**Physics Final Exam Study Guide**

**Define words and answer questions to prepare yourself for the final exam.**

**Unit- Momentum and Impulse**

1. momentum
2. impulse
3. conservation of momentum
4. collisions
5. Two objects with different masses traveling at the same speed have a head-on collision. Which vehicle, the more massive or the less massive, experiences the greatest force?
6. A large truck and a small car travel at the same speed. Which has more momentum?
7. Why are padded dashboards used in cars?
8. If a train runs into another identical train at rest and they link together, what is the velocity of the combined trains after the collision compared to the velocity of the first train?
9. If the trains in question 35 are instead moving toward each other with the same speed, collide, and link together, what is the velocity of the trains after the collision?
10. A 5 kg ball is thrown at 4 m/s. What is the ball’s momentum?
11. Wayne hits a stationary .15 kg hockey puck with a force that lasts for .1 seconds that makes the puck move across the ice with a speed of 18 m/s. With what force did he hit the puck?
12. In an elastic collision, a 20 kg shopping cart traveling at 3 m/s collides with a 9 kg shopping cart at rest. After the collision, the 10 kg shopping cart is at rest. What is the velocity of the 7 kg shopping cart?

**Unit- Waves and Sound**

1. vibration of a pendulum
2. Frequency
3. amplitude
4. wavelength of longitudinal vs. transverse waves
5. crest vs. trough
6. wave speed for sound and light
7. transverse vs. longitudinal
8. interference
9. node vs antinode
10. law of reflection
11. refraction
12. constructive vs. destructive
13. The Doppler Effect
14. sound in air
15. media that transmit sound
16. speed of sound
17. loudness
18. natural frequency
19. resonance
20. beats
21. What is the source of all wave motion?
22. Define cycle.
23. Define wavelength.
24. What type of wave is a sound wave?
25. Define interference.
26. What is the Doppler effect?
27. How are frequency and wavelength related?
28. Which travels faster, sound or light?
29. What type of material transmits sound the best?
30. Where can sound not travel?

**Unit- Light**

1. speed of light
2. electromagnetic spectrum
3. virtual vs real image
4. additive color mixing
5. reflection
6. primary light colors
7. primary pigment colors
8. complementary colors
9. why are objects certain colors?
10. polarization
11. diffraction
12. Name the electromagnetic spectrum in order from the longest to the shortest wavelength.
13. How much light is able to pass through two polarizing filters when their axes are parallel? Perpendicular?
14. Define complementary colors.
15. What two colors make up magenta?
16. What are the three colors of light that are in your TV?
17. State the law of reflection.
18. What causes refraction?
19. What happens to the speed of light as it passes through a lens?
20. What causes diffraction?
21. Taylor sees a coin at the bottom of a swimming pool at an angle of 40° to the normal and she dives in to retrieve it. However, Taylor doesn’t like to open her eyes under the water so she must rely on her initial observation of the coin made in the air. At what angle does the light from the coin travel as it moves? (nwater = 1.33)
22. A factory whistle blows at a frequency of 1116 HZ. What pitch will the passengers of a car moving at 28 m/s away from the whistle hear if the speed of sound is 343 m/s.
23. David sees the inverted image from his light bulb at a distance of 25 cm from the **lens** at a height of 8 cm. IF the object is actually 4 cm from the lens what is the focal length and what is the height of the actual object?
24. A **concave mirror** with a focal length of 10.0 cm creates a real image 30.0 cm away on its principal axis. How far from the mirror is the corresponding object?

**Unit- Electricity**

1. electrostatics
2. static electricity
3. charge
4. conservation of charge
5. Coulomb’s Law
6. conductors vs. insulators
7. electric fields
8. electric field lines
9. electric potential
10. flow of charge
11. electric current
12. electric resistance
13. Ohm’s Law
14. direct current
15. alternating current
16. electric power
17. series circuits vs. parallel circuits
18. Two point charges with values of 4.0 X10-7 C are separated by 0.60 m. What is the electrical **Force** of this two-charge system?
19. What is the charge of a proton, an electron, and a neutron?
20. What do like charges do? What do unlike charges do?
21. How are electrical force and distance related?
22. What is Coulomb’s law?
23. How are electrical and gravitational forces similar? Different?
24. How are the electrons held in a good insulator? Conductor?
25. What is the electric field strength inside a metal sphere?
26. What is needed for charge to flow?
27. Which has more resistance, a thin or a thick wire?
28. A 5V battery is connected to a resistor, 2A of current flows through the resistor. What is the resistance in Ohms?
29. How do you combine resistors in series?
30. Why is it best to buy Christmas lights wired in parallel?
31. What are fuses and circuit breakers used for?
32. What remains constant for each branch in a parallel circuit?
33. A. Find the **total resistance** of the three resistance of the following three resistors connected in parallel: R1 = 12 ohms, R2 = 22 ohms, and R3 = 45 ohms  
    B. What would be the overall current if a 12 V battery is used in the system?  
    C. How much current is present in each resistor?
34. Draw a schematic diagram of two 6-ohm resistors and a 4-ohm resistors in series with each other is a 12 V battery is used?  
    A. What is the overall resistance of the resistors?   
      
    B. What is the current through the series circuit?  
      
    C. What is the voltage drop across each resistor?