

Name: Answer Key

1. Which statement is an identifying characteristic of a mixture?

- (1) A mixture can consist of a single element.
- (2) A mixture can be separated by physical means.
- (3) A mixture must have a definite composition by weight.
- (4) A mixture must be homogeneous.

2. Which subatomic particle is negatively charged?

- (1) electron
- (2) neutron
- (3) positron
- (4) proton

3. A proton has a charge that is opposite the charge of

- (1) an alpha particle
- (2) a neutron
- (3) an electron
- (4) a positron

4. A sample of an element has a mass of 34.261 grams and a volume of 3.8 cubic centimeters. To which number of significant figures should the calculated density of the sample be expressed?

- (1) 5
- (2) 2
- (3) 3
- (4) 4

5. The measurement 0.41006 gram, rounded to three significant figures, is expressed as

- (1) 0.41 g
- (2) 0.410 g
- (3) 0.4100 g
- (4) 0.4101 g

6. An atom is electrically neutral because the

- (1) number of protons equals the number of electrons
- (2) number of protons equals the number of neutrons
- (3) ratio of the number of neutrons to the number of electrons is 1:1
- (4) ratio of the number of neutrons to the number of protons is 2:1

7. Which formula represents a mixture?

- (1) $C_6H_{12}O_6(l)$
- (2) $C_6H_{12}O_6(s)$
- (3) $LiCl(aq)$
- (4) $LiCl(s)$

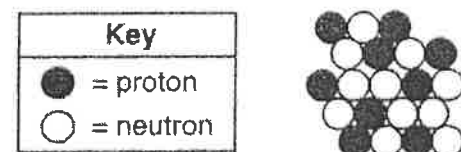
8. Which statement matches a subatomic particle with its charge?

- (1) A neutron has a negative charge.
- (2) A proton has a negative charge.
- (3) A neutron has no charge.
- (4) A proton has no charge.

9. Which particles have approximately the same mass?

- (1) an electron and an alpha particle
- (2) an electron and a proton
- (3) a neutron and an alpha particle
- (4) a neutron and a proton

10. The diagram below represents the nucleus of an atom.



What are the atomic number and mass number of this atom?

- (1) The atomic number is 9 and the mass number is 19.
- (2) The atomic number is 9 and the mass number is 20.
- (3) The atomic number is 11 and the mass number is 19.
- (4) The atomic number is 11 and the mass number is 20.

11. Which particle has *no* charge?

- (1) electron
- (2) neutron
- (3) positron
- (4) proton

12. The total number of protons found in an H_2O molecule is

- (1) 10
- (2) 8
- (3) 3
- (4) 4

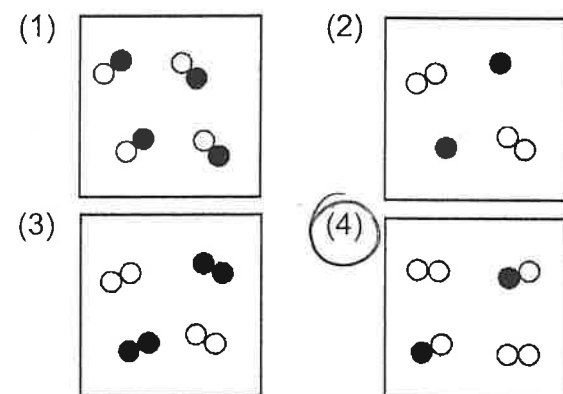
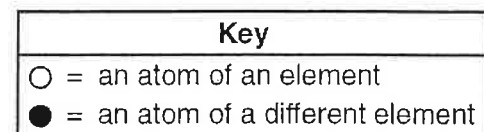
13. What is the total number of electrons in a neutral atom of fluorine?

- (1) 9
- (2) 10
- (3) 19
- (4) 28

14. Every chlorine atom has

- (1) 7 electrons
- (2) 17 neutrons
- (3) a mass number of 35
- (4) an atomic number of 17

15. Which particle diagram represents a mixture of an element and a compound?



16. What is the total number of protons and neutrons in an atom of ${}_{37}^{86}\text{Rb}$?

- (1) 37
- (2) 49
- (3) 86
- (4) 123

17. Which statement compares the masses of two subatomic particles?

- (1) The mass of an electron is greater than the mass of a proton.
- (2) The mass of an electron is greater than the mass of a neutron.
- (3) The mass of a proton is greater than the mass of an electron.
- (4) The mass of a proton is greater than the mass of a neutron.

18. What is the mass number of an atom that has six protons, six electrons, and eight neutrons?

- (1) 6
- (2) 12
- (3) 14
- (4) 20

19. What can be determined if only the atomic number of an atom is known?

- (1) the total number of neutrons in the atom, only
- (2) the total number of protons in the atom, only
- (3) the total number of protons and the total number of neutrons in the atom
- (4) the total number of protons and the total number of electrons in the atom

20. Which measurement contains a total of three significant figures?

- (1) 0.012 g
- (2) 0.125 g
- (3) 1,205 g
- (4) 12,050g

21. Which statement concerning elements is true?

- (1) Different elements must have different numbers of isotopes.
- (2) Different elements must have different numbers of neutrons.
- (3) All atoms of a given element must have the same mass number.
- (4) All atoms of a given element must have the same atomic number.

