Question Number	Answer	Mark
18(a)	Small spherical object **Or** Spherical object moving at low speed **(1)** Laminar flow [allow non-turbulent flow] **(1)**	**2**
18(b)(i)	**Max 3** Initially the velocity is zero so gradient is zero **(1)** As velocity increases the gradient changes **(1)** As velocity increases, drag increases **(1)** Until terminal / constant velocity when the gradient becomes constant. **(1)** [If no other mark scored, allow 1 mark for velocity increases until terminal velocity is reached.]	**3**
18(b)(ii)	Determines radius of ball bearing **(1)** Determines gradient **(1)** Use of $F = 6\pi\eta rv$ **(1)** $\eta = 0.046$ (Pa s) [allow a range from 0.044 (Pa s) to 0.048 (Pa s)] **(1)** <u>Example calculation</u> Radius = $\frac{1.6\times10^{-3}\text{ m}}{2} = 8\times10^{-4}\text{ m}$ Gradient = $\frac{11.5}{1.15-0.60} = \quad 20.9$ $v = 0.209\text{ m s}^{-1}$ $\eta = \frac{1.45\times10^{-4}\text{ N}}{6\pi\times8\times10^{-4}\text{ m}\times0.209\text{ m s}^{-1}} = 0.0460\text{ Pa s}$	**4**
18(b)(iii)	At higher temperature the viscosity will be less **(1)** $F = 6\pi\eta rv$ **and** r is constant **(1)** Drag force is less (at a given speed) **Or** Drag force (at terminal velocity) is unchanged **(1)** <u>Terminal</u> velocity is greater (and ball-bearing takes less time to fall) **(1)**	**4**
	Total for question 18	**13**