**Honors Physics Final Exam Review – Spring 2019**

**Vocabulary**

Alternating Current

Ammeter

Ampere

Amplitude

Antinode

Attraction

Battery

Beat

Capacitor

Charge

Circuit

Circuit Breaker

Color Addition

Color Subtraction

Complementary Colors

Compression

Concave Lens

Concave Mirror

Conduction

Conductor

Conservation of Charge

Convex Lens

Convex Mirror

Cornea

Coulomb

Coulomb’s Law

Crest

Critical Angle

Current

Decibel (dB)

Decibel Scale

Diffraction

Diffuse Reflection

Direct Current

Doppler Effect

Dry Cell

Dye

Echo

Electric Field

Electric Field Line

EM Spectrum

Electromagnetic Wave

Electron

Electrostatics

Equivalent Resistance

Frequency

Fundamental Frequency

Fuse

Grounding

Harmonics

Hyperopia

Illuminated

Incident Wave

Induction

Infrasonic

Insulator

Intensity

Interference

Law of Reflection

Lens

Light

Lightning

Longitudinal Wave

Loudness

Luminous

Mechanical Wave

Mirror

Myopia

Node

Noise

Ohm

Ohm’s Law

Opaque

Oscillation

Parallel Plate Capacitor

Parallel Circuit

Period

Periodic Motion

Pigment

Pitch

Polarization

Potential Difference

Power

Primary Color

Pupil

Rarefaction

Ray Diagram

Real Image

Reflected Wave

Reflection

Refraction

Repulsion

Resistance

Resistor

Resonance

Retina

Secondary Color

Series Circuit

Short Circuit

Simple Harmonic Motion

Snell’s Law

Sound

Standing Wave

Total Internal Reflection

Translucent

Transparent

Transverse Wave

Trough

Ultrasonic

Vibration

Virtual Image

Volt

Voltage

Voltmeter

Wave

Wavelength

Wave Pulse

Wet Cell

Work

**Important Concepts:**

1. Name the subatomic particles: their charge, location in the atom and the electrostatic behavior.
2. Compare and contrast electrostatic force and gravitational force.
3. Explain how a neutral object may be charged through friction, conduction and induction.
4. Determine why a neutral object will be attracted to a charged object, but not repelled by a charged object.
5. State the Conservation of charge and give an example.
6. Analyze Coulomb’s Law: if distance is greater how does the force respond? If charge is greater how does the force respond?
7. Define electric field and explain how to draw an electric field diagram.
8. Discuss the difference between electrical potential difference and electric potential energy.
9. Compare and contrast series and parallel circuits.
10. Analyze Ohm’s Law: if voltage is constant what happens when resistance is increased? If resistance is held constant what happens if voltage is increased? Explain the type of relationship demonstrated in these situations.
11. Compare and contrast an electric field and a magnetic field.
12. Define the types of waves and the components of each type. Draw a diagram to illustrate each type of wave.
13. Explain what happens in each of the following situations: a mechanical wave encounters a boundary, an EM wave strikes a transparent object, two out of phase waves occupy the same space at the same time and two in phase waves occupy the same space at the same time.
14. Discuss the changes in the speed of sound when it travels through different phases of matter.
15. Explain how temperature changes the speed of sound that is traveling through a gas.
16. Define resonance and give two examples.
17. List the waves on the Electromagnetic Spectrum by increasing frequency. Describe what happens to the amount of energy as the frequency increases and to the wavelength as the frequency increases.
18. Compare and contrast sound waves and light waves.
19. Explain why we see certain colors.
20. Discuss the difference between color addition and color subtraction.
21. State the Law of Reflection and give an example.
22. Explain what changes occur when light enters a new medium.
23. Define critical angle and total internal reflection
24. List the types of mirrors and the LOST characteristics for the images formed by each mirror.
25. List the types of lenses and the LOST characteristics for the images formed by each lens.

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**Problems:**

List the information given, the unknown and the formula. Show your work!

1. What is the electric field 3.5 x 101 m from a charge of 3C?
2. What is the magnitude of the force of a 10µC charge exerts on a 3.0µC charge 2.0 m away?
3. A 4.5x109 C charge is located 3.2 m from a 2.8x109 C. Find the magnitude of the electrostatic force by one charge on the other.
4. A 50.0-V battery is connected across a 10.0-ohm resistor and produces a current of 4.5 A.

What is the internal resistance of the battery?

5. How much voltage is required to make 4 amperes flow through a 12-ohm resistor?

6. A battery does 18 J of work on 10 coulombs of charge. What voltage does the battery supply?

7. What is the current in a 60-W bulb connected to a 120-V source?

8. Find the current through a 12-ohm resistive circuit when 24 volts is applied.

9. Find the applied voltage of a circuit that draws 0.2 amperes through a 4800-ohm resistance.

10. Find the applied voltage of a telephone circuit that draws 0.017amperes through a resistance of 15,000 ohms.

11. A series circuit has 1200-ohms of total resistance with 12 V as the power supply. What is the total current of

this circuit?

12. A 35-Ω, 55-Ω, and 85-Ω resistor are connected in parallel. The resistors are then connected to a 35-V

battery.

a. What is the equivalent resistance of the parallel combination?

b. What is the current through each resistor?

