PffP Midterm exam 2 – Essay Questions 17 Nov 2005

Last name_____ First name_____SID_____GSI_____

Essay questions (20 pts): pick **one** and only one to answer; ***circle*** the one you choose. Write a page on the back of this sheet. *This* side is for your personal notes only. 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 English is not your first language, state so at the top of your essay. If you need to re-write it, ask for a new copy of the exam. ***Be concise***; points will be deducted if your essay is overly long!

1. **The eye** is a complicated feature of the human body. How does it work? Discuss the relevant physics. In your essay, include answers to the following questions: what does it mean to be nearsighted or farsighted? How does aging play into this process? How does the eye see colors? What does it mean to be colorblind?

2. **Greenhouse effect.** Explain how it works, and how it affects climate. How is it affected by human emissions? Why is the greenhouse effect "controversial" in public debate? How does it relate to the "ozone problem"?

NOTE: please put your name at the top of the essay.

PffP Midterm exam 2 – Short Questions 17 November 2005
name_____SID_____GSI_____

Short questions (1 point each, 20 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. The aspect of electricity that makes it dangerous is high:
   A. voltage
   B. current
   C. frequency
   D. power

3. Each of these make use of infrared radiation EXCEPT:
   A. capturing illegal immigrants
   B. military "night vision"
   C. Measurement of wave velocities in the ocean.
   D. Using trees to keep morning dew off of campers.

4. A tungsten light bulb says "100 watts" on it. About much power is actually emitted as visible light?
   A. 16 Watts
   B. 40 Watts
   C. 100 Watts
   D. 220 Watts

5. Most electric power is generated by
   A. static electricity
   B. a wire moving through a magnetic field
   C. moving a wire in a strong electric field
   D. chemical means (batteries or fuel cells)

6. Superconducting materials allow electrons to move without loss of energy because:
   A. there are no impurities in the metal.
   B. there is an energy gap.
   C. cold electrons move slowly
   D. high pressure prevents collisions which cause resistance

7. The energy difference between a magnitude 6.1 and 7.1 earthquakes is
   A. a factor of 7.1/6.1 = 1.16
   B. a factor of 2 to 4
   C. a factor of 10 to 30
   D. a factor of 100 to 300 or more

8. What discovery now allows for headphones to be small and light?
   A. dynamos
   B. rare earth magnets, such as samarium cobalt
   C. transformers
   D. iron

9. The speed of sound in air
   A. is always the same
   B. increases if you shout louder
   C. depends on frequency
   D. increases as air temperature increases

10. Which color star would be the hottest:
   A. blue
   B. red
   C. orange
   D. white

TURN PAGE OVER FOR THE REMAINING QUESTIONS

name_____SID_____GSI_____

11. "red-eye" in photographs comes from
    A. the film detecting IR
    B. poor focus on the eye
    C. light of the flash reflecting off the retina (the back of the eye)
    D. light of the flash reflecting off the cornea (the surface of the eye)

12. The Earth flips its magnetism, on average, approximately:
    A. once every 11 years
    B. twice every million years
    C. once every billion years
    D. never (at least not yet

13. UV light (mark ALL that are correct)
    A. is responsible for sunburns and windburns
    B. is used to kill bacteria in the water of remote villages in India.
    C. is also called "black light"
    D. is also called "heat radiation"

14. Loss of accommodation:
    A. means that you are nearsighted
    B. is when the cornea is too curved
    C. is when you lose the flexibility of your lens
    D. is due to reading a lot when young

15. An electron is in orbit around a proton. What is the maximum number of orbits it can be in at the same time?
    A. 1
    B. 2
    C. 0
    D. any number

16. The greatest damage usually comes from the
    A. L wave
    B. P wave
    C. S wave
    D. T wave

17. Magnetic Resonance Imaging detects the density of
    A. mass
    B. hydrogen
    C. heavy elements such as Calcium
    D. radioactive isotopes

18. According to Shannon, the bits that can be sent per second depends primarily on
    A. the amplitude of the wave
    B. the frequency of the wave
    C. the wavelength of the wave
    D. the velocity of the wave

19. energy gap is important for (mark all that are correct) :
    A. spectral fingerprinting
    B. superconductivity
    C. transistors
    D. lasers

20. LCD displays make use of
    A. polarizers
    B. light-emitting diodes
    C. superconductors
    D. lasers