

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) An atomic mass unit (amu) is 1/12 the mass of _____
A) a hydrogen atom.
B) a carbon atom.
C) an electron.
D) a proton.
E) a uranium atom.

Answer: B

Explanation: A)
B)
C)
D)
E)

- 2) The chemical properties of matter come mostly from its _____
A) electrons. B) protons. C) neutrons.

Answer: A

Explanation: A)
B)
C)

- 3) If one neutron is added to a helium nucleus, the result is _____
A) hydrogen. B) lithium. C) helium. D) beryllium. E) boron.

Answer: C

Explanation: A)
B)
C)
D)
E)

- 4) Compared to the atoms that make up the body of an elderly person, the atoms that make up the body of a newborn baby are _____
A) the same age. B) newer. C) actually older.

Answer: A

Explanation: A)
B)
C)

- 5) If an astronaut landed on a planet made of antimatter, there would be an explosion and
- A) the planet would annihilate.
 - B) the astronaut would annihilate.
 - C) the astronaut and an equal amount of the planet would both annihilate.
 - D) an amount of planet matter equal to that of the astronaut would annihilate.

5) _____

Answer: C

Explanation: A)
B)
C)
D)

- 6) A positron orbiting an antiproton would make up an atom of
- A) positronium.
 - B) anti-hydrogen.
 - C) anti-helium.
 - D) unobtainium.
 - E) none of these

6) _____

Answer: B

Explanation: A)
B)
C)
D)
E)

- 7) The smallest particle of those listed below is
- A) a quark.
 - B) a neutron.
 - C) a molecule.
 - D) an atom.
 - E) a proton.

7) _____

Answer: A

Explanation: A)
B)
C)
D)
E)

- 8) Which of these statements is true?
- A) Molecules form atoms that in turn determine chemical properties of a substance.
 - B) Chemical elements are made up of about 100 distinct molecules.
 - C) A molecule is the smallest particle that exists.
 - D) Molecules are the smallest subdivision of matter that still retains chemical properties of a substance.
 - E) None of these statements is true.

8) _____

Answer: D

Explanation: A)
B)
C)
D)
E)

9) The air in this room has

9) _____

- A) energy.
- B) weight.
- C) mass.
- D) all of these
- E) none of these

Answer: D

Explanation: A)
B)
C)
D)
E)

10) A force that determines the chemical properties of an atom is a

10) _____

- A) electrical force.
- B) nuclear force.
- C) gravitational force.
- D) friction force.
- E) none of these

Answer: A

Explanation: A)
B)
C)
D)
E)

11) Atoms heavier than hydrogen were made by

11) _____

- A) radioactivity.
- B) radiant energy conversion.
- C) photosynthesis.
- D) nuclear fusion.
- E) none of these

Answer: D

Explanation: A)
B)
C)
D)
E)

12) Compared to the energy it takes to separate oxygen and hydrogen from water, the amount of energy given off when they recombine is

12) _____

- A) the same.
- B) slightly less.
- C) much more.
- D) slightly more.
- E) much less.

Answer: A

Explanation: A)
B)
C)
D)
E)

13) The volume of matter comes mostly from its 13) _____
A) protons. B) neutrons C) electrons.

Answer: C

Explanation: A)
B)
C)

14) Which of the following is not a mixture? 14) _____

- A) air
- B) granite
- C) beach sand
- D) cake
- E) None. All of the above choices are mixtures.

