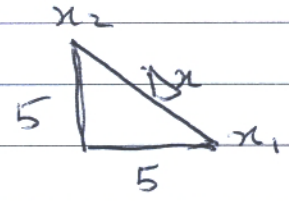
CH 2

Q.1 $\Delta x = \sqrt{5^2 + 5^2} = 7.1\ m$



$$v_{avg} = \frac{\Delta x}{\Delta t} = \frac{7.1}{5} = 1.41 = \sqrt{2}\ m/s$$

Q.2 distance ≡ Area under the curve:

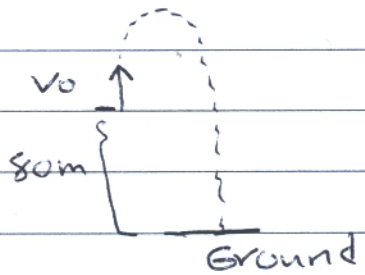
$$= \frac{1}{2}(2)h \times (120)km/h + 3 \times 120 =$$

total dist. $= 450\ km$

Q.3 $$v = \frac{dx}{dt} = 50 + 20t$$

at $t = 3s \Rightarrow v = 50 + 20(3) = 110\ m/s$

Q.4 When the package been released it $V_0 = 12\ m/s$



$$\Rightarrow \Delta y = V_0 t - \frac{1}{2} g t^2$$

$$-80 = 12(t) - 4.9t^2$$

$$4.9t^2 + 12t + 80 = 0$$

$\Rightarrow t = 5.4s$ (neglecting negative answer)

cont. ch2

Q.5 $a_{avg} = \frac{\Delta v}{\Delta t} = \frac{v_2 - v_1}{t_2 - t_1}$

v_2 : when $t = 2s \Rightarrow v = \frac{dx}{dt} = 2 + 3t^2 = 2 + 3(2)^2 = 14$ m/s

$v_1 = 2 + 3t^2 = 2 + 3(1)^2 = 5$ m/s

(at $t = 1$)

$\therefore a_{avg} = \frac{14 - 5}{2 - 1} = 9$ m/s^2

Q.6 $\Delta x = \left(\frac{v + v_0}{2}\right) t$

$80 = \left(\frac{10 + 30}{2}\right)(t)$

$\Rightarrow t = 4$ s

Q.7 $v = v_0 - gt \Rightarrow v = 35 - 9.8(5)$

$v = -15$ m/s (means down)

Q.8 $v^2 - v_0^2 = -2g\Delta y$, $v = 0$ at max. height

$0 - (19.5)^2 = -2 \times 9.8 \Delta y \Rightarrow \Delta y = 19.4$ m

Cont. ch2 →

Comet Ch2

Q.9 $U_0 = 0$

$$U^2 - U_0^2 = -2g\Delta y \quad , \text{ when } (\Delta y = -190\,m)$$

$$U^2 - 0 = -2 \times 9.8 (-190)$$

$U = \pm 61$ m/s but as speed $U = 61$ m/s

Q.10 First projectile: $(U = 0)$

$$U^2 - U_0^2 = -2g\Delta y \Rightarrow 0 - U_0^2 = -2 \times 9.8 (100)$$

$U_0 = 44.3$ m/s

Now: Second projectile: $U_0' = 2U_0 = 88.6$ m/s

$$U^2 - U_0^2 = -2g\Delta y \Rightarrow 0 - (88.6)^2 = -2(9.8)\Delta y$$

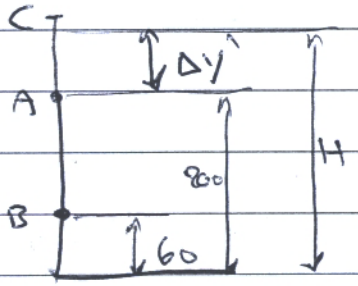
$\Delta Y = 400$m

Q.11 from A → B

~~B A~~ $\Delta y = V_A t - \frac{1}{2} g t^2$

$-140 = V_A (2) - \frac{1}{2}(9.8)(2)^2$

$2V_A = -120.4$ m/s $\Rightarrow V_A = -60.2$ m/s



Now from C → A

$$V_A^2 - V_C^2 = -2g(\Delta y') \Rightarrow (-60.2)^2 = -2(9.8)\Delta y'$$

($V_C = V_0$)

$\Delta y' = -185$ m as height $|\Delta y'| = 185$

So $H = 200 + 185 = 385$ m.