13. The load across a 50.0-V battery consists of a series combination of two lamps with resistances of 125 Ω and

225Ω.

a. Find the total resistance of the circuit.

b. Find the current in the circuit.

c. Find the potential difference across the 125-Ω lamp.

14. A sound wave traveling at 350 m/s has a frequency of 500 Hz. What is its wavelength?

15. A sound wave travels 2.462 km in 8.73 s. What is speed of the wave?

16. An electromagnetic wave travels for 21.38 ms. How far does it travel in kilometers?

17. What is the frequency if you bounce a ball 27 times in 20 seconds? What is the period?

18. What is the wavelength in meters of the sound produced by a tuning fork which has a frequency of 320 Hz?

The temperature of the air is 15°C.

19. A candle is placed 15 cm from a concave mirror that has a focaI length of 10 cm. Where is the image

located? What is the magnification?

20. A 2.0 cm flame forms an image at 12 cm when the candle is located at 12 cm. What is the focal length of the

Mirror? What is the height of the image?

21. Explain why you did not need to perform any calculations to solve problem #20.

22. A candle is placed 15 cm in front of a diverging lens which has a focal length of 10 cm. Where is the image

located? What is the magnification?

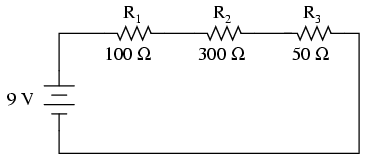
23. What is the angle of refraction for a ray of light striking the water at an angle of 30°?

24. What is the critical angle for a ray of light leaving water and entering air?

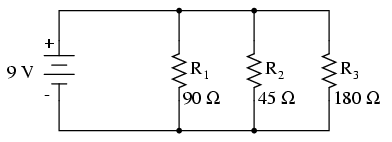
25. What is the speed of light in water?

**Diagrams**

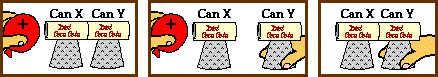
**Name the type of circuit shown below. Calculate the total resistance, current and the voltage drop across each resistor.**



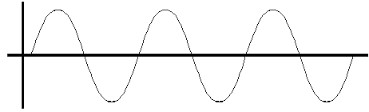
**Name the type of circuit shown below. Calculate the total resistance and the current through each branch.**



**Two neutral conducting pop cans are touching each other. A positively charged balloon is brought near one of the cans as shown below. The cans are separated while the balloon is nearby, as shown. After the balloon is removed the cans are brought back together. When touching again, can X is \_\_\_\_.**



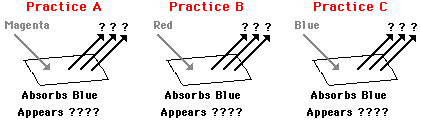
**Identify the wave, label all components, measure and record the amplitude, frequency and wavelength.**



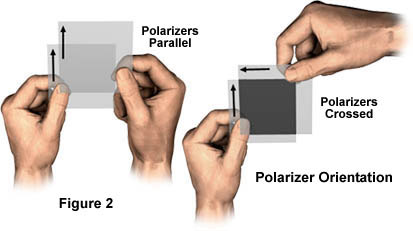
**Label the wave type and all components**



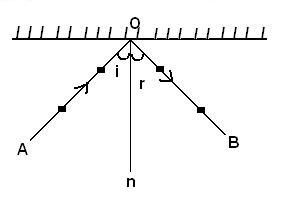
**Determine the color created in each situation.**



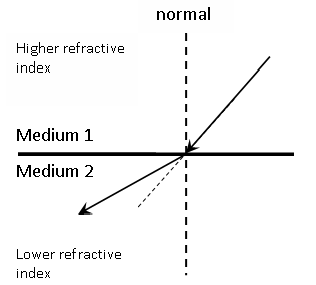
**Explain the process indicated below**

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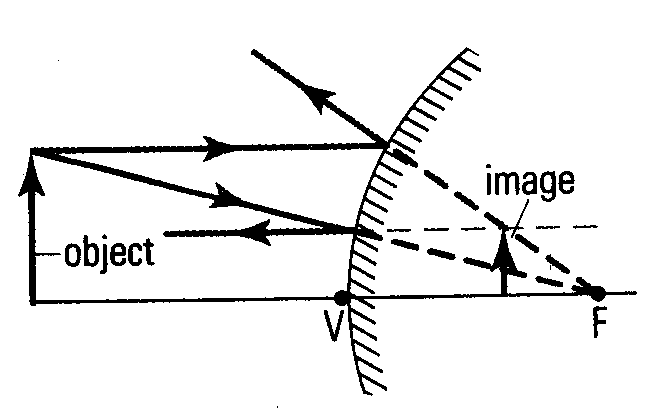
**In the diagram below, the incident ray is equal to 32°. What is the reflected angle?**

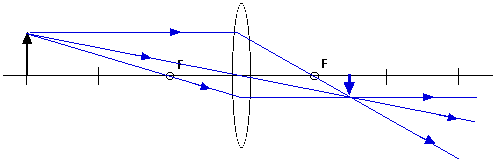
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**Label the medium that is more optically dense. Conceptually justify your answer. Measure the angles with a protractor. Use Snell’s Law to determine the index of refraction value of Medium #2 if Medium #1 is air.**

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**Label each diagram with the correct optical instrument and list the LOST characteristics.**

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**Determine the vision problem experienced by the eyeball below. What lens is needed to correct the issue?**