Answer: E

Explanation: A)
B)
C)
D)
E)

15) What makes an element distinct? 15) _____

- A) the number of neutrons
- B) the number of protons
- C) the number of electrons
- D) the total mass of all the particles
- E) none of these

Answer: B

Explanation: A)
B)
C)
D)
E)

16) In a closed bottle are a certain number of hydrogen molecules. In an identical closed bottle at the same temperature and internal pressure are a certain number of nitrogen molecules. The bottle with the greater number of molecules is the one containing 16) _____

- A) nitrogen. B) hydrogen. C) both the same

Answer: C

Explanation: A)
B)
C)

- 17) In an electrically neutral atom, the number of protons in the nucleus is balanced by an equal number of _____
A) quarks.
B) orbital electrons.
C) neutrons.
D) all of these
E) none of these
Answer: B
Explanation: A)
B)
C)
D)
E)
- 18) Which of these atoms has the greatest amount of electrical charge in its nucleus? _____
A) carbon B) uranium C) gold D) helium E) iron
Answer: B
Explanation: A)
B)
C)
D)
E)
- 19) Nuclei of atoms that make up a newborn baby were made in _____
A) the mother's womb.
B) the food the mother eats before giving birth.
C) the Earth.
D) ancient stars.
E) none of these
Answer: D
Explanation: A)
B)
C)
D)
E)
- 20) To change mercury into gold, a pair of protons must be _____
A) added to the gold nucleus.
B) removed from the mercury nucleus.
C) removed from the gold nucleus
D) added to the mercury nucleus.
E) None of the above is true.
Answer: E
Explanation: A)
B)
C)
D)
E)

21) If a pair of helium nuclei are fused together, the result is

21) _____

- A) helium isotope.
- B) beryllium.
- C) lithium.
- D) boron.
- E) carbon.

Answer: B

Explanation: A)
B)
C)
D)
E)

22) Which of the following statements is true?

22) _____

- A) There are only about 100 different kinds of atoms that combine to form all substances.
- B) An atom is the smallest particle known to exist.
- C) A large atom can be photographed with the aid of an ordinary microscope.
- D) There are thousands of different kinds of atoms that account for a wide variety of substances.
- E) None of these statements are true.

Answer: A

Explanation: A)
B)
C)
D)
E)

23) The reason a granite block is mostly empty space is that the atoms in the granite are

23) _____

- A) held together by electrical forces.
- B) in perpetual motion.
- C) invisible.
- D) mostly empty space themselves.
- E) not as close together as they could be.

Answer: D

Explanation: A)
B)
C)
D)
E)

24) If a gram of antimatter meets a kilogram of matter, the amount of mass to survive is

24) _____

- A) 1 kilogram.
- B) 1 gram.
- C) 999 grams.
- D) 1.1 kilogram.

Answer: C

Explanation: A)
B)
C)
D)

25) If two protons are added to an oxygen nucleus, the result is

25) _____

- A) nitrogen.
- B) heavy oxygen.
- C) fluorine.
- D) sodium.
- E) neon.

Answer: E

Explanation: A)
B)
C)
D)
E)

26) There are about as many atoms of air in our lungs at any moment as there are breaths of air in the atmosphere of

26) _____

- A) the United States.
- B) the whole world.
- C) a large auditorium.
- D) a large city.
- E) none of these

Answer: B

Explanation: A)
B)
C)
D)
E)

27) Brownian motion has to do with the

27) _____

- A) first direct measurement of atomic motion.
- B) rhythmic movements of atoms in a liquid.
- C) size of atoms.
- D) random motions of atoms and molecules.
- E) atomic vibrations.

Answer: D

Explanation: A)
B)
C)
D)
E)

28) Which has the greatest number of protons in its nucleus?

28) _____

- A) mercury.
- B) lead.
- C) gold.
- D) silver.

Answer: B

Explanation: A)
B)
C)
D)

- 29) The weight of matter comes mostly from its 29) _____
A) neutrons B) protons. C) electrons.
- Answer: B
Explanation: A)
B)
C)
- 30) Assuming all the atoms exhaled by Julius Caesar in his last dying breath are still in the atmosphere, 30) _____
then we probably breathe one of those atoms with each
A) ten years.
B) single breath.
C) month.
D) day.
E) It depends—some people still breathe a few of Caesar's atoms every day, while others wouldn't breathe one for an entire year.
- Answer: B
Explanation: A)
B)
C)
D)
E)
- 31) In our part of the universe, antimatter is 31) _____
A) long-lived. B) non-existent. C) short-lived. D) plentiful.
- Answer: C
Explanation: A)
B)
C)
D)
- 32) What is the molecular mass of a water molecule? 32) _____
A) 10 amu
B) 18 amu
C) 15 amu
D) 12 amu
E) None of these. It depends on the temperature.
- Answer: B
Explanation: A)
B)
C)
D)
E)

