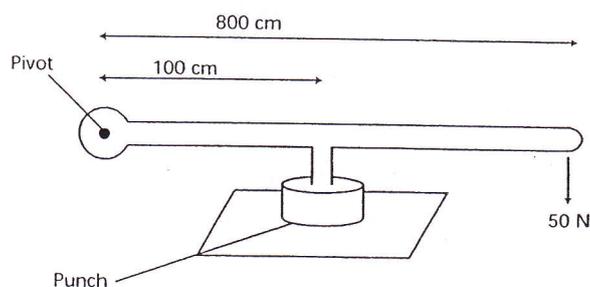


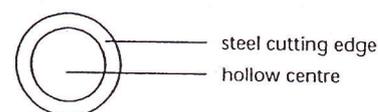
- d i** Object P is suspended from the barrier 0.5 m to the left of point R. Calculate the anticlockwise moment produced by the force.
- ii** The beam to the right of point R is 5 m long. Calculate the downward force of the beam at its right-hand end.
- e i** What would you do to object P if the beam was made a metre longer on the right?
- ii** Explain why this would help.

## EXTENSION

- 3** The diagram shows an old industrial lever used to stamp out pieces of metal from a metal sheet. The operator pushes down on the right-hand end of the handle. The machine is shown at rest. The downward force of 50 N is just the weight of the handle.



View of the punch from below



- a** Calculate the moment, in Nm, of the 50 N weight about the pivot.
- b** When the machine is at rest, what is the downward force exerted by the punch?
- c** To punch out a piece of metal requires a total downward force of 1000 N on the punch. What is the additional force that the operator must use to push down on the handle?
- d** The operator now needs to stamp a mark onto the punched out piece of metal. He changes the punch for a patterned stamp. The stamp has a surface area of  $5 \text{ cm}^2$ . He pushes down on the handle with the same force as before.
- i** Calculate the pressure that this force exerts on the punched out disc.
- ii** Explain why the stamp only makes an impression on the metal but the punch cuts right through it.