

Use a **SEPARATE** answer book for **EACH** question.

Any University-approved calculator is permitted.

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1. Critically assess the role of bioenergy for industrial use in Sub-Saharan Africa. [20 marks]
  
2. Produce a diagram of the 4 stages involved in the conversion of organic wastes into biogas, identify the rate limiting steps. [8 marks]  
  
Evaluate the advantages of anaerobic digestion compared against aerobic treatment of effluents. [8 marks]  
  
Why is Ripley's Ratio a good measure for biogas reactor stability? [4 marks]
  
3. Describe methods for the production of lignocellulosic ethanol and assess the technological challenges faced in improving the efficiency of the processes. [20 marks]

**R. Blanchard**