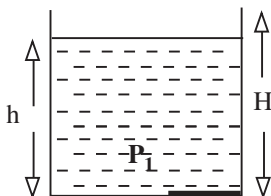


1992 A/L Structured Essay Question No (03)

A clear of refractive index n was filled up to a height h of a cylindrical of height H . The pin P_1 was kept at the bottom of the vessel. You have been provided with a plane mirror, another pin (P_2), a meter ruler and a sufficient amount of the liquid.



(a) Draw how the pin P_2 and the plane mirror are kept in order to determine the position of the image of pin P_1 seen through the liquid, in the given figure.

(b) Briefly explain how the position of the image of pin P_1 is determined.

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(c) (i) When the position of the image was correctly determined, the distance to the pin P_2 from the mirror was taken as u . Write an expression for the image distance of P_1 measured from the liquid surface, in terms of u , H and h .

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(ii) Thereby write down an expression for the refractive index (n) of the liquid.

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(d) If you have to obtain a value for n by drawing a graph, what is the parameter that is more practical and easier to vary?

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- (e) **By taking the parameter stated in part (d) above as the independent variable, re-arrange the expression in part (c) (ii) above in order to draw the graph.**

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- (f) **The gradient and the intercept of a graph drawn as above were determined as $-1/4$ and 50 cm respectively. Determine the refractive index (n) of the liquid and the height (h) of the vessel.**

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