1 **(a)** State what is meant by a vector quantity.

.....

..... [1]

(b) A sphere falls vertically through a liquid that has density 830 kg m^{-3}. The sphere has radius r and constant velocity v, as shown in Fig. 1.1.

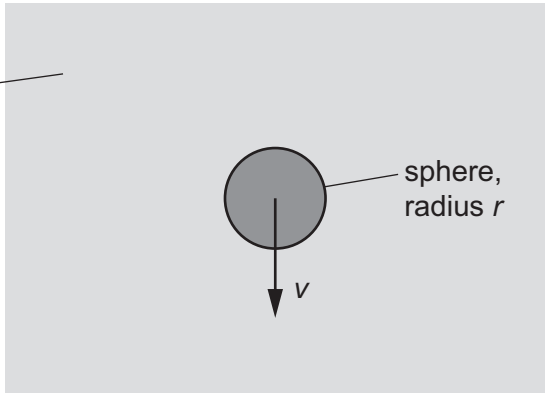

Fig. 1.1

(i) The drag force D acting on the sphere is given by

$$D = 6\pi r\eta v$$

where η is a property of the liquid.

Determine the SI base units of η.

SI base units ..... [3]

(ii) State an equation showing the relationship between the magnitudes of the weight W, drag force D and upthrust U acting on the sphere.

..... [1]

(iii) The volume of the sphere is 4.6 cm^3. The drag force D is 0.32 N.

Calculate the weight of the sphere.

weight = ... N [2]

[Total: 7]