Question			Answer	Marks	AOs	Guidance	
6	**(i)**		$(a =)75$	**B1**	**3.3**		
				[1]			
	(ii)		25 is the value that T approaches after a long time				
			So therefore it is the ambient temperature	**B1**	**2.2a**	oe e.g. room temperature, minimum, lowest, etc.	Not e.g. initial, etc.
				[1]			
	(iii)		$-ak\mathrm{e}^{-kt}$	**B1**	**3.1a**	Correct rate of change of T	
			$-ak = -15$	**M1**	**3.4**	Substitute $t = 0$ into their rate of change and equate with $+/-15$	
			$k = \dfrac{1}{5}$	**A1ft**	**1.1**	oe FT their $\dfrac{15}{a}$	
				[3]			
	(iv)		$45 = 25 + 75\mathrm{e}^{-\frac{1}{5}t} \Rightarrow 75\mathrm{e}^{-\frac{1}{5}t} = 20$	**M1**	**1.1**	Substitute $T = 45$ and subtract 25 from both sides	Their a and k
			(eg) $-\dfrac{1}{5}t = \ln\left(\dfrac{4}{15}\right) \Rightarrow t = ...$	**M1**	**1.1**	Take logs correctly and attempt to solve for t	
			After 6.6 mins	**A1**	**3.2a**	Cao (no FT on this mark) with units	6.6087792…
				[3]			
	(v)		Decrease the value of a	**B1**	**3.5c**	Ignore mention of changes to k and/or 25	
				[1]			