12 Stokes' law can be used to determine the magnitude of the viscous drag for small, spherical objects moving through a fluid.

(a) State one other condition that must be met in order for Stokes' law to apply to the moving object.

(1)

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(b) A sphere falls through water at a constant speed of $0.50\,m\,s^{-1}$.

Assess whether Stokes' law can be applied to the falling sphere.

You should include calculations in your answer.

diameter of ball bearing = 6.0×10^{-3} m
mass of steel ball bearing = 9.1×10^{-4} kg
upthrust on ball bearing = 1.1×10^{-3} N
viscosity of water = 8.9×10^{-4} Pa s

(5)

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(Total for Question 12 = 6 marks)