Physics 10 Midterm exam 1 – Essay Questions October 7, 2004

Last name_____ First name_____SID_____

Essay questions (20 pts): pick **one** and only one to answer, and **circle** the one you picked. 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.

1. This week the price of crude oil, from which gasoline is made, reached a new high of $51 per barrel. Many people think that automobiles will not be able to depend on gasoline in the future, or will at least need gasoline combined with some other system. **Discuss the automobile of the future.** Will solar energy be used? Batteries? How? Briefly mention how your answer might have been different if I had asked you to talk about airplanes or buses.

OR

2. Nuclear reactors are opposed by many people because of the dangers. **What are the dangers from nuclear reactors?** Describe some historical events and their consequences. Be clear about what is known and what is unknown. Briefly state what the realistic alternatives to nuclear are, and whether they have safety issues too. (I am not interested in your opinion; just the technical information that is relevant to forming an opinion.)

Physics 10 Midterm exam 1 Part B – Short Questions October 7, 2004

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. In its manufacture, a sword was folded 20 times, not more. This may be due to
   ( ) the size of the atom
   ( ) the danger of a chain reaction
   ( ) the laziness of ancient sword makers
   ( ) the size of the nucleus

2. The firsst bomb dropped in war, on Hiroshima, was based on:
   ( ) Plutonium
   ( ) tritium and deuterium
   ( ) U-238
   ( ) U-235

3. Depleted uranium is useful in weapons because it:
   ( ) is highly radioactive
   ( ) undergoes a chain reaction
   ( ) does not melt easily
   ( ) is very dense

4. For its fuel, a hydrogen bomb uses
   ( ) heavy water
   ( ) deuterium and tritium
   ( ) ordinary "light" hydrogen
   ( ) almost pure (80%) tritium

5. The Sun's energy comes mostly from:
   ( ) hydrogen and oxygen turning into H_20
   ( ) uranium fission
   ( ) hydrogen fusion
   ( ) U-235 fusion

6. For one rem, the number of gamma rays passing through a gram of material is closest to:
   ( ) 1
   ( ) t10
   ( ) 100
   ( ) 100,000,000,000

7. Which is used for dating human bones?
   ( ) Potassium-40 (K-40)
   ( ) Radiocarbon (C-14)
   ( ) Plutonium (Pu-239)
   ( ) deuterium (H-2)

8. After three half lives, the amount of radioactivity remaining is:
   ( ) 1/3
   ( ) 1/2
   ( ) 1/4
   ( ) 1/8

9. a fuel cell uses
   ( ) gasoline and hydrogen
   ( ) hydrogen and oxygen
   ( ) natural gas and gasoline
   ( ) solar and gasoline

10. For the hydrogen economy, hydrogen will probably be
   ( ) manufacterued from natural gas or water
   ( ) taken from the output of oil wells
   ( ) extracted from hydrogen wells found in salt deposits
   ( ) created in nuclear reactors

11. A typical large power plant produces about one
   ( ) megawatt
   ( ) gigawatt
   ( ) kilowatt
   ( ) megajoule

TURN THE PAGE OVER FOR MORE QUESTIONS

12. Power from a flashlight battery costs how much, per kWhr? (pick the closest)

( ) $0.17
( ) $1.00
( ) $0.01
( ) $1000.00

13. Absolute zero is (mark ***all*** that are correct):

( ) -273 C
( ) 0 K
( ) 32 F
( ) 0 F

14. An hour of vigorous exercise will help you lose weight by using the energy in how much fat?

( ) 1 ounce
( ) 1 pound
( ) 2 pounds
( ) 2 kilograms

15. Having high efficiency engines requires

( ) large temperature differences
( ) low power output
( ) fuel with high density
( ) fuel with low density

