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1. _____: $(V_0^2/g)(1/4 + \sin^2 2\alpha)^{1/2}$ $\alpha < 30°$

  $(2V_0^2\sin\alpha/g)[2(1 - \sin\alpha)]^{1/2}$ $\alpha > 30°$.

_____: x y .

                    t ,   ,

$$x_1 = V_0\cos\alpha t, \quad y_1 = V_0\sin\alpha t - gt^2/2,$$

          ,   ,

$$x_2 = 0, \quad y_2 = V_0 t - gt^2/2.$$

$$R(t) = [(y_2 - y_1)^2 + (x_2 - x_1)^2]^{1/2} = V_0 t[2(1 - \sin\alpha)]^{1/2}$$

    ,   ,   .

          $t_1 = 2V_0\sin\alpha/g$ (   )

                                  ,   ,

                                      ,   , $R(t_1)$

$= (2V_0^2\sin\alpha/g)[2(1 - \sin\alpha)]^{1/2}$. $t_1 > t_2/2,$ $t_2 = 2V_0/g$

$-$,   , . . $\sin\alpha > \frac{1}{2}$ $\alpha > 30°$.

                t_1 ,

                                                    ,

        . $t_1 < t_2/2,$ . . $\alpha < 30°$.

                          $[L_1^2 + H_2^2]^{1/2},$ $L_1 = (V_0^2/g)\sin 2\alpha -$

      ,   , $H_2 = V_0^2/(2g)$ $-$,

              .

    $(V_0^2/g)(1/4 + \sin^2 2\alpha)^{1/2}$.

2. _____: $mg\cos\alpha\sin\alpha$.

_____: ,

                                                          $g\sin\alpha$.   ,

                        $-$,

(   )   (

) $-$

                                $mg\sin\alpha$.   ,

                                                                                 $mg\cos\alpha$.

                                    , $mg\cos\alpha\sin\alpha$,

        .

3. _____: $(6gL)^{1/2}$.

_____: m , $V_0 -$

        .   .

                                                                                 ,

            ,   ,   ($V)$

        . (,

                            ,

                .)   ,

                                                                                 ,

                    . (,

            ,

        .)

.

Δt F,   :

$$mV = F\Delta t$$

:

$$2mV - mV_0 = -F\Delta t.$$

,   ,

.

, $V = V_0/3.$

.

,

.

$$mV^2/2 + 2mV^2/2 = mgL,$$

$V = (2gL/3)^{1/2},$ $V_0 = 3V = (6gL)^{1/2}.$

4. _____: 2   .

_____: ,

,   (

).   ,   (   )

-

. $U,$

$R,$ $R_V,$

,   ,

$$V_1 = U/(2 + R_V/R),$$

,   ,

$$V\!/\!_1 = U/(2 + R/R_V).$$

$V_1 = V\!/\!_1$, $R_V = R.$, $V_2 = 2U/3$

$V\!/\!_2 = U/3.$,   2   .

:   ,   ,   *1-2*

,   .