33) How many protons should be added to the nuclei of oxygen atoms so the resulting gas will glow red when there is an electric current through it? 33) _____

- A) 1
- B) 2
- C) 3
- D) 4
- E) But protons will have to be subtracted, not added.

Answer: B

Explanation: A)
B)
C)
D)
E)

34) Which of these atoms has the greatest number of electrons? 34) _____

- A) carbon
- B) helium
- C) gold
- D) uranium
- E) iron

Answer: D

Explanation: A)
B)
C)
D)
E)

35) How many different elements are in a water molecule? 35) _____

- A) one
- B) two
- C) three
- D) four
- E) none

Answer: B

Explanation: A)
B)
C)
D)
E)

36) A factor that usually determines whether a substance is in the solid, liquid, gaseous, or plasma state is its 36) _____

- A) composition.
- B) temperature.
- C) atomic shell configuration.
- D) atomic number.
- E) none of these

Answer: B

Explanation: A)
B)
C)
D)
E)

37) Which of the following are electrically neutral?

37) _____

- A) neutron
- B) ion
- C) proton
- D) electron
- E) none of these

Answer: A

Explanation: A)
B)
C)
D)
E)

38) If we doubled the magnifying power of the most powerful optical microscope in the world, we would

38) _____

- A) still not be able to see or photograph an atom.
- B) be able to photograph individual atoms, even though we couldn't see them.
- C) be able to see individual atoms.

Answer: A

Explanation: A)
B)
C)

39) When carbon and oxygen atoms combine, energy is

39) _____

- A) given off by the reaction.
- B) taken in by the reaction.
- C) not involved.

Answer: A

Explanation: A)
B)
C)

40) Which of these atoms has the most mass?

40) _____

- A) lead
- B) iron
- C) hydrogen
- D) uranium
- E) All have the same mass.

Answer: D

Explanation: A)
B)
C)
D)
E)

- 41) A molecule has
A) energy.
B) structure.
C) mass.
D) all of these
E) none of these

41) _____

Answer: D

Explanation: A)
B)
C)
D)
E)

- 42) If two protons are removed from an oxygen nucleus, the result is
A) helium.
B) neon.
C) nitrogen.
D) carbon.
E) positively charged oxygen.

42) _____

Answer: D

Explanation: A)
B)
C)
D)
E)

- 43) Compared to the mass of a hydrogen atom, the mass of an oxygen atom is
A) 12 times as great.
B) 16 times as great.
C) 8 times as great.
D) appreciably more than 16 times as great.

43) _____

Answer: B

Explanation: A)
B)
C)
D)

- 44) Solid matter is mostly empty space. The reason solids don't fall through one another is because
A) atoms are constantly vibrating, even at absolute zero.
B) of gravitational forces.
C) of nuclear forces.
D) of electrical forces.
E) none of these

44) _____

Answer: D

Explanation: A)
B)
C)
D)
E)

Answer Key
Testname: C2

- 1) B
- 2) A
- 3) C
- 4) A
- 5) C
- 6) B
- 7) A
- 8) D
- 9) D
- 10) A
- 11) D
- 12) A
- 13) C
- 14) E
- 15) B
- 16) C
- 17) B
- 18) B
- 19) D
- 20) E
- 21) B
- 22) A
- 23) D
- 24) C
- 25) E
- 26) B
- 27) D
- 28) B
- 29) B
- 30) B
- 31) C
- 32) B
- 33) B
- 34) D
- 35) B
- 36) B
- 37) A
- 38) A
- 39) A
- 40) D
- 41) D
- 42) D
- 43) B
- 44) D