85-Q1: Relative Density of a Liquid

Time: $1\frac{1}{2}$ hr.

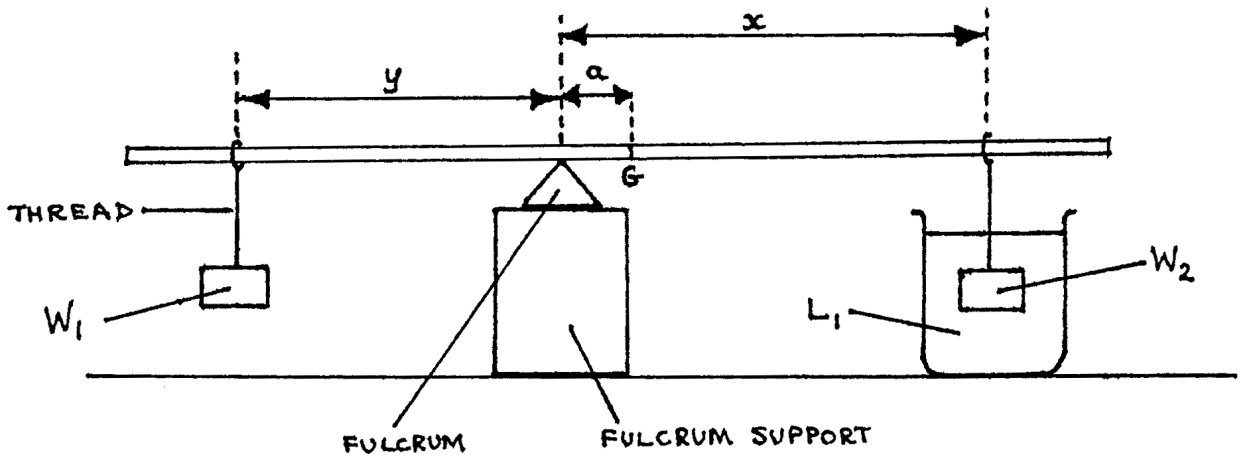
Apparatus

Metre rule; thread ($\approx$50cm); fulcrum (eg. prism); fulcrum support (height $\approx$10cm; L_1 200ml water in 250ml beaker; L_2 200ml motor oil (or kerosene) in 250ml beaker; W_1 50g mass (metal); W_2 20g mass (plastic or rubber); piece of chalk; 2 sheets graph paper.

In this experiment you are required to determine the density of liquid L_2 relative to that of liquid L_1, and find the mass M of the metre rule provided. Proceed as follows:

a. Locate and mark the centre of gravity G of the metre rule.

b. Set up the apparatus as illustrated below, where $a = 5$cm, and W_1 and $W2$ are masses of 50g and 20g respectively. ‘



c. With W_2 totally immersed in liquid L_1 and $x = 10$cm, balance the metre rule by adjusting the position of W_1. Read and record distance y. Repeat the process for $X = 20$cm, 30cm, 40cm, 50cm, and 54cm. Tabulate the values of x and y. (7

marks)

d. Replace liquid L_1 by liquid L_2 and then repeat the procedure outlined in (c) above. (7 marks)

e. Plot a graph of y vs. x using the table obtained in (c): (8 marks)

f. Read and record I, the value of y when $x = 0$. Calculate $10 \times I$, which is equal to the mass of the metre rule. (4 marks)

ii. Find the slope S_1 of the graph. (4 marks)

iii. Find the value of λ_1 given that $\lambda_1 = 0.4 - S_1$. (2 marks)

f. Plot a graph of y against x using the table obtained in (d). (8 marks)

g. Find the slope S_2 of this graph. (4 marks)

ii. Find the value of λ_2 given that $\lambda_2 = 0.4 - S_2$. (2 marks)

iii. Evaluate the ratio $\frac{\lambda_2}{\lambda_1}$, which is equal te the density of liquid L_2 relative to that of liquid L_1. (4 marks)