Physics 10 Midterm exam 2 – Essay Questions **14 April 2005**

Last name_____ First name_____ SID _____

Essay questions (20 pts): pick **one** and only one to answer; ***circle*** the one you choose. Julie – if you find it more convenient to write large, you may write more than one sheet. Cover the important points in a clear and concise manner – as if you have only a few minutes to tell the President, your roommate, or your parent, what that person needs to know. *Clear, effective writing is important.* If you need to re-write, ask for a new sheet.

1. **Electricity and Magnetism** seem different, but electricity can create magnetism, and magnetism can create electricity. Describe how this is done. Give examples illustrating how this is used for practical applications.

2. **Waves**. Everyone knows that water waves are waves – but there are many other "things" that are also waves, even though the general public wouldn't know it. Give examples of as many such phenomena as possible. For each, describe how the wave nature affects the behavior of the phenomenon.

This page is for name and notes only.

The essay should begin on the other side.

Short questions (1 point each, 21 points total). Read the questions carefully so that you don't misinterpret them (e.g. by missing a word such as "not"). Enter all your answers on the Scantron form.

1. This course is taught by
   a. Richard Muller
   b. Hillary Clinton
   c. Arnold Schwartznegger
   d. Osama bin Laden

2. submarines can be detected by their
   a. magnetism
   b. electric charge
   c. backscattered xrays
   d. MRI signal

3. magnetic monopoles
   a. are rare, but have been discovered
   b. are in all permanent magnets
   c. have never been found
   d. are in most superconductors

4."room temperature superconductors"
   a. are the most common kind
   b. are theoretically impossible
   c. may exist, but haven't been found
   d. too expensive to be common

5. small earphones and motors are possible because they contain:
   a. dynamos
   b. PET
   c. tesla coils
   d. rare earth magnets

6. The most damaging earthquake is usually
   a. S
   b. P
   c. L
   d. T

7. SOSUS was designed to
   a. detect nuclear explosions
   b. locate submarines
   c. measure flips of the Earth's field
   d. determine if the core of the earth is liquid

8. The atmospheric sound channel would not exist, if not for:
   a. thunderstorms
   b. carbon dioxide
   c. ultraviolet light
   d. infrared light

9. Sound travels fastest in
   a. rock
   b. hot air
   c. water
   d. cold air

10. Long wavelength water waves
   a. travel slower than short one
   b. travel faster than short ones
   c. travel the same speed as short ones
   d. travel faster if they have high amplitude, and slower if they have low amplitude

11. The sun appears yellow (Y) because
   a. the sun emits more Y than R or B
   b. our eyes are more sensitive to Y
   c. blue is scattered out of the beam
   d. our eye lenses are yellow in color

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12. oil slicks have colors because of
    a. polarization
    b. variations in the thickness
    c. impurities in the oil
    d. variations in the density

13. The resolution of a geosynchronous spy satellite is closest to:
    a. 1 inch
    b. 10 inches
    c. 2 feet
    d. 20 feet

14. Stops signs are bright at night because they use
    a. fluorescent material
    b. polarized light
    c. radioactive sources
    d. retroreflectors

15. Which color of light would give the highest number of bits per second in fiber optics?
    a. red
    b. white
    c. blue
    d. infrared

16. Some people attribute global warming to:
    a. CFCs (such as Freon)
    b. ozone
    d. carbon dioxide
    e. UV radiation

17. Windburn is caused by
    a. UV
    b. high air velocity
    c. IR
    d. visible light

18. x-rays are strongly absorbed by
    a. water
    b. hydrogen
    c. calcium
    d. oxygen

19. Which of the following uses antimatter:
    a. CAT
    b. MRI
    c. PET
    d. x-ray

20. Black light refers to
    a. IR
    b. x-rays
    c. UV
    d.highly polarized light

21. A "volt" is a measure of
    a. energy per electron
    b. number of electrons per second
    c. force on the electron
    d. density of electrons