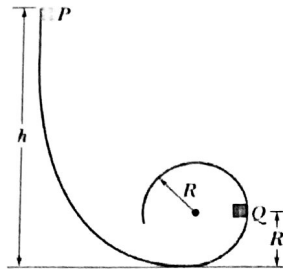


### QUIZ 4 – PHYSICS 271 – SOLUTION

Q) A small block of mass  $m = 5 \text{ kg}$  can slide along the frictionless loop-the-loop, with loop radius  $R = 10 \text{ m}$ .



The block is released from rest at point P, at height  $h = 5.0R$  above the bottom of the loop. How much work does the gravitational force do on the block as the block travels from point P to

(a) Point Q?

$$\text{Work done} = -\Delta U = -(U_f - U_i) = U_i - U_f$$

$$U_i = mgh = 5mgR$$

$$U_f = mgR$$

$$W = 5mgR - mgR = 4mgR = 4 \times 5 \times 9.8 \times 10 = 1960 \text{ J}$$

(b) The top of the loop?

$$U_i = 5mgR$$

$$U_f = 2mgR$$

$$W = U_i - U_f = 3mgR = 1470 \text{ J}$$