Chapter 2

1. In physics, which of the following is *not* a fundamental standard of measurement?

a. speed

b. mass

c. length

d. time

2. In physics, which of the following is a fundamental unit, (not a derived unit):

a. meters per second

b. miles per hour

c. milliamperes

d. centimeters

e. mAs

3. If a 50-kilogram body is moved from outer space down to the earth, its *mass* will:

a. increase

b. decrease

c. remain the same

d. fluctuate

4. The *mass* of a small object, such as a pencil or pen, would be best measured using:

a. ounces

b. pounds

c. kilograms

d. grams

e. cubic centimeters

5. The interactions between all matter in the universe are governed by different forces.

a. 3

b. 4

c. 5

d. 6

e. 10

6. Anything that exerts a “push” or a “pull” such that it can cause a change in the motion of

another body may be described as:

a. a mass

b. a force

c. energy

d. pressure

e. gravity

7. To hold together the nucleus of an atom, the strong nuclear force must overwhelm:

a. the neutrons

b. gravity

c. the weak nuclear force

d. radiation

e. electrical force

8. One-thousandth of a *millimeter* would be a(n):

a. meter

b. kilometer

c. micron or micrometer

d. angstrom

e. nanometer

9. A million volts would be one:

a. millivolt

b. nanovolt

c. kilovolt

d. gigavolt

e. megavolt

10. Which of the following is about the width of your smallest fingernail?

a. one meter

b. one centimeter

c. one millimeter

d. one nanometer

e. one angstrom

11. Which unit is equivalent to one 10-billionth of a meter?

a. the gigameter

b. the centimeter

c. the micrometer

d. the nanometer

e. the angstrom

12. The wavelength of x-rays may be best described as:

a. a fraction of an angstrom

b. several angstroms

c. hundreds of angstroms

d. several centimeters

e. a fraction of a nanometer

13. Approximately how many centimeters is the standard distance of the x-ray tube from the

Bucky when performing tabletop radiographic procedures?

a. 40

b. 80

c. 100

d. 120

e. 180

14. A fluoroscopic examination is conducted using 1.5 A (amperes) of electricity. That is

equivalent to:

a. 15 mA

b. 150 mA

c. 1500 mA

d. 15,000 mA

15. The generic unit of energy is the:

a. quantum

b. pound

c. joule

d. volt

e. mAs

16. Which of the following represents the conversion of kinetic energy into potential energy:

a. running a car motor using gasoline

b. using the chemicals in a battery to make electricity

c. “free-falling” when skydiving

d. lifting a book up off of a table

e. knocking an electron out of an atom

17. As an electron drops down into a lower atomic shell, its *positional* form of potential energy is emitted as a(n) form of potential energy:

a. electric

b. electromagnetic

c. nuclear

d. chemical

e. mechanical

18. If an object is lifted from 10 meters to 20 meters above the ground, it will have:

a. twice as much potential energy

b. twice as much kinetic energy

c. the same energy

d. one-half the potential energy

e. one-half the kinetic energy

19. In “closed systems” such as the universe, laws of conservation demand that:

a. matter cannot be created nor annihilated

b. total energy must be equal before and after an event

c. the potential energy of an object must increase as it drops

d. force cannot be multiplied

20. One correct interpretation of Einstein’s famous equation “E = mc2 ” is that:

a. energy cannot be created nor destroyed

b. atom bombs require huge amounts of matter to work

c. absolutely nothing can exceed the speed of light

d. it takes an enormous amount of energy to create a very small amount of matter

21. Which of the following is *not* a form of energy:

a. thermal

b. chemical

c. nuclear

d. work

e. electrical

22. The energy that would be released by complete annihilation of any particle of matter is

referred to as that particle’s:

a. rest energy

b. potential energy

c. electromagnetic energy

d. mass energy

e. annihilation energy

23. Any device that can change one form of energy into another is called a(n):

a. convector

b. transducer

c. generator

d. transformer

e. compressor

24. At the molecular level, sound and heat are actually both forms of:

a. kinetic energy

b. potential energy

c. atomic energy

d. chemical energy

e. electrical energy

25. If a textbook that is suspended 2 feet above your desk possesses 6 joules of potential energy

relative to the desk, and is dropped, how much *kinetic* energy will it have when it reaches

a point ½ foot above the desk?

