PYP 001
Quiz # 5 (A)

Name: **ID :**

1. A car has a mass of 1500 Kg, initially moving at a speed of 52 m/s applied the brakes and slows down to a speed of 27 m/s. If the car needs a distance of 15 m to make this change in speed, then what is the magnitude of the braking force?
   Solution:
   $W = Fd = \Delta KE$
   $\Delta KE = \frac{1}{2} m (v_2^2 - v_1^2) = 1.48 \times 10^6 \text{ J} = 1.48 \text{ MJ}$
   $F = \frac{\Delta KE}{d} = 98750 \text{ N}$

2. A stone of mass 0.2 Kg is released from the top of a 92 m high building and allowed to fall to earth. If we ignore all frictional forces, use the energy-work theorem to find the speed of the stone when it reaches the surface of the earth?
   Solution:
   mgh (at the top) $= KE$ (at the bottom)
   $\frac{1}{2} m v^2 = mgh \Rightarrow v = \sqrt{2gh} = 43 \text{ m/s}$

3. How much power does a person expend when lifting a 53 Kg box a vertical distance of 1.2 m in a time interval 1.5 s.
   Solution:
   $W = Fd = mgh = 53 \times 10 \times 1.2 = 636 \text{ J}$
   $P = \frac{W}{t} = 424 \text{ W}$

PYP 001
Quiz # 5 (B)

Name: **ID :**

1. A ball of mass 0.5 Kg is released from the top of a 87 m high building and allowed to fall to earth. If we ignore all frictional forces, use the energy-work theorem to find the speed of the stone when it reaches the surface of the earth?
   Solution:
   mgh (at the top) $= KE$ (at the bottom)
   $\frac{1}{2}mv^2 = mgh \Rightarrow v = \sqrt{2gh} = 42$ m/s

2. How much power does a person expend when lifting a 23 Kg box a vertical distance of 1.2 m in a time interval 1.5 s.
   Solution:
   $W = Fd = mgh = 23 \times 10 \times 1.2 = 276$ J
   $P = \frac{W}{t} = 184$ W

3. A train (mass = 2200 Kg) initially moving at a speed of 46 m/s applied the brakes and slows down to a speed of 13 m/s. If the train needs a distance of 12 m to make this change in speed, then what is the magnitude of the braking force?
   Solution:
   $W = Fd = \Delta KE$
   $\Delta KE = \frac{1}{2}m(v_2^2 - v_1^2) = 2.1 \times 10^6$ J $= 2.1$ MJ
   $F = \frac{\Delta KE}{d} = 178475$ N