

FIRST NAME _____ LAST NAME _____
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Physics 10 midterm exam #2

November 6, 2000

What has the greatest resistance?

- You
- A six inch cooper wire
- A 12 inch copper wire
- A 1 meter iron rod

Which kind of earthquake wave is purely longitudinal?

- the p-wave
- the l-wave
- the s-wave
- the the r-wave

Which kind of light has the longest wavelength?

- red light
- blue light
- infrared light
- ultra violet light

When an object is short of electrons, it

- has a negative charge
- has a positive charge
- has a low resistance
- glows (e.g. lightbulb wire)

Radio waves and x-rays have the:

- same frequency
- same speed
- same wave length
- same surface area
- none of the above

A shaped charge in an explosion does more damage because:

- The sharp shape cuts the object
- The shape focuses the power
- It adheres to the object
- It disguises the explosive

If an earthquake wave reaches an area that has slow wave speed, the amplitude is:

- increased
- decreased
- stays the same

What is a coulomb?

- 6×10^{18} electron charges
- the energy of one electron at a potential of one volt
- one cubic kilometer per second
- one ohm per second
- the charge on one electron

Which of the following statements about earthquakes is true?

- S waves are fastest and cause the most destruction.
- P waves are fastest and L waves cause the most destruction.
- L waves are slowest and P waves cause the most destruction.
- P waves are fastest and cause the most destruction.

The Tesla coil was useful because:

- it allowed there to be a powerplant in every neighborhood.
- it made the high voltage less dangerous
- it decreased the current going through long wires to reduce the loss of electricity.
- it was given strong support by Thomas Edison, who popularized it

If the distance between two charges is increased by a factor of 4, what happens to the electric force?

- it remains the same
- it decreases by 2
- it increases by 2
- it decreases by 4
- it increases by 4
- none of the above

When a earthquake at sea starts a tsunami or tidal wave, the initial height is relatively small. What accounts for the towering wave that breaks near the shore?

- the wave builds up energy as it moves
- the wavelength increases
- the depth increases
- the wave moves faster
- the wave moves slower
- its appetite for destruction is piqued

Theoretically, the earth should not have a permanent magnetic field because:

- its interior is too hot
- the Earth spins
- there is not enough iron
- magnets do not occur naturally

If half of a lens is blocked, then

- half of the image disappears
- a quarter of the image disappears
- no image is produced
- the image becomes less bright

Diamonds sparkle in many colors due to their

- high dispersion
- high index of refraction
- hardness
- fluorescence
- polarization

Light is polarized when it bounces off of (check all that are correct):

- water
- glass
- air

Why do people squint to see better?

- reduces the light
- increases the light
- makes the lens stronger
- reduces the blur size
- they don't see better. It is an example of the placebo effect.

You can demagnetize a natural magnet

- by placing it on a TV or Computer screen
- by placing it in a very strong electric field
- by heating it above the curie point
- none of the above

You can measure the distance to the epicenter by measuring

- The amplitude of the P wave
- The amplitude of the S wave
- The frequency of the L wave
- The time between the P and S waves

A diopter is inversely equal to:

- wave length
- focal length
- lens size
- image size
- lens thickness

A lens is to be made by combining a lens having a focal length of 50 cm with another lens having a focal length of 100 cm. What is the approximate strength of the new lens?

- 150 cm
- 50 cm
- 2 diopters
- 3 diopters
- none of the above

What invention made it possible to change low voltage AC to high voltage AC?

- Van de Graaff generator
- samarium-cobalt magnets
- electron beam
- transformer

What part inside a television set emits electrons?

- the hot wire
- the phosphor
- the vacuum
- the glass surface
- the magnetic deflector

When an opening gets smaller, a wave

- spreads more
- spreads less
- stays the same
- changes its wavelength

Which best describes the Earth's North Magnetic Pole?

