

11	(a)	$A = 11$  Substitution of $t = 3$ and $V = 13.8$  $B = 7.0$	<b>B1</b>  <b>M1</b>  <b>A1</b>  <b>[3]</b>	<b>1.1</b>  <b>3.3</b>  <b>1.1</b>	from $t = 0$ and $V = 11$  $13.8 = A + B(1 - e^{-0.17 \times 3})$  Allow 7, 7.01, 7.009, etc	Implied by 7.0086
11	(b)	$t = 4$ and $V = 14.453681053\dots$ to 1 or more dp good fit  $t = 5$ and $V = 15.008095476\dots$ to 1 or more dp good fit	<b>B1</b>  <b>B1</b> <b>[2]</b>	<b>3.4</b>  <b>1.1</b>	allow <b>SC1</b> for two correct values with no comment or incorrect comment(s)  If B0B0, allow sc M1 for subst with their values.	Allow full marks if more accurate value of $B$ used – 14.458 and 15.013
11	(c)	$\frac{dV}{dt} = \text{their } 7.0 \times 0.17 e^{-0.85}$  $0.509 \text{ ms}^{-2}$	<b>M1</b>  <b>A1</b> <b>[2]</b>	<b>3.1a</b>  <b>1.1</b>	Allow for their $7.0 \times 0.17 e^{-0.17t}$ ; condone use of 7.0086 for $B$	

Question		Answer	Marks	AOs	Guidance
11	(d)	$t \rightarrow \infty, \quad V \rightarrow 11 + 7 \text{ oe}$ their $18 \times 3.6$ $64.8 > 60$ so the motorist is fined	<b>M1</b> <b>M1</b> <b>A1</b> <b>[3]</b>	<b>3.3</b> <b>1.1</b> <b>3.5a</b>	Allow ft from (a) for M1M1 Allow for any attempt to change to km/hr, accept use of ‘their 18’ Need to show $64.8 > 60$ for full marks