H.W

1) (4) $\frac{1}{2} m \frac{v^2}{t^2} t^2$

2) (4) $2F^2/m$

3) (1) 2kW

4) $h_1 = 10m$

$g = 10 m/s^2$

P.E of ball = mgh

$= m \times 10 \times 10$

$= 100 mJ$

The ball looses 40% of initial energy on striking

i.e $\Rightarrow \frac{40}{100} \times 100 mJ$

$= 40 mJ$

Energy left to hit the ground = 100mJ - 40mJ

= 60mJ

∴ Height at which it will rebound,

$= \frac{60}{10} = 6m$

5) (a) Law of conservation of energy states that energy can neither be destroyed nor created.

(b) Girl A

$h = 8m$

weight $= 400N$

$t = 20$ sec.

$P = \frac{\text{work done}}{\text{time taken}} = \frac{mgh}{t}$

$= \frac{400 \times 8}{20} = 160$ Watt

Girl B

$h = 8m$

weight $= 400N$

$t = 50$ sec

$P = \frac{mgh}{t} = \frac{400 \times 8}{50} = 64$ watt

(c) Energy consumed = power x time

$= 1500 \times 10$

$= 15000W$

6) (a) Initial velocity = 36 km/hr = (10 m/s)
Final " = 72 km/hr = (20 m/s)

Initial kinetic energy,

$= \frac{1}{2}mu^2$

$= \frac{1}{2} \times 1500 \times 10 \times 10^5$

$= 1500 \times 50$

$= 75000\ J$

Final kinetic energy,

$= \frac{1}{2}mv^2$

$= \frac{1}{2} \times 1500 \times 20 \times 10^{10}$

$= 1500 \times 200$

$= 300000\ J$

∴ Change in K.E = work done = 3,00,000 − 75,000
= 225000 J

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(b) In an oscillating pendulum the P.E is maximum at the extreme positions and K.E is maximum at reference level or mean position.