- It is closer to the North Pole than to the South Pole
- It attracts the North-pointing pole of a magnet
- It has always had the same magnetic polarity
- none of the above

The top end of a long rod is discovered to be a north-pointing magnetic pole. The rod is broken in half. In the resulting two pieces, the number of south-seeking poles is:

- zero
- one
- two
- four

The floating pan (shown in class) was supported by:

- a magnetic force
- an electric force
- a gravitational force
- the Curie effect
- Brewster's angle
- small blowers carefully hidden by Muller

Ohms are a measure of

- current
- charge
- voltage
- resistance

A one way mirror works because

- clutter from the bright room confuses transmitted light
- polarized light bounces only at the critical angle
- polarization blocks the transmitted image
- glare interferes with the transmitted light

According to Muller, magnetic therapy works because:

- they exert force on iron in blood
- they reduce resistance of muscles
- they affect the voltage of the nerves
- they operate through the placebo effect
- they heat you above the Curie point

The force of gravity between two ants that are separated by 1 meter is:

- attractive
- zero
- it depends on their charge
- repulsive

Phosphors have been used in which of the following (check all that are correct):

- radiation detectors
- watches
- televisions

Which of the following is incorrectly paired? (check all that are wrong)

- power - watts
- energy - kwhr
- resistance - ohms
- current - volts

In a hologram, the image is

- always real
- always virtual
- sometimes real, sometimes virtual
- neither real nor virtual

Sunglasses can help you see a fish underwater because:

- reflected light is polarized
- light from the fish is polarized
- they dim the light, making your pupils dilate
- they cut the blue light of the water surface

The eye can see which wavelengths? (Check all that apply):

- Red
- IR
- UV
- microwave

To make a spy satellite that can read a license plate, you would have to:

- put it in a higher orbit
- cover it with a polarizing filter
- use a larger mirror
- do nothing. They already can read license plates

To get a spark, you normally need:

- High voltage
- High current
- Low resistance
- Alternating Current

In a metal, electrons

- are confined to a single atom
- always point in the same direction
- can move freely
- do not exist

Which of the following illustrate the “doubling law” (check all that apply):

- DNA fingerprinting
- atomic (nuclear) bomb
- computer chip memory
- energy in an earthquake
- Presidential elections

The existence of the Higgs particle

- gives everything mass
- gives electrons charge
- disproves the Big Bang
- allows xrays to work efficiently

Earphones usually work by using

- small magnets
- electric repulsion
- gravitational forces
- direct current
- static electricity

The current through a flashlight bulb is approximately:

- 120 amp
- 1.6×10^{-19} amp
- one amp
- 15 amp

Sunburn is usually caused by

- UV radiation
- IR radiation
- X radiation
- gamma radiation
- visible light
- all of the above

Old people (e.g. Prof. Muller) need reading glasses because:

- their pupils can't contract as well
- their eyes become less sensitive to visible light
- their lenses become less flexible
- they forget how to read

In a permanent magnet, the magnetism comes from:

- the spin of the electrons
- the motion of the protons
- the high voltage inside the atom
- the electron avalanche

One kilowatt hour of electricity has the same

- energy as a kilogram of TNT
- charge as a kilogram battery
- energy as a gram of TNT
- power as a kilogram of TNT

Polaroids are used for 3-D movies because:

- They reduce glare from the surface
- they give a different image to each eye
- they polarize the light
- they reduce the dispersion

The light from an ordinary light bulb comes from the fact that:

- the wire contains phosphor
- the wire is heated by electricity
- the high voltage causes small sparks
- electricity is a wave

Topsy was executed with AC:

- to show the dangers of high voltage
- because DC would not have worked
- because it was the only way to get high current

AC delivers more power than DC

At the United States border, the patrol can detect people by:

- the UV they emit
- the IR they emit
- the RGB light they emit
- the gamma rays they emit

An electron begins an avalanche. After 10 generations, the number of electrons is:

- 1
- squareroot of 10
- 10
- 100
- greater than 500

A fuse is used in a house to prevent:

- large power surges
- house wires from overheating
- illegal use of electricity
- too much voltage from entering the house
- too much energy usage

An indication that light is a wave is (check all that are appropriate):

- dark bands in the diffraction pattern
- it passes through glass
- it reflects off surfaces
- its high speed