

Last name _____ First
name _____ SID _____

Essay Questions. Choose TWO of the four. Write your essays on separate pages. with your name on the top of each page. Also put your name on the top of the multiple-choice page.

- A. Describe the light humans see and the light humans don't see. Use everyday examples to explain the uses of invisible light and why they are helpful or harmful to us. Can animals detect some of this light?
- B. The public has a fear for many things that relate to radioactivity. Give some reasons why people fear radioactivity and explain whether this fear is rational or irrational. What is the worst that can perceptibly and in reality happen with a nuclear power plant? What has happened, historically?
- C. Superconductivity sounds super, yet most people do not use it in everyday life. Explain how the nature of superconductivity, the physics behind it, and why it is not more widely used. Discuss its present-day applications, and the possibilities for the future.
- D. Some people confuse the properties of the ozone layer with the greenhouse effect. Explain the two, pointing out the differences. Describe the current day concerns for each, and what action is appropriate.
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Physics 10 Final exam – Short Questions

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Short questions (1 point each, 40 points total). Read the questions carefully so that you don't misinterpret them (e.g. by missing a word such as "not").

1. Fiber optics used to send signals are located

- in satellites
- in most of our homes
- under the ocean floor
- in power plants

2. The California energy crisis was due to:

- shortage of energy
- shortage of state money
- inability to obtain the required power
- shortage of gasoline

3. Why is there a weightlessness felt in space?

- Centrifugal force and gravity cancel
- There is no gravity in space
- There are no other objects on which to reflect your weight
- The force of gravity on you is not enough to be felt

4. We obtain Plutonium by:

- extracting natural Plutonium from the ground
- reprocessing used-up Uranium fuel
- fusing two U-235 atoms together
- enriching fission fragments from old nuclear bomb tests

5. Alpha rays are

- packets of energetic light
- chunks consisting of two protons and two neutrons
- energetic electrons
- energetic photons

6/ 1 watt is equal to:

- 1 meter per second
- 15 joules per second
- 1 second per joule
- 1 joule per second

7. Which does not involve a chain reaction? (select one)

- nuclear explosion
- linear hypothesis
- laser
- cancer

8. Depleted Uranium is dangerous because:

- dropping it could cause a nuclear chain reaction
- it can be made into bullets that penetrate armor
- terrorists could get enough for a critical mass
- It is more radioactive than natural uranium

9. The original superconductors were cooled with

- liquid nitrogen
- liquid helium

- Freon refrigerators
 hydrogen gas
10. A plastic cup and one made of glass are both at the same temperature yet the glass one feels cooler because:
- glass conducts your body heat away more rapidly
 - plastic conducts your body heat away more rapidly
 - plastic contains more heat
 - glass does not absorb heat as well
11. Cell phones emit
- microwaves
 - x-rays
 - gamma rays
 - P-waves
12. The Lorentz Contraction refers to the fact that:
- metals contract when they are cooled
 - ice contracts when it melts
 - plastics contract when they are cooled
 - moving objects get shorter
13. The most accurate equation for energy is
- $E = (1/2) m v^2$
 - $E = m_0 c^2 + (1/2) m v^2$
 - $E = m c^2$
 - $E = m_0 c^2$
14. Which of the following has the lowest index of refraction?
- water
 - glass
 - air
 - crystal
15. The power from the sun comes from
- nuclear fission
 - burning of fossil fuels
 - heat left from the big bang
 - nuclear fusion
16. Mark all that are correct: one kilowatt
- will power a medium sized house
 - is the power in a square meter of sunlight
 - is approximately one horsepower
 - is a measurement of energy
17. Which one of the following contains the least radioactivity per gram?
- wine
 - gasoline
 - humans
 - corn
18. If one person travels at 99% the speed of light for seven years, how much younger will he be than the identical twin who didn't travel?
- one year
 - eight years
 - he will be the same age
 - he will be older
19. The frequency of "Middle C" is 256 cycles per second. The frequency of C an octave lower than "Middle C" is therefore:
- 508 cycles per second
 - 256 cycles per second
 - 128 cycles per second
 - 64 cycles per second
20. The discovery of Dark Energy means
- the Universe is heading towards a "Big Crunch"
 - most stars have burned out
 - the expansion of the universe is accelerating
 - the expansion of the universe is slowing down

21. Hybrid automobile engines are more efficient because (mark one):

- they take advantage of solar power
- they can regain energy when the car goes down a hill
- they use hydrogen fuel instead of gasoline
- they recycle their own fuel and use it more than once

22. The energy of a photon depends on:

- color
- direction
- velocity
- width

23. The human eye has cones that detect:

- red, yellow, blue
- cyan, magenta, yellow
- yellow, green, red
- green, blue, red

24. There is little hydrogen gas in the atmosphere because

- hydrogen is rare in the universe
- hydrogen is radioactive, and it has mostly decayed
- hydrogen has high velocity, and it has escaped
- hydrogen reacts with carbon, so it has all turned to CO₂

25. Which of the following use or consist of permanent magnets? (check all that apply)

- loadstones
- transformers
- compasses
- earphones

26. Noise in the sound channel travels _____ than the noise outside of the sound channel.

- the same as
- slower
- it depends on the sound channel
- faster

27. Europe uses higher voltage in their homes because it

- creates less heat in home wiring
- carries greater power
- is less dangerous
- works better for DC (used in Europe instead of AC).

28. The Kyoto treaty is concerned with

- nuclear testing
- carbon dioxide
- CFCs
- Anti ballistic missile systems

29. A transistor is

- a form of superconductor
- a device that emits gamma radiation
- a strong absorber of radio waves
- a device that can amplify or turn AC to DC

30. Cars are less efficient at high speeds because

- they use more power
- they use more energy
- resistance from the road increases
- air resistance increases

31. A geosynchronous satellite orbits the earth once every

- hour
- day
- week
- year

32. Which of the following exposes a person to the kind of radiation that can cause cancer? (Mark all that apply)

- Computer-Aided Tomography (CAT Scans)
- Magnetic Resonance Imaging (MRI)
- Positron-Emission Tomography (PET)
- Thermography

33. An amplifier is similar in function to

- a nuclear explosion
- a chemical explosion
- a microphone
- a valve

34. Which of the following are always quantized? (mark one)

- velocity of an electron
- energy of an electron
- energy of a photon
- velocity of a water wave

35. Gamma rays have the following characteristics: (Check all that apply.)

- low frequency and long wavelength
- often more than an MeV
- are emitted by radioactive nuclei
- pass through the Earth without being absorbed

36. The LD50 for radiation illness is approximately

- 300 millirem
- 300 rem
- 2500 rem
- 2500 Sieverts

37. In fission, plutonium chain reacts faster than uranium because it emits:

- more protons
- less neutrons
- more neutrons
- more electrons

38. In the high atmosphere, air is hotter because

- hot air rises
- ozone absorbs UV
- the air is less dense
- there is more oxygen

39. TV picture tubes glow because they are hit with

- x-rays
- electrons
- UV radiation
- protons

40. A morning inversion...

- usually means that it will be a cold day.
- usually means it will be warm
- means it will rain
- means you have reached the last question of the exam.