NA-PROB-CNMTK 4°ESO

1| $70\frac{km}{h} = 19,444\frac{m}{s}$ $20min = 1200s$

MRU

$x_f = x_0 + v \cdot t$; $x_f = 0 + 19,444 \cdot 1200 =$

$x_f = 23332,8m$

2| $12min = 720s$ $250m$

MRU

$x_f = x_0 + v \cdot t$; $250 = 0 + v \cdot 720$

$v = 0,347 m/s$

3| $130\frac{km}{h} = 36,111\frac{m}{s}$ $20,5km = 20500m$

MRU

$x_f = x_0 + v t$ $20500 = 0 + 36,111 \cdot t$

$t = 567,694s$

4| $NADADOR = 8\frac{km}{h} = 2,222 m/s$ $20500m$

MRU

$x_f = x_0 + vt$; $20500 = 0 + 2,222 \cdot t$

$t = 9225,923s$

5| $20 m/s$ $150m$

MRUA

$v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$0 = 20 + a \cdot t \rightarrow a = \frac{-20}{t}$

$150 = 0 + 20t + \frac{1}{2}at^2$

$150 = 20t + \frac{1}{2}\left(\frac{-20}{t}\right)t^2$ $t = 15s$

$a = -1,333 m/s^2$

6| $v_0 = 0 m/s$ $t = 30s$ $v_f = 588 m/s$

MRUA $v_f = v_0 + at$ $x_f = y_0 + v_0 t + \frac{1}{2}at^2$

$588 = 0 + a \cdot 30 \rightarrow \boxed{a = 19,6\frac{m}{s^2}}$

7| $v_0 = 0 m/s$ $t = 30s$ $v_f = 588 m/s$

$a = 19,6 m/s$ → CALCULADA PROB. 6

$y_f = 0 + 0 \cdot 30 + \frac{1}{2}19,6 \cdot 30^2 = 8820m$

8| $t = 25s$ $x = 400m$ $v_f = 0 m/s$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$0 = v_0 + a \cdot 25 \rightarrow v_0 = -25 \cdot a = 32 m/s$

$400 = v_0 \cdot 25 + \frac{1}{2}a25^2$

$400 = -25 \cdot 25 \cdot a + \frac{1}{2}a25^2$ $a = -1,28 m/s^2$

9| HECHO EN ECB

10| $60\frac{km}{h} = 16,667 m/s$ $v_0 = 0 m/s$ $a = 0,1 m/s^2$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$16,667 = 0 + 0,1 \cdot t \rightarrow t = 166,667s$

12| $v_0 = 0 m/s$ $a = 20 m/s^2$ $t = 15s$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$x_f = 0 + 0 \cdot 15 + \frac{1}{2}20 \cdot 15^2 = 2250m$

11| $v_0 = 0 m/s$ $a = 20 m/s^2$ $t = 15s$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$v_f = 0 + 20 \cdot 15 = 300 m/s$

13| $90\frac{km}{h} = 25 m/s$ $t = 5s$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$25 = 0 + a \cdot 5 \rightarrow a = 5 m/s^2$

14| $90\frac{km}{h} = 25 m/s$ $t = 5s$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$25 = 0 + a \cdot 5 \rightarrow a = 5 m/s^2$

$x_f = 0 + 0 + \frac{1}{2}5 \cdot 5^2 = 62,5m$

15| $v_0 = 0 m/s$ $t = 10s$ $20m$ $40\frac{km}{h} = 11,111\frac{m}{s}$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$20 = 0 + 0 \cdot 10 + \frac{1}{2}a \cdot 10^2 \rightarrow a = 0,4 m/s$

$\rightarrow 11,111 = 0 + 0,4 \cdot t \rightarrow t = 27,778s$

16| $a = 30 m/s^2$ $2min = 120s$

MRUA $v_f = v_0 + at$ $x_f = x_0 + v_0 t + \frac{1}{2}at^2$

$x_f = 0 + 0 \cdot 120 + \frac{1}{2}30 \cdot 120^2 = 216000m$

$216 km$

17| EL ESPACIO RECORRIDO EN LOS 2 MINUTOS SE CALCULÓ EN EL PROBLEMA 16 → 216000m

AHORA CALCULO SU $v_f$ A LOS 2 MIN.

