PHYSICS TEST : CH. 2 (MOSTLY)

100 @ Seal

KEY

12 SEPT, 97

TELL HOW MANY SIGNIFICANT DIGITS ARE IN EACH OF THE FOLLOWING MEASUREMENTS:

① 2040 m $\boxed{3}$ ② 1.20×10^{10} μL $\boxed{3}$ ③ 1000 pounds $\boxed{1}$

Prefixes Used with SI Units			
Prefix	Symbol	Fractions	Example
pico	p	1/1 000 000 000 000 or 10^{-12}	picometer (pm)
nano	n	1/1 000 000 000 or 10^{-9}	nanometer (nm)
micro	μ	1/1 000 000 or 10^{-6}	microgram (μg)
milli	m	1/1 000 or 10^{-3}	milligram (mg)
centi	c	1/100 or 10^{-2}	centimeter (cm)
deci	d	1/10 or 10^{-1}	decimeter (dm)
		Multiples	
tera	T	1 000 000 000 000 or 10^{12}	terameter (Tm)
giga	G	1 000 000 000 or 10^{9}	gigameter (Gm)
mega	M	1 000 000 or 10^{6}	megagram (Mg)
kilo	k	1000 or 10^{3}	kilometer (km)
hecto	h	100 or 10^{2}	hectometer (hm)
deka	da	10 or 10^{1}	dekagram (dag)

PERFORM THE FOLLOWING CONVERSIONS:

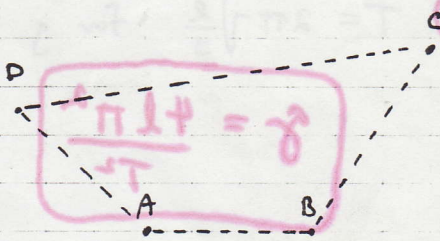
④ 420 μg (micro!!!) = $\boxed{0.420}$ mg (small "m")

⑤ 0.058 m^2 = $\boxed{580}$ cm^2

-4 if digs are ok, but decimal is off.

PERFORM THE FOLLOWING CALCULATIONS TAKING SIGNIFICANT DIGITS INTO ACCOUNT

⑥ FOUR POLES ON A PLAYGROUND ARE LABELED, A, B, C, & D AS SHOWN AT RIGHT. VARIOUS LAB GROUPS OF PHYSICS STUDENTS MEASURE DISTANCES BETWEEN POLES, & SINCE THE VARIOUS GROUPS USE DIFFERENT MEASURING DEVICES THEY ARE ABLE TO REPORT (ALL RESULTS ARE CORRECTLY REPORTED) THE FOLLOWING RESULTS: FROM POLE A TO B IS 16.24 m, FROM POLE B TO C IS 24.9 m, FROM POLE C TO D IS 48 m, AND FROM POLE D TO A IS 15.994 m. WHAT IS THE PERIMETER OF THIS AREA AS CAN BEST BE DETERMINED FROM THESE MEASUREMENTS?



$\boxed{105\ m}$

3 ans 2 units

$1.0 \cdot 10^2 = -2$

105.134 m = -3

105.1 = -1

110 = -2

⑦ A RECTANGULAR DRIVEWAY IS 3.20 m WIDE + 16.5 m LONG. FIND THE AREA OF THIS DRIVEWAY.

$\boxed{52.8\ m^2}$

3 ans 2 units

52.80 = -1

53 = -1

SOLVE EACH FORMULA FOR THE INDICATED VARIABLE

⑧ $F = ma$, FOR M

$\boxed{M = \frac{F}{a}}$

⑨ $F = \frac{G M_1 M_2}{d^2}$ FOR G

$\boxed{\frac{Fd^2}{M_1 M_2} = G}$

⑩ $T = 2\pi\sqrt{\frac{m}{k}}$ for m

$\boxed{\frac{T^2 k}{4\pi^2} = m}$

⑪ $d = vt + \frac{1}{2}at^2$ FOR a

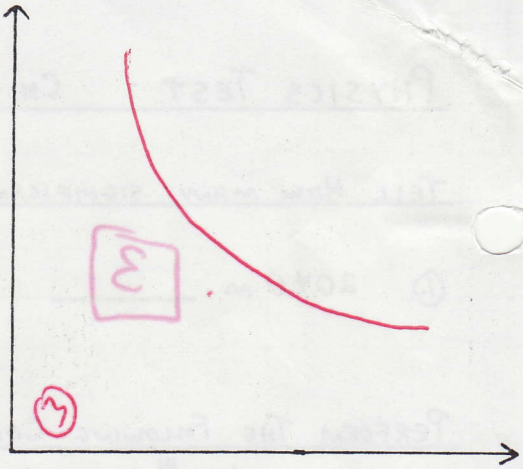
$\boxed{\frac{2(d - vt)}{t^2} = a}$

$\frac{2d}{t^2} - \frac{2v}{t} = a$

-2 if they can't's cancel

(12.) A NEW PHYSICS STUDENT found THE DATA TABLE AT THE RIGHT FOLDED UP IN THEIR TEXTBOOK FROM LAST YEARS CLASS. EVEN WITHOUT KNOWING THE DETAILS ABOUT THE LENS LAB THE DATA CAME FROM, THIS STUDENT WAS ABLE TO REACH SOME CONCLUSIONS ABOUT THE RELATIONSHIP BETWEEN THE DISTANCES d_I AND d_o. GRAPH THE DATA + DESCRIBE THE RELATIONSHIP

d_I (cm)	d_o (cm)
40	40
30	60
60	30
25	100
70	28
50	33



Type of RELATIONSHIP: Inverse

SOLVE EACH EQUATION FOR THE INDICATED VARIABLE:

