

Last name \_\_\_\_\_ First \_\_\_\_\_ SID \_\_\_\_\_ GSI \_\_\_\_\_

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**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 this page.

1. Describe the two ways in which radiation can hurt people. What are the prejudices and other mistaken ideas that people think are true but aren't. Give examples from two historical events. Give relevant numbers if you remember them; if you don't, make good guesses (and state that they are guesses). Is radiation ever administered to people on purpose? Explain.
  2. When Columbia re-entered the atmosphere, and the insulating tiles failed, the space shuttle essentially exploded. Why? Was it because it had a large amount of fuel? Explain what happened. Use numbers when appropriate to illustrate your points. Can re-entry be made safer by using retro-rockets?
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Circle the essay question you chose.

This page is for name and notes only.

The essay should be on the other side.

PffP Midterm exam 1 Part A – Essay Questions

23 February 2006

Last name \_\_\_\_\_ First \_\_\_\_\_ SID \_\_\_\_\_ GSI \_\_\_\_\_  
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**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. Molecular motion stops at
  - 0 K
  - 0 C
  - 0 F
  - 32 F
2. The purpose of a "breeder" reactor is to manufacture lots of
  - U-235
  - tritium
  - Sr-90
  - Plutonium
3. Alcohol is radioactive because
  - it was made from grain
  - it was made from fossil fuels
  - it absorbs radiation from the air
  - it is treated in a nuclear reactor
4. The most dangerous part of fallout comes from
  - alpha particles
  - Plutonium
  - Uranium
  - fission fragments
5. At an altitude of 200 km, the downward force of gravity on an Earth satellite (compared to the force on the surface of the Earth):
  - the same
  - a little bit weaker
  - less than half the force
  - a little bit stronger
6. Smart rocks are
  - asteroids that threaten life
  - a future source of energy
  - an idea for hitting ballistic missiles
  - a method of radioactive dating
7. Which of the following has the lowest orbit?
  - weather satellite
  - GPS
  - TV satellite
  - spy satellite
8. An airplane can detect buried oil in the ground from:
  - its radioactivity
  - its emitted plasma
  - its weaker gravity
  - its effect on air resistance
9. Rail guns are not used for astronauts because
  - they are inefficient
  - they would crush the astronaut
  - such high velocities aren't needed
  - they are limited to the speed of sound
10. A large power plant produces about
  - one kilowatt
  - one megawatt
  - one gigawatt
  - one quad

Turn page over for more questions

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11. DNA “fingerprinting” is done with  
 PCR  
 K-40  
 C-14  
 neutron activation
12. If 2500 people are each exposed to 10 rems whole body dose. The number of extra cancer this will induce is closest to:  
 0  
 1  
 10  
 2500
13. Battery energy, compared to an equal weight of gasoline, is about  
 2.4 times greater  
 100 times less  
 a million times less  
 a different kind of energy, so it can't be compared
14. A refrigerator operating in a room  
 warms the room  
 cools the room  
 has no effect on the room  
 removes water vapor from the room
15. The number of cancers from the Hiroshima blast is small, because:  
 the bomb was uranium, not plutonium  
 there has been insufficient time for cancer to develop  
 the bomb emitted primarily gamma rays, and they don't cause cancer  
 most people exposed to high levels of radioactivity were killed by the blast
16. There is little hydrogen in the Earth's atmosphere because  
 it combined with oxygen to make water  
 it is too heavy, and it sunk to the core  
 it had sufficient velocity to escape gravity  
 it was all burned into helium
17. Saddam Hussein built this to help make an atomic bomb:  
 nothing. He never had a program to make bombs  
 diffusion plant  
 centrifuge  
 Calutron
18. If the half life of an atom is 2 years, then after 6 years, the amount remaining is about:  
 50%  
 25%  
 16.67%  
 12.5 %
19. Plutonium can be safely held in the hand because it emits only  
 alpha rays  
 gamma rays  
 fission fragments  
 it can not be held safely
20. The energy from the sun comes primarily from  
 the fission of uranium  
 the fission of plutonium  
 the fusion of hydrogen  
 the fission of hydrogen