$v_f = 0 + 30 \cdot 120 = 3600 m/s$ A PARTIR DE LOS 2 MINUTOS LLEVA UN MRU DURANTE 118 MIN = 7080s

$x_f = x_0 + v \cdot t = 216000 + 3600 \cdot 7080$

$x_f = 25704000 m$

**18)** $30\ \frac{km}{h} = 8{,}333\ m/s$

$V_F = 0\ m/s \quad t = 4s$

MRUA $V_F = V_0 + at \quad X_F = X_0 + V_0 t + \frac{1}{2} a t^2$

$0 = 8{,}333 + a \cdot 4 \quad a = -2{,}083\ m/s^2$

---

**19)** La a CALCULADA PARA 18 $a = -2{,}083\ m/s^2$

MRUA $X_F = X_0 + V_0 t + \frac{1}{2} a t^2$

$X_F = 0 + 8{,}333 \cdot 4 - \frac{1}{2} 2{,}083 \cdot 4^2 = 16{,}668\ m$

---

**20)** $a = -20\ m/s^2 \quad 100\ m$

MRUA

$V_F = V_0 + at \quad X_F = X_0 + V_0 t + \frac{1}{2} a t^2$

$0 = V_0 - 20t \rightarrow V_0 = 20t = 63{,}24\ m/s$

$100 = 0 + V_0 t - \frac{1}{2} 20 t^2$

$100 = 20t^2 - \frac{1}{2} 20 t^2 \rightarrow t = 3{,}162s$

---

**21)** CALCULADO EN EL 20 $t = 3{,}162s$

---

**22)** $t = 25s \quad X_F = 400m \quad V_F = 0\ m/s$

MRUA $V_F = V_0 + at \quad X_F = X_0 + V_0 t + \frac{1}{2} a t^2$

$0 = V_0 + a \cdot 25 \rightarrow V_0 = -25a$

$400 = V_0 \cdot 25 + \frac{1}{2} a 25^2$

$400 = -25a \cdot 25 + \frac{1}{2} a 25^2$

$400 = -312{,}5a \quad a = -1{,}28\ m/s^2$

$V_0 = 32\ m/s$

---

**23)** HECHO EL 22 $a = -1{,}28\ m/s^2$

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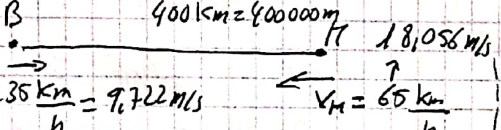
**24)**




B → MRU $X_F = X_0 + V_B t$ M → MRU $X_F = X_0 + V_M t$

$X_F = 0 + 9{,}722t \quad X_F = 400000 - 18{,}056t$

CUANDO SE ENCUENTRAN

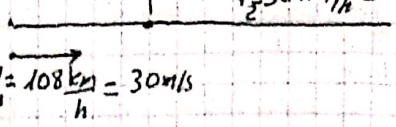
$9{,}722t = 400000 - 18{,}056t$

TIEMPO ENCUENTRO $t = 14399{,}885s \simeq 4$ HORAS

POSICIÓN $X_F = 9{,}722 \cdot 14399{,}885 = 139995{,}682m$

---

**25)**




$V_1 = 108\ \frac{km}{h} = 30\ m/s$

MRU

1 → $X_F = 0 + 30t$ 2 → $X_F = 1000 + 10t$

CUANDO SE ENCUENTRAN

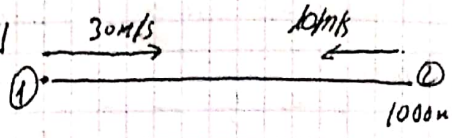
$30t = 1000 + 10t$

$t = 50s$

$X_F = 30 \cdot 50 = 1500m$

---

**26)**




MRU

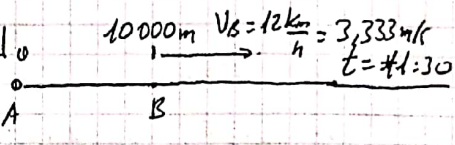
1 → $X_F = 0 + 30t$ 2 → $X_F = 1000 - 10t$

$30t = 1000 - 10t$

$t = 25s \rightarrow X_F = 30 \cdot 25 = 750m$

---

**27)**




$V_A = 14\ \frac{km}{h} = 3{,}889\ m/s$

$t = 11{:}00 \rightarrow 0s \rightarrow (t + 1800)s$

MRU

A → $X_F = 0 + 3{,}889(t + 1800)$

B → $X_F = 10000 + 3{,}333t$

$3{,}889(t + 1800) = 10000 + 3{,}333t$

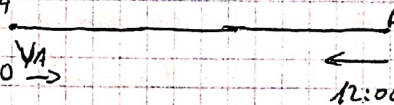
$t = 5395{,}325s \rightarrow 1{,}5$ horas

