

Name _____ Date _____
Teacher _____ Period _____

Honor's Physics 2nd Semester Review

Thermodynamics (8 questions)

What is the difference between heat and temperature?

What is the major implication of the second law of thermodynamics as related to absolute zero?

What is thermodynamics?

What is the SI unit for heat? What is the physical capability of one of these units?

What is specific heat?

Sound (8 Questions)

What are the physical characteristics of a sound wave that affects the pitch, volume, and quality?

How does the temperature of the air affect the velocity of a sound wave?

Explain what happens to the observed wavelength and frequency of the wave, when the source moves with respect to the observer.

What causes beat frequencies to be heard? Are there any conditions in which they will not be heard?

What causes the loud tones to be heard when a tuning fork is held over certain length pipes? What is the relationship between the length of pipe and the wavelength of the sound wave that is heard? How does the type pipe affect the frequencies (fundamentals and harmonics) are heard?

Light (10 Questions)

What is the quantum theory?

What is the difference between transparent, translucent, and opaque objects? Illuminated and luminous objects?

How does the distance from a luminous object affect the illumination of that object?

What is the relationship between phosphors and highlighters or “glow in the dark” objects?

Know how light colors are mixed to produce other colors. Also make sure you understand how light and pigments interact to give you the colors you see.

Refraction and Reflection – Lenses and Mirrors (11 Questions)

What are the two types of reflection? How can you differentiate between the two?

What is the law of reflection?

Familiarize yourself with lenses and mirrors and the images that are produced when the objects are placed in certain areas. Be sure you know how to find the distances, heights, and magnification when given specific numerical information. (Look at the diagrams we made in class)

What is refraction?

How can you tell the speed of light through a medium if you know the index of refraction of the medium?

What is the relationship between the index of refraction and the speed of light in a medium? What causes the change in speed? How is the index related to optical density?

As light travels into a medium of different optical density, what properties of the light wave changes? If the light enters the new medium at an angle, how does the path change? Is there any time (or angle) at which the light will not move into the new medium?

What is the relationship between the frequency, wavelength, and velocity of a wave? When a wave refracts due to a change in medium, which of these changes?

Diffraction and Polarization (6 Questions)

What is diffraction? How is the amount of diffraction related to the wavelength?

What is polarization? By what methods can light be polarized? List examples for each.

When light is reflected off of a horizontal surface, what direction is the glare polarized? How can you reduce the amount of glare that meets your eyes?

What types of waves can be polarized? List an example of one type of wave that cannot be polarized.

Electrostatics (7 Questions)

What is an electric field? What happens when a charged particle is placed in an electric field?
How is an electric field symbolized around a charge?

How is the force between charges, the magnitude of the charges, and the distance between the charges related?

Know how to find the force between two particles when given the charge of each particle and the distance between the particles.

What is static electricity?

How are charges distributed on a conductor? If the conductor is grounded, what happens to the charges? How does this affect the electric potential of the conductor?

Capacitance (5 Questions)

What are capacitors used for?

How do you compute the equivalent capacitance for capacitors in series and in parallel?

How can you compute the charge on a capacitor?

Circuits (6 Questions)

Know Kirchoff's rules and how they can be applied to a circuit to find the current and voltage.

What is current? How is it related to charge?

What is Ohm's Law?

How are the direction of conventional current and the electron flow related?

What factors affect the resistance of a metal, and how do they affect it?

Magnetism (4 Questions)

What are the different types of magnetic material? What are their properties? Know an example of each.

What is the Curie Point? What happens to the domains at this point?

What is the relationship between the magnetic field strength and the number of loops in an electromagnet? What is the relationship between the magnetic field strength and current in an electromagnet?

In a magnetic field diagram, how do you know the location of the stronger magnetic field? How do you know the location of the north and south poles?

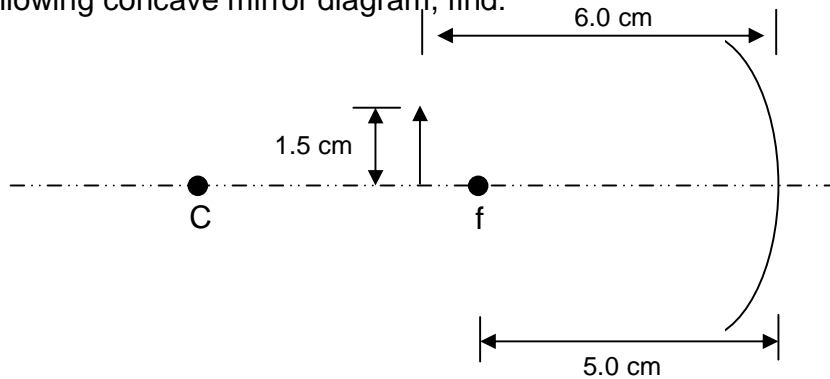
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Honors Physics 2nd Semester Final Exam Written Practice

Answer all questions in the space provided. Show all work. NO CREDIT WILL BE GIVEN IF WORK IS NOT SHOWN.

