Physics 10 Midterm exam 1 – Essay Questions 24 Feb 2005

Last name_____ First name_____SID_____

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.

1. **Artificial Earth satellites.** With the terrorism continuing in Iraq, some people assume the US has placed a spy satellite above that country. Have we? Discuss the different altitudes at which satellites can orbit, and give examples of the applications at each altitude. Discuss the possibility of placing a satellite permanently above Iraq. What other options do we have for watching Iraq from above?

2. **How dangerous is radioactivity?** Discuss the real and imagined dangers. Give examples, along with numbers. Which risks are known from direct observation, and which are known only from calculations? What assumptions are made in calculating risk?

This page is for name and notes only.

The essay should be on the other side.

Physics 10 Midterm exam 1 – Short Questions February 24, 2005

Last name_____ First name_____SID_____

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").

1. Hybrid autos are useful because
   ( ) they don't use gasoline
   ( ) they use less gasoline
   ( ) they use solar energy
   ( ) they do not emit carbon dioxide

2. Terminal velocity for humans is about
   ( ) 10 miles per hour
   ( ) 100 miles per hour
   ( ) 1000 miles per hour
   ( ) 100 meters per second

3. Energy in butter, compared to flashlight battery:
   ( ) about the same
   ( ) 10x less
   ( ) 10x more
   ( ) 1000 times more

4. An hour of very hard exercise uses the energy in how much fat?
   ( ) 3 ounces
   ( ) 1 pound
   ( ) 2 pounds
   ( ) 10 pounds

5. A typical nuclear power plant is
   ( ) about 1 kilowatt
   ( ) about 1 megawatt
   ( ) about 1 gigawatt
   ( ) about 1 terrawatt

6. When a nuclear reactor loses its coolant, what happens?
   ( ) the chain reaction stops
   ( ) the radioactivity stops
   ( ) the fission fragments are lost
   ( ) heat is no longer produced

7. The Nagasaki bomb was based on
   ( ) U-235
   ( ) U-238
   ( ) Pu-239
   ( ) H-2 and H-3

8. Energy from the sun is from
   ( ) hydrogen fission
   ( ) plutonium fission
   ( ) uranium fusion
   ( ) hydrogen fusion

9. The most dangerous part of fallout is:
   ( ) carbon dioxide
   ( ) plutonium
   ( ) fission fragments
   ( ) lead

10. The typical velocity of water in your blood (the speed that molecules shake) is about
   ( ) 1 mile per 5 seconds
   ( ) 186,000 miles per second
   ( ) 1 cm per second
   ( ) 0

11. Solar power is about
   ( ) 10 watts per square meter
   ( ) 10^3 watts per square meter
   ( ) 10^6 watts per square meter
   ( ) 10^9 watts per square meter

12. Ice melts at what temperature? Mark ALL that are correct.
   ( ) 32 F
   ( ) 0 C
   ( ) 273 K
   ( ) 0 K

13. A refrigerator operating in a room
    ( ) warms the room
    ( ) cools the room
    ( ) has no effect on the room
    ( ) removes water vapor from the room

14. The pipe in a pipe bomb is there
    ( ) because its fragments do most of the damage
    ( ) only to hold the explosive
    ( ) to contain the explosion and minimize the damage
    ( ) to make the explosion go out the ends

15. To make hydrogen undergo fusion, the main thing needed is
    ( ) carbon to act as a catalyst
    ( ) very high temperature
    ( ) a moderator
    ( ) a critical mass

16. Depleted uranium is used
    ( ) in dirty bombs
    ( ) in artillery shells
    ( ) in nuclear reactors
    ( ) in homemade bombs

17. Yucca Mountain will be used
    ( ) for a solar power plant
    ( ) as a site for wind mills
    ( ) to extract geothermal energy
    ( ) to store nuclear waste

18. Geologists search for oil by trying to measure its
    ( ) gravity
    ( ) gamma rays
    ( ) beta rays
    ( ) microwaves

19. An astronaut in orbit is weightless because
    ( ) he is above the Earth's gravity
    ( ) the moon balances the Earth's gravity
    ( ) he is constantly "falling"
    ( ) He isn't. He is "massless."

20. Volcanic heat comes from
    ( ) hydrocarbons
    ( ) fission
    ( ) fusion
    ( ) radioactive decay