

## G634: Applications of Biotechnology – Sample Assignment C

<b>Unit Name:</b> Applications of Biotechnology	<b>Unit Number:</b> G634
<b>Assignment Title:</b> Enzyme Technology	<b>Assignment Number:</b> G634 Sample Assignment C
<b>Date Set:</b>	<b>Due Date:</b>
<b>Assessment Objective(s):</b> AO3(a), (b), (c) & (d)	

### Assignment Brief:

Enzymes are increasingly being used commercially as industrial catalysts. Laboratory research into their effect is important to commercial manufacturers. Your task is to plan and carry out a practical investigation into enzyme technology involving the construction of a simple bioreactor and its use in assessing the effect of temperature on an enzyme-controlled process.

### Assignment:

You will produce a report on the practical investigation of the effect of temperature on a specified, immobilised enzyme, in a bioreactor of your own design and construction. Your report should include the outcomes of Tasks 1 – 4.

**[ Max marks possible for this assignment: 26 ]**

### Task 1:

AO3(a)

This task involves the production of:

- a plan for the investigation
- a risk assessment
- a design and the construction of a simple bioreactor
- an immobilised enzyme for use in the bioreactor.

**[ Max marks possible for this task: 5 ]**

**Task 2:**

AO3(b)

In this task you are expected to generate data on the effect of temperature on the rate of reaction in the bioreactor and to do so:

- carry out measurements
- use a range of techniques and equipment.

**In order to gain the higher marks check that:**

- measurements are repeated where appropriate
- you have explained the use of the different techniques
- work is to an appropriate degree of accuracy.

**[ Max marks possible for this task: 5 ]**

**Task 3:**

AO3(c)

In this task you will:

- record relevant observations and precise measurements of the effect of temperature on the performance of the bioreactor
- display the data using tables and simple graphs
- include some simple calculations on rates of reaction
- use a variety of display methods
- select the display method(s) that best illustrates the trends in the data
- collect sufficient data to complete simple statistics on the results.

**In order to gain the higher marks check:**

- there is evidence of independent work
- work is detailed and recorded to the appropriate precision
- the results are displayed accurately in a range of ways
- processing is accurate and detailed
- sufficient data is collected to show trends.

**[ Max marks possible for this task: 9 ]**

**Task 4:**

AO3(d)

In this task you will:

- interpret the results in terms of how enzymes work and the effect of immobilisation
- consider the advantages of using bioreactors and immobilised enzymes
- use secondary sources to support your findings
- draw conclusions
- specify named examples in either medicine or industry
- discuss the advantage of enzyme technology to industry.

**In order to gain the higher marks check that:**

- results are interpreted and supported by secondary sources
- information on the advantages of using bioreactors and enzyme immobilisation
- conclusions need to be related to the use of bioreactors and enzyme immobilisation
- work is supported with examples in either medicine or industry
- evidence that the significance of the outcomes of the experimental work evaluations are detailed and at a high level.

**[ Max marks possible for this task: 7 ]**

**Task 5:**

If you have collected sufficient data from your investigation you can use it for AO2 (b).

Include in your report evidence to show the completion of a range of calculations both simple and complex, accurately completed with answers recorded using the correct number of significant figures.

**In order to gain the higher marks check that:**

- you have worked independently and your calculation work is complex and correct.

**[ Max marks possible for this task: 3 ]**