SE ENCUENTRAN A LAS 13:00 horas

POSICIÓN $X_F = 27982{,}602m$ DESDE A

---

**28)**




$V_A = 70\ \frac{km}{h} = 19{,}444\ m/s \quad V_B = 80\ \frac{km}{h} = 22{,}222\ m/s$

MRU

(A) $X_F = 0 + 19{,}444(t + 7200)$

(B) $X_F = 440000 - 22{,}222t$

$19{,}444(t + 7200) = 440000 - 22{,}222t$

$t = 7200{,}14s \simeq 2$ horas SE ENCUENTRAN A LAS 14:00h

POSICIÓN $X_F = 19{,}444(t + 7200) = 279993{,}6m$

**29)** $V_H = 20\,m/s$ los obuses policía $30\,m/s$

M → MRU $x_F = 20(t+10)$ P MRU $x_F = 30t$

$20(t+10) = 30t$

$t = 20s \rightarrow x_F = 30 \cdot 20 = 600m$

---

**30)** A ← 600 000 m → B

$V_A = 80\frac{km}{h} = 22{,}222\,m/s$ ← $V_B = 60\frac{km}{h} = 16{,}667\,m/s$

$90\,min = 5400s$

A → MRU $x_F = 22{,}222(t+5400)$

B → MRU $x_F = 600000 - 16{,}667t$

$22{,}222(t+5400) = 600000 - 16{,}667t$

$t = 12342{,}853s$

---

**31)** A ——— B

$V_A = 80\frac{km}{h} = 22{,}222\,m/s$

→ $+5400s$

$B \rightarrow V_B = 27{,}78\,m/s$

MRU A → $x_F = 22{,}222(t+5400)$

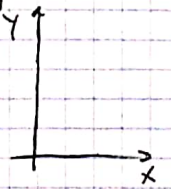
B → $x_F = 27{,}78t$

$27{,}78t = 22{,}222(t+5400)$

$t = 21590{,}284s$

---

**32)**




$g = -9{,}8\,m/s^2$

$V_0 = 25\,m/s$

MRUA $V_F = V_0 + gt$

$Y_F = Y_0 + V_0t - \frac{1}{2}gt^2$

$0 = 25 - 9{,}8t \rightarrow t = 2{,}551s$

---

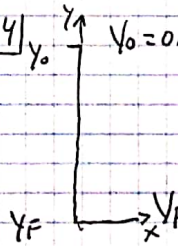
**33)** t calculado problema 32

$Y_F = 0 + 25 \cdot 2{,}551 - \frac{1}{2}9{,}8(2{,}551)^2$

$Y_F = 31{,}888m$

---

**34)**




$V_0 = 0m/s$ $g = -9{,}8\,m/s^2$

$V_F = -18\,m/s$

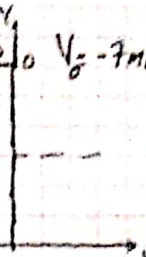
MRUA $V_F = V_0 + gt$ $Y_F = Y_0 + V_0t - \frac{1}{2}gt^2$

