①

The minimum time resolution, ΔT, required for idealized measurement of a mass change of .1% ~~we~~ is calculated here for a typical case of a 150 # ~~man~~ object at a ~~frequency~~ period of approx. 1.2 ~~[illegible]~~ secs. —

τ_1 – period (secs.) at 150.#
τ_2 – " " " 150.1 "
$\Delta T = \tau_2 - \tau_1$
$W_1 = 150$ #
$W_2 = 150.1$ "

g (value for Austin, Texas) =

385.54372 "/sec²

$$\tau = 2\pi\sqrt{\frac{W}{KG}}$$

$$T_1 = 2 \cdot 3.1416 \cdot .197245 = \cancel{1.239}\ 1.2393297 \text{ sec}$$

$$T_2 = 2 \cdot 3.4166 \cdot .197311 = 1.2397444 \text{ sec.}$$

$$\Delta T = .4147 \text{ m sec.}$$

This order of time resolution may be readily obtained by a 10^{-4} sec. counter (10^{-6} sec. resolution is routine) so ~~the~~ measurements of time ~~resolution~~ per se is not difficult. As will be shown later the difficulty will arise from the distance resolution required to ~~obtain this~~ time. It is obvious that a stop watch will not suffice

P 2

$$T_1 = 2\pi\sqrt{\frac{W}{KG}}$$

$$= 2\pi\sqrt{\frac{15.0 \times 10^1}{10 \times .385\ 54372 \times 10^2}}$$

$$= 2\pi\sqrt{\frac{15.}{3.8554372}}$$

$$= 2\pi\sqrt{3.89\,06\,06\,09\,00\,00} \times \sqrt{10^{-2}}$$

1.9 7 2 5 7

```
   |3.89 06 06 09 00 00
   |1
20 |2 89
 9 |2 61
380|28 90
  7|27 09
3940|1 01 60
   2|  78 84
39440|2 27 60 90
    5|1 97 22 5
394500|30 46 5 00
      |27 61 5 49
```

omit

P3

$$T_1 = 2\pi\sqrt{3.89\,06\,09} \quad \begin{matrix}1.9\,7\,2\,4\,5 \\ .1\underline{9}\,\underline{7}\,\underline{2}\,4\,5\end{matrix} \times 10^{-1}$$

```
       1
20  | 289
 9  | 261
380 | 2806
  7 | 2709
3940 |  9709
   2 |  7884
39440 | 192500
    4 | 157776
78888 | 3472400
    5 | 1.97311
```

$$T_2 = 2\pi\sqrt{3.89\,32\,03}$$

```
       1.9
20  | 289
 9  | 261
380 | 2832
  7 | 2709
3940 | 12303
   3 | 11829
39460 | 47400
    1 | 39461
60922 | 793900
```

6.2832 ~~Omit~~ {4P}

$\parallel$

$2 \cdot 3.1416$

$\parallel$

$$\tau_1 = 2\pi \cdot .197245 = \cancel{.62832} = 1.239329784$$

$$\tau_2 = 2\pi \cdot .197311 = 1.2397444752$$

$$\Delta T = .00066 \times 2\pi$$

$$\begin{array}{r} 1.23974447 \\ 1.23932978 \\ \hline \boxed{.00041469} \end{array}$$

ck

$\Delta T =$

$$\begin{array}{r} .197311 \\ .197245 \\ \hline .000066 \end{array}$$

$$\begin{array}{r} .000066 \ \times 10^{-5} \\ 6.2832 \\ \hline 41.469 \times 10^{-5} \\ 414.69 \times 10^{-6} \end{array}$$

omit