

1. Lever - There are many possibilities with a meter rule as a lever with a load (known or unknown) suspended from a point near one end (say left), the lever itself pivoted on a knife edge, use slotted weights suspended from the other (right) side for effort.

Determine the mass of a metre rule using a spring balance or by balancing it on a knife edge at some point away from the middle and a 50g weight on the other side. Next pivot (F) the metre rule at the 40cm, 50cm and 60cm mark, each time suspending a load L or the left end and effort E near the right end. Adjust E and or its position so that the rule is balanced. Tabulate the position of L, F and E and the magnitudes of L and E and the distances of load arm and effort arm. Calculate  $MA=L/E$  and  $VR = \text{effort arm/load arm}$ . It will be found that  $MA<VR$  in one case,  $MA=VR$  in another and  $MA>VR$  in the third case. Try to explain why this is so. Also try to calculate the real load and real effort in these cases.

2. Determine the VR and MA of a given pulley system.

3. Trace the course of different rays of light refracting through a rectangular glass slab at different angles of incidence, measure the angles of incidence, refraction and emergence. Also measure the lateral displacement.

4. Determine the focal length of a convex lens by (a) the distant object method and (b) using a needle and a plane mirror.

5. Determine the focal length of a convex lens by using two pins and formula  $f = uv/(u+v)$ .

6. For a triangular prism, trace the course of rays passing through it, measure angles  $i_1$ ,  $i_2$ ,  $A$  and  $\delta$ . Repeat for four different angles of incidence (say  $i_1=40^\circ$ ,  $50^\circ$ ,  $60^\circ$  and  $70^\circ$ ). Verify  $i_1 + i_2 = A + \delta$  and  $A = r_1 + r_2$ .

7. For a ray of light incident normally ( $i_1=0$ ) on one face of a prism, trace course of the ray. Measure the angle  $\delta$ . Explain briefly. Do this for prisms with  $A=60^\circ$ ,  $45^\circ$  and  $90^\circ$ .

8. Calculate the specific heat capacity of the material of the given calorimeter, from the temperature readings and masses of cold water, warm water and its mixture taken in the calorimeter.

9. Determination of specific heat capacity of a metal by method of mixtures.

10. Determination of specific latent heat of ice.

11. Using as simple electric circuit, verify Ohm's law. Draw a graph and obtain the slope.

12. Set up model of household wiring including ring main circuit. Study the function of switches and fuses.