22. Which must be a mixture of substances?

- (1) solid
- (2) liquid
- (3) gas
- (4) solution

23. Compared to the charge of a proton, the charge of an electron has

- (1) a greater magnitude and the same sign
- (2) a greater magnitude and the opposite sign
- (3) the same magnitude and the same sign
- (4) the same magnitude and the opposite sign

24. Which measurement has the greatest number of significant figures?

- (1) 6.060 mg
- (2) 60.6 mg
- (3) 606 mg
- (4) 60600 mg

25. A mixture of crystals of salt and sugar is added to water and stirred until all solids have dissolved. Which statement best describes the resulting mixture?

- (1) The mixture is homogeneous and can be separated by filtration.
- (2) The mixture is homogeneous and cannot be separated by filtration.
- (3) The mixture is heterogeneous and can be separated by filtration.
- (4) The mixture is heterogeneous and cannot be separated by filtration.

26. Which total mass is the *smallest*?

- (1) the mass of 2 electrons
- (2) the mass of 2 neutrons
- (3) the mass of 1 electron plus the mass of 1 proton
- (4) the mass of 1 neutron plus the mass of 1 electron

27. Which of these terms refers to matter that could be heterogeneous?

- (1) element
- (2) mixture
- (3) compound
- (4) solution

28. What is the total number of neutrons in the nucleus of a neutral atom that has 19 electrons and a mass number of 39?

- (1) 19
- (2) 20
- (3) 39
- (4) 58

29. An atom of any element must contain

- (1) an equal number of protons and neutrons
- (2) an equal number of protons and electrons
- (3) more electrons than neutrons
- (4) more electrons than protons

30. Which two particles have opposite charges?

- (1) an electron and a neutron
- (2) an electron and a proton
- (3) a proton and a neutron
- (4) a proton and a positron

31. The atomic number of an atom is always equal to the number of its

- (1) protons, only
- (2) neutrons, only
- (3) protons plus neutrons
- (4) protons plus electrons

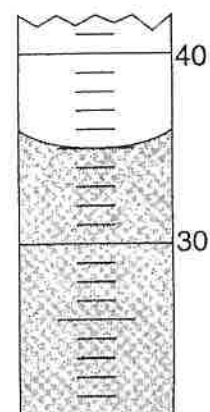
32. A student in a laboratory determined the boiling point of a substance to be 71.8°C . The accepted value for the boiling point of this substance is 70.2°C . What is the percent error of the student's measurement?

- (1) 1.60%
- (2) 2.28%
- (3) 2.23%
- (4) 160.0%

33. A neutron has a charge of

- (1) +1
- (2) +2
- (3) 0
- (4) -1

34. The diagram below represents a portion of a 100-milliliter graduated cylinder.



What is the reading of the meniscus?

- (1) 35.0 mL
- (2) 36.0 mL
- (3) 44.0 mL
- (4) 45.0 mL

35. Which quantity represents the number of protons in an atom?

- (1) atomic number
- (2) oxidation number
- (3) number of neutrons
- (4) number of valence electrons

36. The atoms in a sample of an element must contain nuclei with the same number of

- (1) electrons
- (2) protons
- (3) neutrons
- (4) nucleons

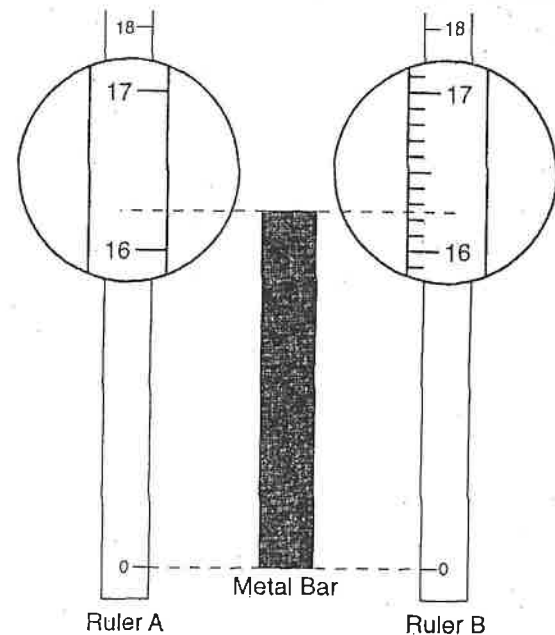
37. Which subatomic particles are located in the nucleus of a carbon atom?

- (1) protons, only
- (2) neutrons, only
- (3) protons and neutrons
- (4) protons and electron

38. Expressed to the correct number of significant figures, the sum of two masses is 445.2 grams. Which two masses produce this answer?

