

Question		Answer	Marks	AOs	Guidance	
9	(a)	$\log_{10} N = \log_{10} A + kt \log_{10} 2$ Equation above is of the form $y = mx + c$ [with $\log_{10} N$ as y and t as x] Gradient = $k \log_{10} 2$ Intercept = $\log_{10} A$	M1 E1 A1 A1 [4]	1.1 1.2 2.2a 2.2a		
9	(b)	$k \log_{10} 2 = 0.2 \Rightarrow k = 0.66[438\dots]$ $\log_{10} A = 2 \Rightarrow A = 100$	B1 B1 [2]	1.1 1.1		
9	(c)	$N = 100 \times 2^{0.66\dots \times 24} = 6\,300\,000$ FT their A, k	B1 [1]	3.4	Answer in range 5 860 000 to 6 400 000	
9	(d)	E.g. the piece of bread may not be sufficient to support the number of bacteria	E1 [1]	3.5b	OR bacterial growth may obey different rules for large values of t	