$-18 = 0 - 9{,}8t$ $0 = Y_0 + 0t - 4{,}9(1{,}837)^2$

$t = 1{,}837s$ $Y_0 = 16{,}535m$

---

**35)**




$V_0 = -7m/s$ 3s $g = -9{,}8\,m/s^2$

MRUA $V_F = V_0 + gt$

$Y_F = Y_0 + V_0t + \frac{1}{2}gt^2$

$V_F = -7 - 9{,}8 \cdot 3 = -36{,}4m/s$

---

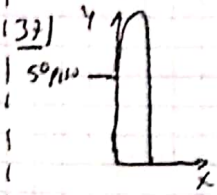
**36)** Mismo dibujo que 35

$Y_F = Y_0 + V_0t + \frac{1}{2}gt^2$

$Y_F = 0 - 7 \cdot 3 - \frac{1}{2}9{,}8 \cdot 3^2 = -65{,}1m$

---

**37)**




$g = -9{,}8\,m/s^2$

$V_0 = 90\frac{km}{h} = 25\,m/s$

MRUA $V_y = V_0 + gt$

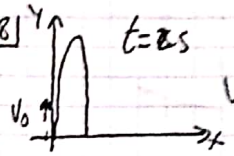
$Y_F = Y_0 + V_0t + \frac{1}{2}gt^2$

ALTURA MAX → $V_y = 0$

$0 = 25 - 9{,}8t \rightarrow t = 2{,}551s$

---

**38)**




$t = 2s$ MRUA $g = -9{,}8\,m/s^2$

$V_y = V_0 + gt$

$Y_F = Y_0 + V_0t + \frac{1}{2}gt^2$

CUANDO CAE $Y_F = 0m$

$0 = 0 + V_0 \cdot 2 - \frac{1}{2}9{,}8 \cdot 2^2$

$V_0 = 9{,}8\,m/s$

---

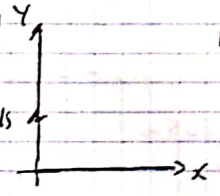
**39)** TARDA 1s EN SUBIR Y 1s EN BAJAR

La $V_0$ está calculada en el 38

$Y_F = 0 + 9{,}8 \cdot 1 - \frac{1}{2}9{,}8 \cdot 1^2$ $Y_F = 4{,}9m$

---

**40)**




MRUA $g = -9{,}8\,m/s^2$

$V_y = V_0 + gt$

$Y_F = Y_0 + V_0t + \frac{1}{2}gt^2$

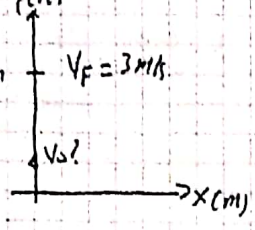
ALTURA MÁXIMA $V_y = 0$

$0 = 25 - 9{,}8t \rightarrow t = 2{,}55s$

ALTURA $Y = 0 + 25 \cdot 2{,}551$ CALCULADO EL 33

$Y = 31{,}888m$

41] Y(m)




$g = -9{,}8\ m/s^2$

MRUA

$V_Y = V_0 + gt$

$Y_F = Y_0 + V_0 t + \frac{1}{2} g t^2$

$3 = V_0 - 9{,}8t$

$21 = 0 + V_0 t - 4{,}9t^2$

$V_0 = 9{,}8t + 3 = 20{,}513$ m/s

$21 = (9{,}8t + 3)t - 4{,}9t^2$ DOS SOLUCIONES

$t = \ominus$ N

$t = 1{,}787$ s

42] VELOCIDAD INICIAL CALCULADA PROB 41

$V_0 = 20{,}513$ m/s

ALTURA MAXIMA $V_F = 0$ m/s — $t$ ALTURA MAX

$0 = 20{,}513 - 9{,}8t \rightarrow t = 2{,}093$ s

$Y_F = 0 + 20{,}513 \cdot 2{,}093 - \frac{1}{2} 9{,}8 (2{,}093)^2$

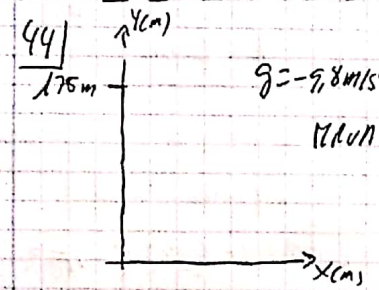
$Y_F = 21{,}469$ m

43] SI TARDA 4s = 2s SUBIR + 2s BAJAR

$V_Y = V_0 + gt \Rightarrow 0 = V_0 - 9{,}8 \cdot 2$

$V_0 = 19{,}6$ m/s

44]




$V_{CLAVO} = 8$ m/s

$g = -9{,}8\ m/s^2$

MRUV $V_Y = V_0 + gt$

$Y_F = Y_0 + V_0 t + \frac{1}{2} g t^2$

ALTURA MAXIMA $\Rightarrow V_F = 0$ m/s

$0 = 8 - 9{,}8t \quad t = 0{,}816$ s

$Y = 175 + 8 \cdot (0{,}816) - \frac{1}{2} 9{,}8 (0{,}816)^2$

$Y_F = 178{,}265$ m

45] CONTINUACIÓN PROB 44

$Y_F = 175 + 8 \cdot 5 - \frac{1}{2} 9{,}8 \cdot 5^2$

$Y_F = 92{,}5$ m