Physics Final Exam Study Guide

**To earn Full Credit you must:**

1. **Summarize all of the study guides in at least 2 sides of 1 piece of paper (you can not turn in old study guides)!**
2. **Do all of the calculations and show your work!**
3. **Write all of the possible lab reports for the exam (you can not turn in old labs)!**

**Write at least 2 pages that covers the information that follows.**

Study Guide for Unit 1 Physics Test

\*\*Using your notes and assignments: write a 1 paged ( 1 side) study guide that covers the information below.

1. Know the 6 parts of a lab report and how to write one.
2. Know how to convert from one metric unit to another (example: 10 km = \_\_\_\_ dm).
3. Know what dimensional analysis is and how to use it toc convert from the English system to the metric system. (example: 1600 m = \_\_\_\_\_\_\_ yards).
4. Know what average velocity is, instantaneous velocity is and the difference between the two.
5. Know how to calculate the final velocity of an accelerating object.
6. Know what acceleration is and how to calculate it.
7. Be sure to label all of your calculations with the correct units.
8. Know what a scalar and a vector are and the difference between the two of them.
9. Know what significant digits are and how to use them.
10. Know how to calculate the distance of a falling object if you are given the time.
11. Know how to calculate the distance of an accelerating object.

Unit 2 Physics Study Guide.

1. Know gravity’s acceleration and know how to prove it in Lab.
2. Know how to calculate the distance of an accelerating object.
3. Know what Newton’s 2nd law is and how to use the equation that it is associated with.
4. Know what Newton’s 1st Law is and what inertial is.
5. Know how to calculate the velocity of a falling object.
6. Know how to use a “positive” or “negative” direction when dealing with an accelerating object.
7. Know what happens to the acceleration of an object when the force is constant.
8. Know what happens to the velocity of an object when the force is constant.
9. Know what momentum and impulse are.

Study guide for the

Unit 3 Physics Test.

1. Know what the center of gravity is and how to locate it. Be able to explain why the hammer and fork demonstrations were able to balance.
2. Know what impulse is and how to calculate it. Know how the change in impulse is related to the change in momentum.
3. Know how you can make the force of impulse smaller or larger and how to relate this to the egg drop contest.
4. Know what work and power are, how to calculate the both of them and what their units are.
5. Know how to use Pythagorean and the trig function Tangent to solve for a vector addition.
6. Know the four steps that should be used when you are solving vectors.
7. Know how to draw linear and non- - linear vectors to scale and how to use your drawing to find the resultant.
8. Know what torque is and how it can help or hurt the effectiveness of a lever.

Unit 4 physics

# Study guide

1. Know how the phase of matter is related to the motion of molecules. Know about the forces that exist between water molecules and what “polar” means.
2. Know how to use trig to find the height of a building. Be able to solve vector additions that form right triangles (Pythagorean theorem and tangent).
3. Be able to use the law of sine and the law of cosine to solve vector additions that do not form right triangles.
4. Know how vectors apply to sail boats. Know why they can travel the fastest going against the wind.
5. Be able to measure the distance and time of a falling object and use those measurements to calculate the acceleration.
6. Know how to use a lever to calculate the mass of bottle water..
7. Know how to calculate the average the momentum, average velocity, final velocity and acceleration of dart if given the needed data.
8. Know how to compare the accuracy of finding a resultant using a force table and using the Law of Cosine and the Law of Sine.

Unit 5 Physics test Study Guide

1. Know what waves are and all of the parts (wavelength, frequency, period ) are.
2. Know how to calculate the frequency, period and speed of a wave.
3. Know what reflection is, how light behaves when it hits a plane mirror and how the image distance should compare to the object distance.
4. Know what refraction and why it happens.
5. Know what the “normal” line is and how to use it to measure the angle of incidence and the angle of refraction.
6. Know what Snell’s Law is and how to use the equation that is associated with it.
7. Know how to draw ray diagrams.
8. Know the difference between a virtual image and a real image.
9. Know what polarized is and how polarizers work.

Unit 6 physics study guide

**All students will:**

1. Know how the frequency and the pitch of a sound are related. Know what the Doppler shift is and why it happens.
2. Know what kind of wave sound is.
3. Know what a compressional wave is and it’s different parts.
4. Know what the loudness of a sound wave depends on.
5. Know why sound has to have a medium to travel through.
6. Know what Resonance is.
7. Know what a standing wave is.
8. Know what a Natural frequency is.
9. Know how to calculate the resistance created by a series circuit and a parallel circuit. Know what Ohm’s law is and how to use the equation that comes with it.
10. Know what Coulomb’s law is and how to calculate the force of attraction (or repulsion) between two or more charged objects.
11. Be able to solve vector problems using Coulomb’s law and drawing to scale.
12. Know the relationship and the difference between current, voltage and resistance.
13. Know what conduction and induction are. Know the difference between induction and conduction are. Be able to give examples of all of these. Know what friction charging is and what polarization is.

Unit 7 Physics

Study guide

1. What magnetism is and how it is related to electricity.
2. What magnetic fields are and what they look like around a bar magnet.
3. What heat and temperature are.
4. How to calculate heat.
5. What thermal equilibrium is and how it is related to average temperature.
6. What specific heat is.
7. What Calories are.
8. How to convert from Kelvin to Celsius.
9. How to convert from Celsius to Fahrenheit.
10. What Potential and Kinetic energy are.
11. How to calculate KE and PE.
12. What thermal expansion is.
13. What Archimedes’ Principle is.