(13.) $T = 2\pi\sqrt{\frac{l}{g}}$ for g

$g = \frac{4l\pi^2}{T^2}$

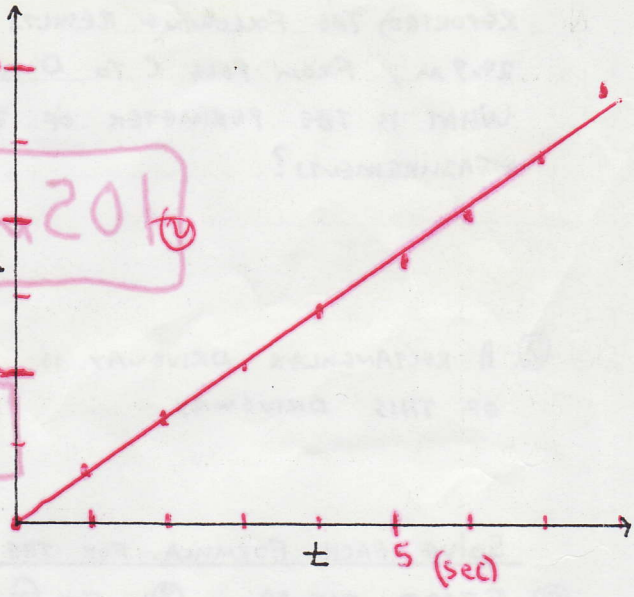
(14.) $K = \frac{1}{2}MV^2$, for V

$\sqrt{\frac{2K}{M}} = V$ OR $V = \frac{\sqrt{2KM}}{M}$

(15.) A STUDENT COLLECTS THE DATA AT THE RIGHT FROM MR. D's TOY 4x4.

t (sec)	d (cm)
0	0
1	27
2	59
3	104
4	120
5	172
6	197
7	240
8	270

(a) PLOT THE VALUES FROM THE TABLE + DRAW THE CURVE THAT BEST FITS ALL POINTS.



(b) describe THE TYPE RELATIONSHIP THIS GRAPH SHOWS. DIRECT

(c.) FIND THE UNITS of the SLOPE OF THIS GRAPH

$\frac{cm}{sec}$

(16.) EXPLAIN WHY SCIENTISTS ONLY CONCERN THEMSELVES WITH SIGNIFICANT DIGITS WHEN DISCUSSING NUMBERS FROM MEASUREMENTS, & NOT WITH THE OTHER NUMBERS IN FORMULAS THAT ARE NOT FROM MEASUREMENTS.

THERE IS A LIMIT TO THE PRECISION OF THE MEASURING DEVICE, & only those digits known with CERTAINTY, PLUS one UNCERTAIN DIGIT, ARE REPORTED.

(17.) TELL ON WHICH (X OR Y) AXIS INDEPENDENT AND DEPENDENT VARIABLES ARE GRAPHED. ALSO, COMPARE & CONTRAST INDEPENDENT & DEPENDENT VARIABLES.

Independent - X
Dependent - Y.
Independent are manipulated by the experimenter to see the change in the dependent variable.

(18.) WATER DRIPS FROM A FAUCET INTO A SINK AT THE RATE OF 3 DROPS EVERY 2 SEC. ONE CUBIC CENTIMETER (cm^3) CONTAINS 20 DROPS. 1 LITER OF WATER CONTAINS 1000 cm^3. THE PRICE OF 4L OF WATER IS 0.4 CENTS. WHAT IS THE PRICE OF THE WATER WHICH WOULD DRIP FROM THIS FAUCET IN ONE YEAR?

$$\frac{1\,yr}{1\,yr}\left|\frac{365\,d}{1\,d}\right|\frac{24\,hr}{1\,hr}\left|\frac{3600\,sec}{1\,hr}\right|\frac{3\,dr}{2\,sec}\left|\frac{1\,cm^3}{20\,dr}\right|\frac{1\,L}{1000\,cm^3}\left|\frac{0.4\,¢}{4\,L}\right.$$

236.52¢ or $\boxed{\$2.37}$

(19.) EACH CUBIC CENTIMETER OF GOLD HAS A MASS of 19.3 g. A CUBE of gold MEASURES 3.24 cm ON EACH SIDE. FIND THE VOLUME & MASS OF THIS CUBE.

$V = s^3$

$V = (3.24\,cm)^3 = \boxed{34.0\,cm^3}$

$$\left|\frac{19.3\,g}{1\,cm^3}\right| = \boxed{656\,g}$$

(20.) EARTH'S MOON IS ABOUT 380,000 KM FROM EARTH, & ORBITS ONCE EACH 28 DAYS. FIND THE AVERAGE SPEED OF THE MOON AROUND THE EARTH, IN (KM/HR) USING $V = \frac{2\pi r}{T}$.

$$V = \frac{2\pi(380{,}000\,km)}{672\,hrs}$$

$$\frac{28\,d}{1\,d}\left|\frac{24\,hrs}{1\,d}\right. = 672\,hrs$$

$= 3552.99$

$= \boxed{3553\,\frac{km}{hr}}$

3553