1. Determine the amount of energy used to fully vaporize a 20g ice cube at 0°C.
(Answer: 6.02×10^4 J)
2. A tenor sings at a frequency of 523 Hz. The wavelength of the sound wave is measured at 0.651m. What is the temperature of the air that the tenor is singing in? (Answer: 15.8 °C)
3. A lamp with a luminous intensity of 120.0 candelas shines on a screen 3.4 meters away. What is the Illumination on the screen?(Answer: 10.4 lux)

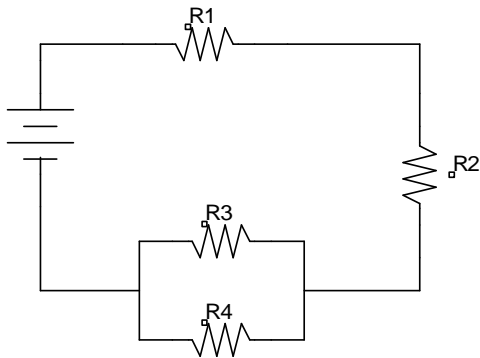
4. For the following concave mirror diagram, find:



- a. d_i Answer _____ (30 cm)
- b. h_i Answer _____ (-7.5 cm)
- c. magnification Answer _____ (-5.0)

5. A light beam with an intensity of 350 W/m^2 is sent through three polarizing sheets. The angle between the first and second polarizer sheet is 24° , while the angle between the second and third polarizer sheet is 39° . What is the light's intensity after passing through the three polarizing sheets? (Answer: 88 W/m^2)
6. Five protons and twenty electrons 3.4 mm apart. How much force is present between the two sets of charges? (Answer: $-2.0 \times 10^{-21} \text{ N}$)
7. Given 4 capacitors: $8.00\mu\text{F}$, $12.00\mu\text{F}$, $4.00\mu\text{F}$, $16.00\mu\text{F}$. Find the equivalent capacitance if they are connected in series and parallel. (Series: $1.92\mu\text{F}$, Parallel: $40\mu\text{F}$)

8. Complete the following table for the circuit shown:



	V	I	R
Batt.		8.0 A	
R ₁			3.0 Ω
R ₂			2.0 Ω
R ₃	15.0 V		
R ₄		5.0 A	

	V	I	R
Batt.	55.0 V	8.0 A	6.88 Ω
R ₁	24.0 V	8.0 A	3.0 Ω
R ₂	16.0 V	8.0 A	2.0 Ω
R ₃	15.0 V	3.0 A	5.0 Ω
R ₄	15.0 V	5.0 A	3.0 Ω

2nd Semester Final Exam Equations

Thermodynamics

$$Q = mc\Delta t$$

$$Q_f = mL_f$$

$$Q_v = mL_v$$

$$\Delta L = \alpha L_0 \Delta T$$

$$\Delta V = \beta V_0 \Delta T$$

Sound

$$v_{\text{sound}} = 331 + 0.6(\Delta T)$$

Waves

$$v_{\text{wave}} = \lambda f$$

Mirrors and Lenses

$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

$$m = \frac{-d_i}{d_o} = \frac{h_i}{h_o}$$

Light

$$E = \frac{F}{4\pi d^2} \quad I = \frac{F}{4\pi}$$

$$I = I_0 \cos^2 \theta$$

Electrostatics

$$E = \frac{F}{q}$$

$$E = \frac{4\pi k Q}{A}$$

$$F = k \frac{q_1 q_2}{r^2}$$

Capacitance

$$C = \frac{\epsilon_0 A}{d}$$

$$V = Ed$$

$$C_p = C_1 + C_2 + \dots$$

$$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots$$

Capacitance(cont.)

$$V = \frac{W}{q}$$

$$C = \frac{Q}{V}$$

Electric Circuits

$$P = I^2 R = IV = \frac{W}{t}$$

$$I = \frac{q}{t}$$

$$V = IR$$

Magnetism

$$B = 2k \frac{I}{r}$$

$$F = \frac{(2kl)I_1 I_2}{d}$$

$$F = BIL$$

$$F = Bqv$$