

- 1 (a) The Young modulus of the metal of a wire is 1.8×10^{11} Pa. The wire is extended and the strain produced is 8.2×10^{-4} . Calculate the stress in GPa.

stress =GPa [2]

- (b) An electromagnetic wave has frequency 12THz.

- (i) Calculate the wavelength in μm .

wavelength = μm [2]

- (ii) State the name of the region of the electromagnetic spectrum for this frequency.

.....[1]

- (c) An object B is on a horizontal surface. Two forces act on B in this horizontal plane. A vector diagram for these forces is shown to scale in Fig. 1.1.

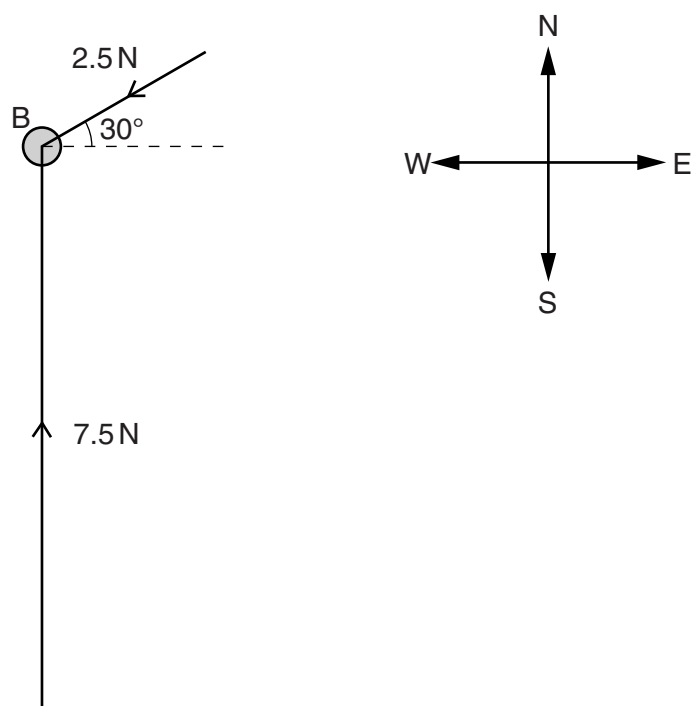


Fig. 1.1

A force of 7.5 N towards north and a force of 2.5 N from 30° north of east act on B.
The mass of B is 750 g.

- (i) On Fig. 1.1, draw an arrow to show the approximate direction of the resultant of these two forces. [1]

- (ii) 1. Show that the magnitude of the resultant force on B is 6.6 N.

[1]

2. Calculate the magnitude of the acceleration of B produced by this resultant force.

magnitude = ms^{-2} [2]

- (iii) Determine the angle between the direction of the acceleration and the direction of the 7.5 N force.

angle = ° [1]