16. Which kind of material is most difficult to obtain

( ) Plutonium
( ) U-238
( ) U-235
( ) deuterium

17. A geosynchronous satellite orbits the Earth every:

( ) 90 minutes
( ) day
( ) month
( ) it doesn't; it is stationary

18. To get the force of the Earth's gravity to be zero, the minimum altitude you need is about

( ) 100 km
( ) 100 miles
( ) 24000 miles
( ) infinity

19. The space shuttle Challenger was destroyed by energy that came from:

( ) its landing fuel
( ) its maneuvering fuel
( ) its own kinetic energy
( ) collision with meteors

20. In order to fly, rockets

( ) push air downwards
( ) eliminate gravity
( ) push air upwards
( ) push burned fuel downwards

Physics 10 Midterm exam 1 Part B – Short Questions 7 October 2004

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. In its manufacture, a sword was folded 20 times, not more. This may be due to
   ( ) the size of the atom
   ( ) the danger of a chain reaction
   ( ) the laziness of ancient sword makers
   ( ) the size of the nucleus

2. Absolute zero is (mark ***all*** that are correct):
   ( ) -273 C
   ( ) 0 K
   ( ) 32 F
   ( ) 0 F

3. An hour of vigorous exercise will help you lose weight by using the energy in how much fat?
   ( ) 1 ounce
   ( ) 1 pound
   ( ) 2 pounds
   ( ) 2 kilograms

4. Having high efficiency engines requires
   ( ) large temperature differences
   ( ) low power output
   ( ) fuel with high density
   ( ) fuel with low density

5. Which kind of material is most difficult to obtain
   ( ) Plutonium
   ( ) U-238
   ( ) U-235
   ( ) deuterium

6. A geosynchronous satellite orbits the Earth every:
   ( ) 90 minutes
   ( ) day
   ( ) month
   ( ) it doesn't; it is stationary

7. To get the force of the Earth's gravity to be zero, the minimum altitude you need is about
   ( ) 100 km
   ( ) 100 miles
   ( ) 24000 miles
   ( ) infinity

8. The space shuttle Challenger was destroyed by energy that came from:
   ( ) its landing fuel
   ( ) its maneuvering fuel
   ( ) its own kinetic energy
   ( ) collision with meteors

9. In order to fly, rockets
   ( ) push air downwards
   ( ) eliminate gravity
   ( ) push air upwards
   ( ) push burned fuel downwards

10. The firsst bomb dropped in war, on Hiroshima, was based on:
   ( ) Plutonium
   ( ) tritium and deuterium
   ( ) U-238
   ( ) U-235

TURN THE PAGE OVER FOR MORE QUESTIONS

11. Depleted uranium is useful in weapons because it:
( ) is highly radioactive
( ) undergoes a chain reaction
( ) does not melt easily
( ) is very dense

12. For its fuel, a hydrogen bomb uses
( ) heavy water
( ) deuterium and tritium
( ) ordinary "light" hydrogen
( ) almost pure (80%) tritium

13. The Sun's energy comes mostly from:
( ) hydrogen and oxygen turning into H_20
( ) uranium fission
( ) hydrogen fusion
( ) U-235 fusion

14. For one rem, the number of gamma rays passing through a gram of material is closest to:
( ) 1
( ) t10
( ) 100
( ) 100,000,000,000

15. Which is used for dating human bones?
( ) Potassium-40 (K-40)
( ) Radiocarbon (C-14)
( ) Plutonium (Pu-239)
( ) deuterium (H-2)

16. After three half lives, the amount of radioactivity remaining is:
( ) 1/3
( ) 1/2
( ) 1/4
( ) 1/8

17. a fuel cell uses
( ) gasoline and hydrogen
( ) hydrogen and oxygen
( ) natural gas and gasoline
( ) solar and gasoline

18. For the hydrogen economy, hydrogen will probably be
( ) manufacterued from natural gas or water
( ) taken from the output of oil wells
( ) extracted from hydrogen wells found in salt deposits
( ) created in nuclear reactors

19. A typical large power plant produces about one
( ) megawatt
( ) gigawatt
( ) kilowatt
( ) megajoule

20. Power from a flashlight battery costs how much, per kWhr? (pick the closest)
( ) $0.17
( ) $1.00
( ) $0.01
( ) $1000.00