

Last name \_\_\_\_\_ First name \_\_\_\_\_ 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 the exam. **Be concise**; points will be deducted if your essay is overly long!

1. **"Solar power has a great future."** Discuss this claim. How will it be used? Which claims of solar power advocates make sense, and which ones don't? What are the advantages and disadvantages of solar power. Be specific, and give numbers where appropriate.
  2. **Nuclear terrorism.** How real is the threat that an organization such as al Qaeda could develop a nuclear weapon? What difficulties do they face to get the different kinds of nuclear weapons? What approach would be most likely to work for them?
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This page is for name and notes only.

The essay should be on the other side.

**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 energy in uranium, compared to that in TNT, is (per pound):
  - A. thousand times greater
  - B. 1 million times greater
  - C. 1 billion times greater
  - D. 1 trillion (1000 billion) greater
3. At the same temperature, which moves fastest?
  - A. light molecules
  - B. heavy molecules
  - C. they all move at the same average velocity
4. The storm "surge" refers to
  - A. the higher winds
  - B. the high water
  - C. the high waves
  - D. the eye of the hurricane
5. Which is NOT a good example of the doubling law?
  - A. future world population
  - B. nuclear chain reaction
  - C. Moore's Law
  - D. PCR
6. Victims of cancer from Hiroshima are what fraction of the deaths?
  - A. less than 2%
  - B. about 8%
  - C. About 20%
  - D. more than 30%
7. Radioactivity is the main source of
  - A. helium for balloons
  - B. oil in the ground
  - C. heat in our bodies
  - D. human cancer
8. Radioactivity in our bodies comes mostly from
  - A. food we eat
  - B. cosmic rays
  - C. radioactivity in nearby rocks
  - D. medical x-rays
9. The main cause of rising sea level is:
  - A. melting of glaciers
  - B. increase in storms and hurricanes
  - C. winds blowing water towards shore
  - D. warming of sea water
10. The fraction of people in the U.S. who die of cancer is about
  - A. 1.5%
  - B. 8%
  - C. 20%
  - D. 40%
11. A person is exposed to 100 rem. His chance of cancer increases by about
  - A. 1/5
  - B. 1/25
  - C. 1/100
  - D. 1/1000

TURN PAGE OVER FOR THE  
REMAINING QUESTIONS

12. The sexual behavior of Thomas Jefferson was investigated by
- A. Carbon-14
  - B. Potassium 40
  - C. PCR
  - D. LEO
13. In one billionth of a second ( $1\text{E}-9$  sec), light travels about one
- A. inch
  - B. foot
  - C. meter
  - D. kilometer
14. Which has the least energy? One gram of:
- A. battery
  - B. TNT
  - C. fat
  - D. meteor
15. Boil water. The vapor has a greater volume by a factor of about:
- A. 10
  - B. 100
  - C. 1000
  - D. 10,000
16. Run up a flight of stairs as quickly as you can. Your power is about
- A. 1 watt
  - B. 100 watts
  - C. 1 kilowatt
  - D. 100 kilowatts
17. At 60 miles per hour, what fraction of the gasoline is being used to push against the air? About:
- A. 1%
  - B. 4%
  - C. 40%
  - D. 90%
18. According to the text, the number of cancer deaths from Chernobyl are calculated to be about:
- A. 200
  - B. 2000
  - C. 20,000
  - D. 200,000
19. A spy satellite usually orbits at
- A. LEO
  - B. MEO
  - C. HEO
  - D. TEO
20. At what distance does the gravity of the Earth disappear?
- A. 100 miles
  - B. about half way to the Moon
  - C. close to the Sun
  - D. never

**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.

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TURN SHEET OVER FOR MORE  
QUESTIONS

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