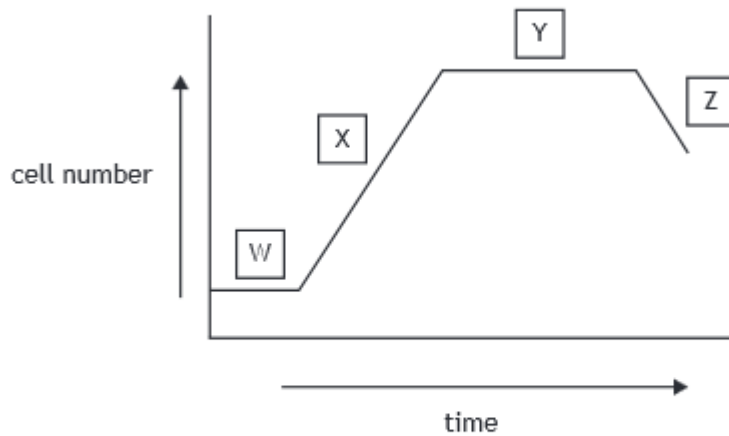


Environmental Control of Metabolism

6. A growth curve in a culture of bacteria is shown in the diagram.



- (a) In culturing bacteria it is important to control the culture conditions in the growth medium.

Name one condition which should be controlled.

1

- (b) (i) Name the phase in which secondary metabolites such as antibiotics are produced.

2

Describe the ecological advantage of this to bacteria in the wild.

Phase _____

Advantage _____

- (ii) State the letter which indicates a region of the graph in which most enzymes are being induced to metabolise the available substrate.

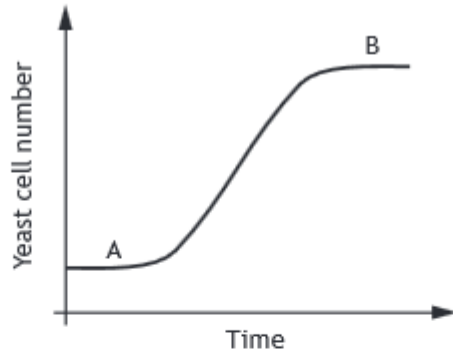
1

Letter _____

- (iii) State one reason for the decrease in number of cells at phase Z.

1

(b) Some phases of a growth curve of yeast culture are shown.



Complete the table by selecting growth phase A or B. Name the chosen phase and describe an event which occurs during that phase of growth.

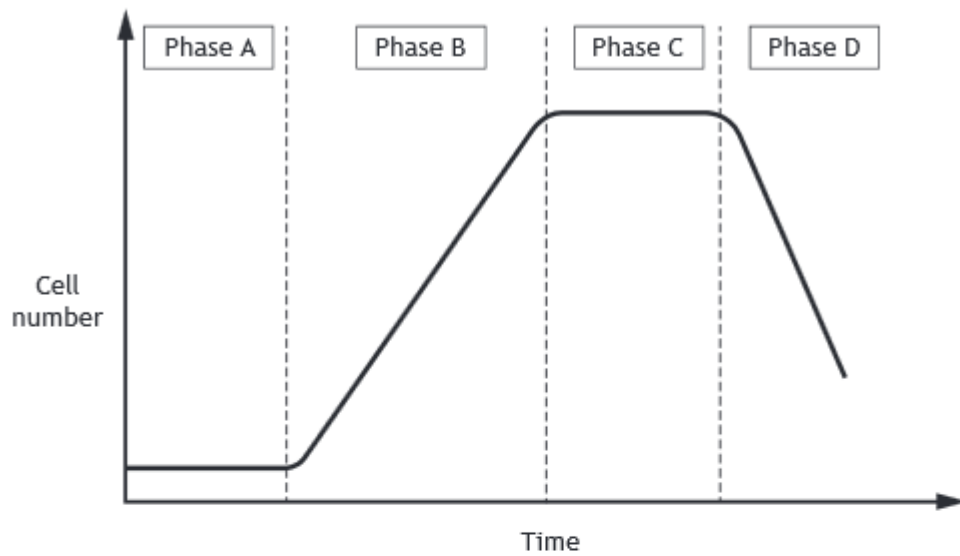
2

<i>Letter</i>	<i>Phase of growth</i>	<i>Description</i>

(c) Describe a safety mechanism used to prevent the survival of genetically modified microorganisms in the external environment.

1

6. The antibiotic bacitracin is produced by the bacterial species *B.subtilis*.
The graph below shows the growth curve of a population of *B.subtilis* cultured to produce the antibiotic.



- (a) Name Phase A and explain why cells do not divide during this phase. 2

Name _____

Explanation _____

- (b) (i) Name the phase in which the bacteria produce the secondary metabolite bacitracin. 1

- (ii) Explain why this secondary metabolite gives an ecological advantage to *B.subtilis*. 1

- (c) This growth curve shows viable cell numbers of *B.subtilis*.
Give evidence from the graph to justify this statement. 1