- (1) 210.10 g + 235.100 g
- (2) 210.100 g + 235.10 g
- (3) 210.1 g + 235.1 g
- (4) 210.10 g + 235.10 g

39. The diagram below represents a metal bar and two centimeter rulers, A and B. Portions of the rulers have been enlarged to show detail.



What is the greatest degree of precision to which the metal bar can be measured by ruler A and by ruler B?

- (1) to the nearest tenth by both rulers
- (2) to the nearest hundredth by both rulers
- (3) to the nearest tenth by ruler A and to the nearest hundredth by ruler B
- (4) to the nearest hundredth by ruler A and to the nearest tenth by ruler B

40. All atoms of a given element *must* contain the same number of

- (1) protons
- (2) neutrons
- (3) electrons plus neutrons
- (4) protons plus neutrons

41. A student calculates the density of an unknown solid. The mass is 10.04 grams, and the volume is 8.21 cubic centimeters. How many significant figures should appear in the final answer?

- (1) 1
- (2) 2
- (3) 3
- (4) 4

42. Which statement best describes the nucleus of an aluminum atom?

- (1) It has a charge of +13 and is surrounded by a total of 10 electrons.
- (2) It has a charge of +13 and is surrounded by a total of 13 electrons.
- (3) It has a charge of -13 and is surrounded by a total of 10 electrons.
- (4) It has a charge of -13 and is surrounded by a total of 13 electrons.

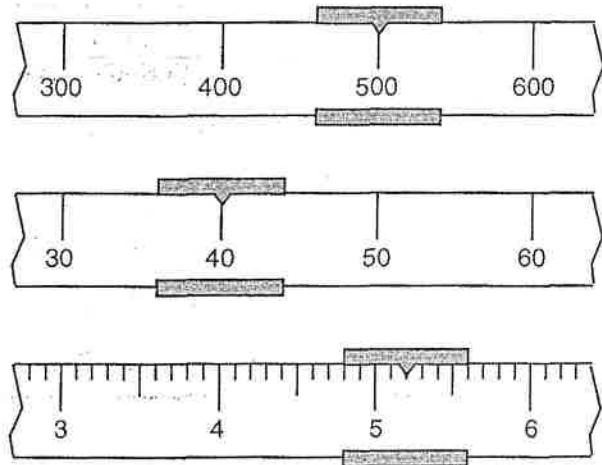
43. Which statement about one atom of an element identifies the element?

- (1) The atom has 1 proton.
- (2) The atom has 2 neutrons.
- (3) The sum of the number of protons and neutrons in the atom is 3.
- (4) The difference between the number of neutrons and protons in the atom is 1.

44. What is the atomic number of an element that has six protons and eight neutrons?

- (1) 6
- (2) 2
- (3) 8
- (4) 14

45. The diagram below represents a portion of a triple-beam balance.



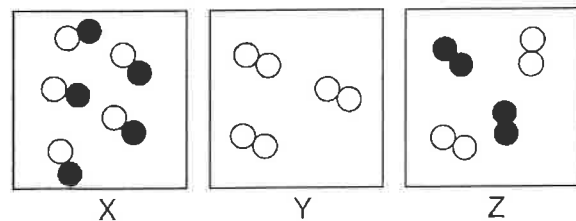
If the beams are in balance with the riders in the positions shown, what is the total mass of the object?

- (1) 540.20 g (2) 540.52 g
 (3) 545.20 g (4) 545.52 g

46. One similarity between all mixtures and compounds is that both

- (1) are heterogeneous
 (2) are homogeneous
 (3) combine in a definite ratio
 (4) consist of two or more substances

47. Given the diagrams X, Y, and Z below:



Key
Atom of element A = ○
Atom of element B = ●

Which diagram or diagrams represent a mixture of elements A and B?

- (1) X, only (2) Z, only
 (3) X and Y (4) X and Z

48. Which quantity is equivalent to 50 kiloJoules?

- (1) 5000 J (2) 0.05 J
 (3) 5×10^3 J (4) 5×10^4 J

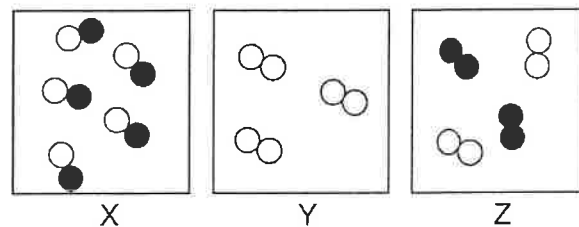
49. What is the mass number of a carbon atom that contains six protons, eight neutrons, and six electrons?

- (1) 6 (2) 8 (3) 14 (4) 20

50. Describe diagrams X, Y, and Z using the following terms:

- Pure substance
 Compound
 Element
 Mixture of elements
 Mixture of compounds

You may use more than one term for each diagram.



Key
Atom of element A = ○
Atom of element B = ●

X Pure substance - compound
 Y pure substance element
 Z mixture of elements