Question Number	Answer		Mark
19(a)	The car (body) is driven/forced into oscillation at its natural frequency **Or** The driving/forcing frequency is the same as the natural frequency of the car (body) **Or** the driving/forcing frequency from the road is the same as the natural frequency (of the car body)	**(1)**	
	There is a maximum transfer of energy (to the car body)	**(1)**	**2**
	[Accept "similar" or "close to" for "the same as" in MP1] [If neither MP is met, MAX 1 mark for a general statement such as " the driving frequency is equal to the natural frequency"]		
19(b)	Use of $F = mg$	**(1)**	
	Use of $\Delta F = (-)k\Delta x$	**(1)**	
	Use of $T = 2\pi\sqrt{\frac{m}{k}}$ [Allow use of $\omega = \sqrt{\frac{k}{m}}$ **and** $T = \frac{2\pi}{\omega}$]	**(1)**	
	Use of $s = ut$	**(1)**	
	$u = 17$ m s^{-1}	**(1)**	**5**
	Example of calculation $k = \frac{65\text{ kg} \times 9.81\text{ N kg}^{-1}}{2.5 \times 10^{-2}\text{ m}} = 2.55 \times 10^{4}\text{ N m}^{-1}$ $T = 2\pi \times \sqrt{\frac{1365\text{ kg}}{2.55 \times 10^{4}\text{ N m}^{-1}}} = 1.45\text{ s}$ $u = \frac{25\text{ m}}{1.45\text{ s}} = 17.2\text{ m s}^{-1}$		
19(c)	(Kinetic) energy is transferred from the car	**(1)**	
	Or (Kinetic energy transferred to the suspension/dampers [Accept "removed" for "transferred"] [Accept reference to "oscillating system"]	**(1)**	**2**
	The energy is dissipated to the surroundings [so the vibration energy decreases]		
	Total for question 19		**9**