Question Number	Answer		Mark
18(a)	The constant maximum velocity reached by an object falling (through a fluid)	(1)	
	When the resultant force equals zero **Or** when the drag plus the upthrust equals the weight	(1)	2
18(b)	Use of $V = 4\pi r^3 / 3$	(1)	
	Use of upthrust U = weight of fluid displaced W	(1)	
	Use of $\rho = m / V$ and $W_S = mg$	(1)	
	Use of $D = W - U$	(1)	
	$D = 0.24$ (N)	(1)	5
	Example of calculation $V = \frac{4}{3}\pi \times (0.0175 \text{ m})^3 = 2.24 \times 10^{-5} \text{ m}^3$ $U = 2.24 \times 10^{-5} \text{ m}^3 \times 1.43 \times 10^3 \text{ kg m}^{-3} \times 9.81 \text{ N kg}^{-1} = 0.314 \text{ N}$ $W = 2.24 \times 10^{-5} \text{ m}^3 \times 2.52 \times 10^3 \text{ kg m}^{-3} \times 9.81 \text{ N kg}^{-1} = 0.554 \text{ N}$ $D = 0.554 \text{ N} - 0.314 \text{ N} = 0.240 \text{ N}$ $D = W - U = (2.52 - 1.43) \times 10^3 \text{ kg m}^{-3} \times 9.81 \text{ N kg}^{-1} \times \frac{4}{3}\pi \times (0.0175 \text{ m})^3 = 0.24 \text{ N}$		
18(c)(i)	All data points are close to the straight line through origin **Or** Best fit straight line goes through origin	(1)	
	This consistent with Stokes' Law.	(1)	
	Stokes' Law implies laminar flow (for the spheres).	(1)	3
18(c)(ii)	Determines gradient of graph	(1)	
	Uses large triangle.	(1)	
	$k = 5.8$ to 6.2 m^{-1}s^{-1}	(1)	3
18(c)(iii)	Use of $k = \dfrac{(\rho_g - \rho_s)g}{18\eta}$	(1)	
	$\eta = 99$ Pa s (allow ecf from (c)(ii))	(1)	2
	Example of calculation $\eta = \dfrac{(\rho_g - \rho_s)g}{18k} = \dfrac{(2.52 - 1.43) \times 10^3 \text{ kg m}^{-3} \times 9.81 \text{N kg}^{-1}}{18 \times 6 \text{ m}^{-1}\text{s}^{-1}}$ $= 99.0 \text{ Pa s}$		
	Total for question 18		15