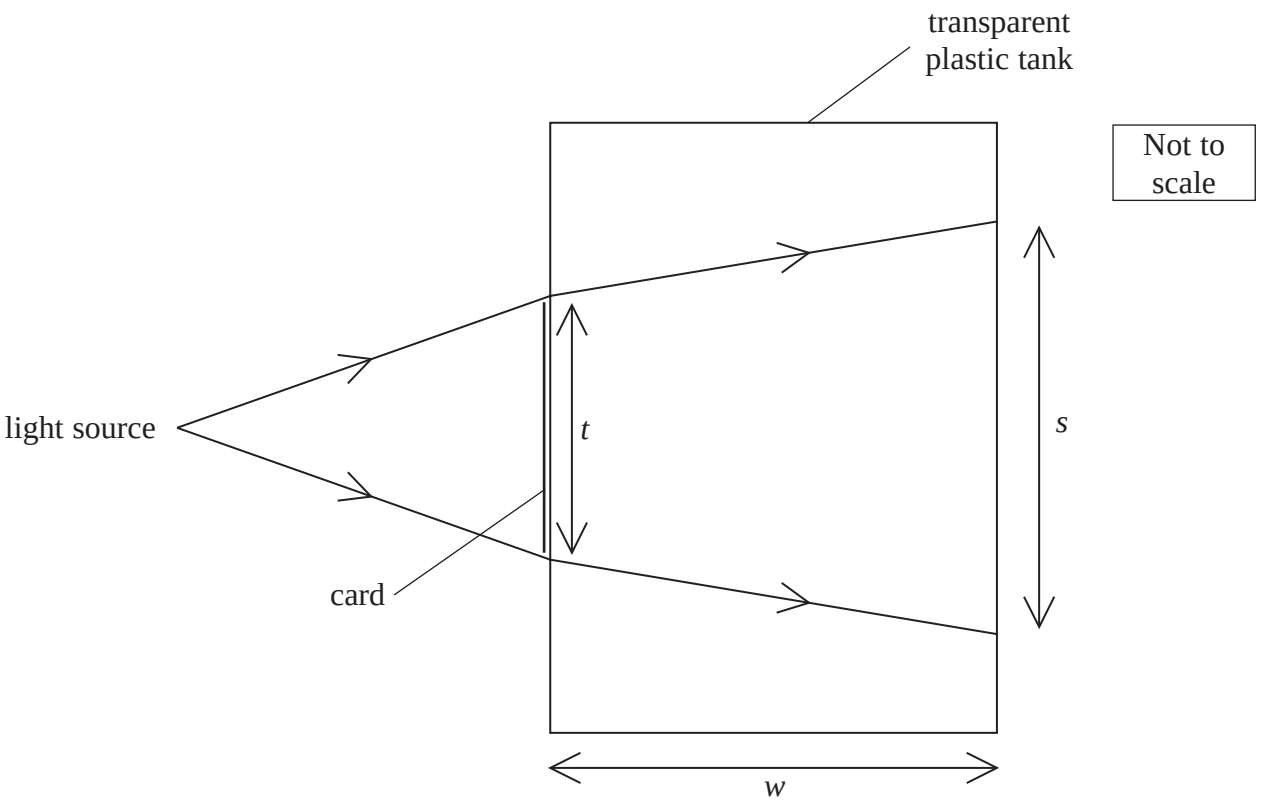
12 The diagram shows a transparent tank, with thin plastic sides, that can be used to determine the refractive index of a transparent liquid.



A rectangle of opaque card is stuck on the side of the tank containing the liquid. A light source is placed in front of the tank and the width s of the shadow of the card, which is formed on the back of the tank, is measured. The width t of the card and the width w of the tank are also measured.

(a) The angle of incidence of the light as it enters the tank is 7.2°

Show that the refractive index of the liquid is about 1.4

$w = 35.0\,\text{cm}$
$t = 4.0\,\text{cm}$
$s = 10.2\,\text{cm}$

(3)

(b) Determine the speed of light in the liquid.

(2)

Speed of light = ...

(Total for Question 12 = 5 marks)