

# Culturing Microorganisms 2 MS

## QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	heat at 120oC for 30 minutes		1
b)	no bacteria near the mould or nothing grows near Penicillium or gap between bacteria and Penicillium or bacteria gone / killed / destroyed near Penicillium		1
c)i)	valid / reliable / representative	not 'accurate' ignore 'fair'	1
c)ii)	6		1
c)iii)	2		1
c)iv)	48 to 60		1
d)	any two from: ✗ temperature / heat / suitable temperature range eg 25–40°C ✗ pressure ✗ (concentration of) oxygen ✗ food / nutrients ✗ ions / correct eg / NH <sub>3</sub> / NH <sub>4</sub> <sup>+</sup> / nutrients ✗ wastes / named wastes eg. Carbon dioxide / lactic acid	do not allow keep cool  ignore water / nutrient agar allow nutrients only once	2
Total marks			8

## QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any one suitable product: eg <ul style="list-style-type: none"> <li>• penicillin / antibiotic / other named antibiotic</li> <li>• mycoprotein / described / quorn</li> <li>• lactic acid / yoghurt</li> <li>• enzymes</li> <li>• ethanol / alcohol / beer / wine</li> <li>• hormones / insulin / GH / somatotrophin</li> <li>• blood-clotting protein / factor VIII</li> <li>• methane / biogas</li> <li>• vaccines</li> </ul>		1

b)i)	otherwise too many colonies to count or too many bacteria to count or make it easier to count		1
b)ii)	a colony is many bacteria or cannot see one bacterium each bacterium produces one colony		1 1
c)	correct answer: 8 800 000 /8.8 million / $8.8 \times 10^6$	correct answer gains 2 marks with or without 1st two lines if answer incorrect, 1 error in calculation eg 88 000 / 880 000 gains 1 mark or allow error carried forward from incorrect 1st line for 1 mark	2
d)i)	on graph: line starts at x and decreases downward sloping s - shaped curve not reaching zero before 30 hours		1 1
d)ii)	(graph A) rises: because glucose is used for reproduction / growth / cell division / multiplication (graph A) falls: less / no glucose available or glucose is limiting causes some bacteria to die		1 1 1
d)iii)	method B counts living and dead bacteria / includes dead bacteria		1
Total marks			12



b)i)	to kill (unwanted) bacteria / microorganisms /microbes	allow fungi ignore viruses / germs	1
b)ii)	Using a flame		1
b)iii)	any one from: <ul style="list-style-type: none"> <li>• so bacteria / microorganisms / microbes / pathogens / fungi (growing in dish) do not get out</li> <li>• so bacteria / microorganisms / microbes / pathogens / fungi (from the air) do not get in</li> </ul>	ignore reference to gases ignore viruses / germs  ignore viruses / germs	1
c)	25 °C		1
Total marks			6