Respiration (aerobic, anaerobic)

Q1. (2019)

A)

04.4	to allow air / oxygen in for bacteria to respire **or** so bacteria can respire aerobically	allow to allow carbon dioxide produced in respiration to escape	1	AO3 4.4.2.1

B)

04.5	(A) (no change in population size) because no / limited cell division / reproduction	allow (no change in population size) because bacteria / cells adjusting to environment / culture conditions ignore reference to growth unqualified	1	AO2 4.1.2.2 4.3.1.1 4.4.2.1 4.4.2.3
	(B) (rapid increase in population size) as cells dividing rapidly as (plentiful) supply of nutrients / food	allow rapid binary fission as (plentiful) supply of nutrients / food	1	
	(C) (population size stays the same) as rate of cell death equals rate of cell division		1	
	(D) (population size decreasing) as cells dying due to nutrients running out **or** (population size decreasing) as cells dying due to toxins / carbon dioxide / cell wastes building up (in solution)		1	

Q2. (2021)

03.1	releases energy (to the surroundings)	allow transfers (thermal) energy to the surroundings ignore transfers energy unqualified	1	AO1 4.4.2.1

Q3. (2021)

A)

03.2	to keep oxygen out	allow to keep air out allow (because) fermentation is an anaerobic reaction allow to prevent aerobic respiration	1	AO3 4.4.2.1

B)

03.3	to allow the mixture / yeast / cells to reach the temperature	allow to reach 2 °C allow so yeast can equilibrate allow idea that contraction of gas (on cooling) would hinder results collection	1	AO3 4.4.2.1

C)

03.4	(2 °C is) too cold for enzymes / yeast to work	allow (at 2 °C) few / no collisions (between sugar and enzymes)	1	AO2 4.2.2.1 4.4.2.1
	(so) no carbon dioxide / gas produced **or** (so) fermentation did not occur **or** fermentation was very slow	do **not** accept an incorrect gas	1	
	enzymes become active at 35 °C so carbon dioxide / gas was produced	allow at 35 °C the enzymes started to work so carbon dioxide / gas was produced	1	

D)

03.5	ideal / suitable temperature for enzymes / yeast to work		1	AO1
	(so) carbon dioxide / gas produced (rapidly)	do **not** accept an incorrect gas	1	AO2
	(after time / ≥ 15 minutes) rate / fermentation slowed	allow (after time / ≥ 15 minutes) less gas produced per minute	1	AO2
	(because) sugar / glucose / food began to run out **or** (because) increased concentration of ethanol / alcohol started to kill the cells		1	AO2 4.2.2.1 4.4.2.1