a. ½ joule

b. 1.5 joules

c. 2 joules

d. 3 joules

e. 4.5 joules

26. A substance which occupies a definite volume of space, but does not retain a definite shape,

would be a:

a. gas

b. solid

c. fluid

d. liquid

e. resin

27. Pascal’s law explains how liquid pumps (such as the human heart or the brakes on your car)

work: Applied pressure will be transmitted undiminished throughout any liquid *because*

liquids:

a. have indefinite shape

b. have indefinite volume

c. resist compression

d. expand according to pressure

28. Condensation results in a(n)

a. increase in potential energy

b. decrease in potential energy

c. increase in kinetic energy

d. decrease in kinetic energy

29. Heat is defined as the flow of from one substance to another:

a. temperature

b. potential energy

c. internal energy

d. pressure

e. radiation

30. Temperature measures the of molecules:

a. average internal energy

b. average external energy

c. average potential energy

d. average kinetic energy

31. At the moment a liquid changes state into a gas, it changes:

a. potential energy

b. kinetic energy

c. both kinetic and potential energy

d. temperature

32. Heat transfer by convection is restricted to:

a. fluids

b. liquids

c. gasses

d. solids

e. plasmas

33. Most of the heat energy produced in an x-ray tube during an exposure is released by:

a. conduction

b. convection

c. radiation

d. condensation

e. evaporation

34. In the x-ray tube, an example of heat dispersion by conduction is:

a. circulation of oil surrounding an x-ray tube

b. warping of metal ball bearings in the shank of the anode

c. glowing of the anode disc to “white hot”

d. the production of x-rays

e. the production of infrared radiation

35. The *dewars* in an MRI machine keep the temperature of its super-conducting magnetic coils

at 4 degrees above:

a. absolute zero

b. freezing

c. the boiling point

d. condensation

e. room temperature

36. The only kind of heat transfer that can take place through vacuum space is:

a. friction

b. conduction

c. convection

d. radiation

e. temperature

37. A bowling ball is dropped from the Leaning Tower of Pisa at a height of 21 meters. At this

height its potential energy relative to the ground is 30 joules. What is the *kinetic* energy

of the ball when it reaches a point 7 meters above the ground?

a. 20 joules

b. 10 joules

c. 7 joules

d. 14 joules

e. 30 joules

38. Toothpaste flows out of a tube squeezed at the far end because:

a. every action has and equal and opposite reaction

b. weight is transmitted undiminished in a fluid

c. liquids cannot be compressed

d. compressed liquid convects force to the end of the tube

39. The molecules of a gas:

a. maintain their collective shape without a container

b. maintain their collective volume within an open-ended container

c. are not held in fixed positions relative to each other

d. do not necessarily take on the shape of their container

e. are not a fluid

40. The unit of force is the:

a. joule

b. watt

c. newton

d. volt

e. mA

41. Which of the following numbers is the same as 10 raised to the minus 6th power?

a. 6

b. 1/6

c. 1,000,000

d. 1/1,000,000

e. 1/10,000,000

42. Heating a substance can lead to two results: It will either increase the temperature OR it will:

a. increase the kinetic energy

b. increase the chemical energy

c. cause the substance to drop to a lower level

d.. increase the potential energy

43. When snow is forming from droplets of water in a cloud, the surrounding air:

a. is warmed

b. is cooled

c. is unchanged

d. increases humidity

44. 40 ms = seconds

a. 0.04

b. 0.4

c. 40,000

d. 400,000