Unit 8 Physics Study Guide

1. Know what rotational inertia is and be able to give examples of it changing (Ice Skater).
2. Be able to calculate the initial velocity of a dart fired by a Nerf dart gun.
3. Know what Trajectory is and how to calculate the distance of a projectile.
4. Know how water expands and what the shape of the ice crystal has to do with this.
5. Know what Hooke’s law is and how to calculate the “K” of a rubber band.
6. Know how things rotate and how this can create a centripetal acceleration.

Unit 9 Physics Study guide

1. Know what Resistivity is and how to calculate it.
2. Know what Terminal Velocity is and how to investigate it.
3. Know what Capacitors are.
4. Know how temperature can effect variance in resistors.
5. Know how current, electrons and charge are related.

Final Exam Physics

Calculations Review.

1. Convert 125 pounds to kilograms.
2. Convert 55 m/s to mi/hr.
3. If an object had an initial velocity of 20 m/s, a final velocity of 75 m/s in a time of 10 seconds, how far did the object go?
4. If an object fell for 25 seconds, how far did it fall?
5. If an object had a mass of 150 pounds and a velocity of 32 m/s west, what is the momentum?
6. If a falling object exerted a force on the ground of 15 N, with a time interval of .35 seconds, what is the impulse?
7. If an air plane had a velocity of 150 mi/hr., collided with a head wind of 14 mi/hr., what is the resultant?
8. If a car traveling 55 mi/hr. at 42 degrees collided with another traveling 15 mi/hr. at 108 degrees, what would the resultant be?
9. If an airplane traveling 56 m/s at 0 degrees collided with another plane traveling 72 m/s at 90 degrees, what is the resultant?
10. If someone moved a 120 N mass 25 meters, how much work was done? If it took the person 32 seconds, how much power was used?
11. If light traveling through two different mediums had an angle of incidence of 45 degrees and the angle of refraction is 58 degrees, what would the index of refraction be?
12. If an object created an image with a lens with an object distance of 25 cm, an image distance of 50 cm, what is the focal point?
13. If a roller coaster had a kinetic energy of 1200 J, a mass of 1500 pounds, what is the velocity of the roller coaster at the bottom of the first hill?
14. Convert 25 degrees Fahrenheit to Kelvin.
15. If a series circuit was built with the following resistors : 2 ohms, 5 ohms and 3.5 ohms, what would the resistance (total) be? If it was built in parallel what would the resistance be?
16. If a circuit created 20 amps of current, 14 ohms of resistance, what would the voltage be.
17. If the forces on the particles were: A = 24 Coulombs, B = 10 Coulombs and C = 3 Coulombs, Calculate the “net force” on particle B of the three pictures below:

.005 m

.0075m

18.) If the forces on the particles were: A = .0033 Coulombs, B = .0024 Coulombs and C = .0010 Coulombs, Calculate the “net force” on particle B of the three pictures below:

.0044 m

.0033

Trajectory Problems.

1. If a rifle fired with an initial velocity of 17 m/s at an angle of 15 degrees, what is the distance traveled?
2. If an outfielder threw a base ball at an initial velocity of 15 mi/hr at an angle of 12 degrees, what is the distance the ball traveled?

**Lab Review**

**One of the following will be the lab report you write for the exam. You need to write all of them!**

Possible labs. For

Physics Exam.

\*\*1 of the following Labs will be the one you write on the exam. Write a Lab report (do not just turn in your old ones!) and turn in.

**Gravity Lab**

**1.) Problem: How can you calculate the acceleration due to gravity?**

**Material: ball, stop watch, meter stick.**

**Data:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **D** | **T** | **AV** | **FV** | **Acceleration** | **“G”** |
| **Ball** | **1 m** | **.48 s** |  |  |  | **9.8 m/s2** |

**Conclusion: ?’s from notes.**

**Ht. of Gym Lab**

2.) Problem:

How can you use trig to calculate the height of the gym?

Material:

Straw, protractor, yarn, weight.

Tan = height from eye level/Distance from wall

Dist. From wall

Data:

|  |  |  |  |
| --- | --- | --- | --- |
|  | D (m) | Ht. from viewer’s eye to floor | Angle of point of view |
| Wall | 6.5 | 2.34 | 47.5 |

Calculations:

Conclusion : normal

\*\*Calculate height of wall and % error.

Actual height of wall 9.45 m

Conclusion: ?’s from notes.

Force table Lab

**3.) Problem: How can you calculate the resultant of two forces (20 N @ 90 degrees + 35 N @ 180 degrees, resultant)? How can you use a force table to test the magnitude of your calculation?**

**Material: force table.**

**Data:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Force @ 90** | **Force @ 180** | **Resultant** |
| **Drawing** | **20 N** | **35N** |  |
| **Force Table** | **20.5 N** | **35.5 N** | **50.5 N** |

**Conclusion: ?’s from notes**

**Parallel and series Lab**

**Problem (s):**

1. **How can you build a series circuit and a parallel circuit?**
2. **Will there be a difference in the brightness of the bulbs in the two different circuits?**

**Material:**

**Battery, 6 light bulbs, Battery, alligator clips.**

**Observations:**

**Parallel: Brighter and evenly distributed.**

**Series: Much dimer and not evenly distributed.**

**Conclusion: Answer the following in at least 50 words.**

1. **What is a parallel circuit?**
2. **What is a series circuit?**
3. **Did you use static electricity or current? What’s the difference?**
4. **How did the brightness of the bulbs compare? Why do you think this happened?**