Question	Scheme	Marks	AOs
11(a)	$339 = ab^{20},\ 414 = ab^{60} \Rightarrow \dfrac{414}{339} = b^{40} \Rightarrow b = \sqrt[40]{\dfrac{414}{339}}$	M1	3.1a
	$b = 1.005$	A1	1.1b
	$339 = ab^{20} \Rightarrow a = \dfrac{339}{b^{20}}$ or $414 = ab^{60} \Rightarrow a = \dfrac{414}{b^{60}}$	M1	1.1b
	$a = 307$	A1	1.1b
		(4)	
(b)(i)	a is the concentration in 1960	B1	3.4
(b)(ii)	b is the factor by which the concentration increases each year	B1	3.4
		(2)	
(c)	$450 = 307 \times 1.005^t \Rightarrow 1.005^t = \dfrac{450}{307}$	M1	3.4
	$1.005^t = \dfrac{450}{307} \Rightarrow t = \log_{1.005}\dfrac{450}{307}$ or $\dfrac{\ln \frac{450}{307}}{\ln 1.005}$	M1	1.1b
	$t = 76.67...$	A1	1.1b
	2036 or 2037	A1	3.2a
		(4)	
			(10 marks)

Notes

(a)
M1: Forms 2 equations in a and b and solves to obtain a value for b.
A1: $b = 1.005$
M1: Uses either equation and their value for b to find a value for a
A1: $a = 307$
(b)(i)
B1: Correct interpretation for the constant a
(b)(ii)
B1: Correct interpretation for the constant b
(c)
M1: Uses their values of a and b and the 450 in the equation for the model and reaches an equation of the form "1.005"$^t = k$
M1: For using correct log work to obtain a value for t
A1: For awrt 76.7
A1: Interprets the value of t correctly and states the year 2036 or 2037, following correct work