AP PHYSICS C MECHANICS: EXPERIMENTAL LAB FRQS

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Equipment

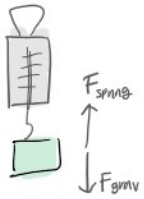
tinyurl.com/APPhysicsLabTingz

Meter Stick
measures length / distance

Stopwatch
measures time elapsed

Force Probe / Sensor
measures amount of force being applied
used in experiments involving friction, SHM, collision springs

Spring Scale
measures forces as well, more specifically the downward force of gravity



Balance
measures an objects mass

Photogate
measures time to get from one point to another


Basically the photogate records when something is blocking this gap

Motion Sensor
measures motion of an object (can be used for position, velocity, & acceleration)

What to Write

tinyurl.com/APPhysicsWkbk
pg 353

drawing conclusions from lab data

Purpose	Conclusion
establish a relationship between 2 quantities	graph 2 quantities & state relationship between 2 quantities & explain how you got your answer
determine value of a singe quantity	graph OR set of calculations. clearly state value of quantity & remember units
demonstrate or test a law of physics	include measurements of all quantities in law you are testing. state the equation in law & prove it true by plugging in values
make smth happen	state if you could accomplish challenge for lab w/ evidence (target OR measurement)
observe a phenomenon	state whether what you observed was true & what you observed as a result (observation probably qualitative) use appropriate physical principles & explain why
answer a scientific question	

General Tips

DO THESE

#1 Read the entire question first

#2 Have a mental / physical outline so your answer is not ridiculously rambly

#3 Underline key words or phrases to emphasize (words like increase decrease, directly proportional)

#4 use simple sentences. eloquence doesn't matter

NOUN – verb – direct object

DON'T DO THESE

#1 Try to avoid "it" & "they" → too ambiguous

#2 DON'T restate question. waste of time

#3 ↑ words ≠ ↑ points

#4 Be specific

~~Force~~ spring, normal, friction?
~~Energy~~ kinetic, spring, thermal

#5 Don't say smth moves → instead object moves w/ constant speed in a straight line

#6 Rate ⇒ velocity, Acceleration?
component ⇒ what is being broken into components

arguably the best / most important

equation

IF there are NO nonconservative forces (normally friction) then

Conservation of energy



Initial energy of system is same as final energy

common energy: PE_{grav}, PE_{spring}, $KE_{translational}$, $KE_{rotational}$

Situation Specific Equations

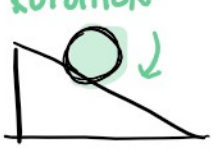
COLLISIONS

$\Delta P_i = \Delta P_f$ conservation of momentum

$P = mv$ impulse formula

$P = \Delta J = \int_{t_1}^{t_2} F(t)\,dt$

ROTATION


Ball Rolling Down


Rotating Thing

$\tau = I\alpha = rF$

$I = \int I^2\,dm \quad \int dm = \int \lambda\,dx$

Writing the Experiment

#1 make sure you measure everything

- mass
- length
- time
- incline angle
- radius
- etc

#2 **REPEAT** experiment (at least 5 times for each trial) to minimize experimental error

EASY POINTS

2017 #2 Aii

1 point for including valid method for reducing experimental error

Possible Errors

#1 errors in measurement
#2 forces not accounted for
friction, air resistance