1 **(a)** Explain the differences between the quantities *distance* and *displacement.*

.....

.....

.....[2]

(b) State Newton's first law.

.....

.....

.....[1]

(c) Two tugs pull a tanker at constant velocity in the direction XY, as represented in Fig. 1.1.

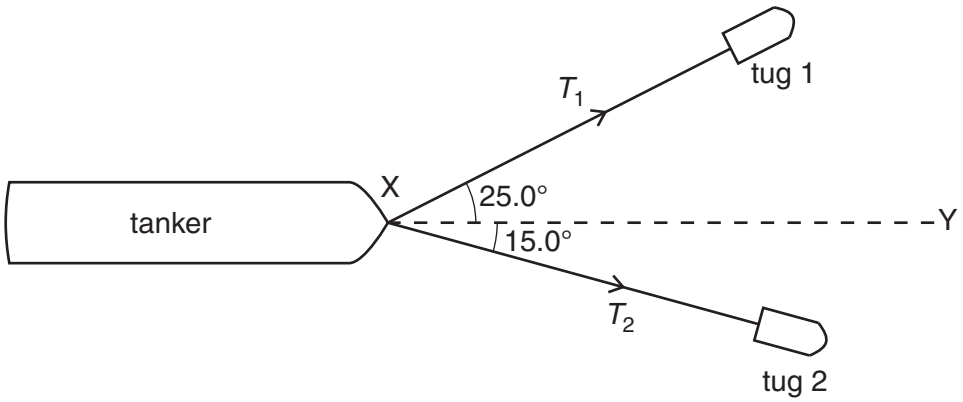

Fig. 1.1

Tug 1 pulls the tanker with a force T_1 at 25.0° to XY. Tug 2 pulls the tanker with a force of T_2 at 15.0° to XY. The resultant force R due to the two tugs is 25.0×10^3 N in the direction XY.

(i) By reference to the forces acting on the tanker, explain how the tanker may be described as being in equilibrium.

.....

.....

.....

.....[2]

(ii) **1.** Complete Fig. 1.2 to draw a vector triangle for the forces R, T_1 and T_2. [2]

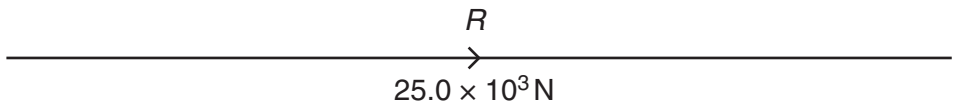

Fig. 1.2

2. your vector triangle in Fig. 1.2 to determine the magnitude of T_1 and of T_2.

T_1 = ... N

T_2 = ... N
[2]