Q1W3- Qs. Bank- Introduction to periodic table

Multiple Choice

Identify the choice that best completes the statement or answers the question.

| 1. | Which of the following elements is a metal? | | |
|---------|--|---------|---|
| | a. Boron | c. | Magnesium |
| | b. Nitrogen | d. | Carbon |
| 2. | According to periodic table, the physical | and | chemical properties of elements are periodic functions of |
| | their atomic weights. | | |
| | a. Dmitri Mendeleev's | c. | Henry Moseley's |
| | b. John Newlands' | d. | Lothar Meyer's |
| 3. | Which of the following is an example of period | icity | ? |
| | a. eating breakfast | c. | writing a letter |
| | b. hitting a home run | d. | sneezing |
| 4. | All of the following elements are metals except | | |
| | a. aluminum | c. | sodium |
| | b. chlorine | d. | copper |
| 5. | Which element is least likely to be used in semi | icon | ductors? |
| | a. silicon | c. | sulfur |
| | b. phosphorus | d. | boron |
| 6. | is credited with discovering the periodic | law | |
| | a. Linus Pauling | c. | Dmitri Mendeleev |
| | b. Artemis Halogen | d. | J.W. Dobereiner |
| 7. | Chlorine, iodine, and make up the haloge | en tr | iad. |
| | a. bromine | c. | sodium |
| | b. lithium | d. | potassium |
| 8. | One of the elements whose existence was predi | cted | by Mendeleev was |
| | a. aluminum | c. | potassium |
| | b. silicon | d. | germanium |
| 9. | The second row of the periodic table includes _ | | _ elements. |
| | a. 2 | с. | 18 |
| | b. 8 | d. | 32 |
| 10. | is an unreactive element. | | |
| | a. Hydrogen | с. | Helium |
| | b. Chlorine | d. | Sodium |
| 11. | Which of the following is a transition element? | | |
| | a. gallium | с. | aluminum |
| | b. nickel | a. | tellurium |
| 12. | All Group 1 elements have | | 1. 4. 1. 1 |
| | a. one valence electron | С. | unpredictable properties |
| | b. one energy level | a. | one electron |
| 13. | which of the following events is periodic? | _ | |
| | a. a basketball game | C. | SNOW1211 a single flower blooming |
| 1.4 | | u. | |
| 14. | Dobereiner's classification system was based of | n gro | oups of elements he called |
| | a. failues | с. d | groups |
| | o. perious | u. | ulaus |

| 15. | Earliest attempts at classifying elements was ba | ased | on |
|--------------|--|----------|--|
| | a. size of atoms | c. | similar properties |
| | b. atomic numbers | d. | changing states |
| 16. | The concept of triads suggested that the proper | ties | of an element are related to its |
| | a. atomic number | c. | periodicity |
| | b. atomic mass | d. | melting point |
| 17. | The blank spaces in Mendeleev's periodic table | rep | resented |
| 1.1. | a. liquids | C. | nonexistent elements |
| | b. gases | d. | undiscovered elements |
| 18 | Modern periodic law states that properties of a | omo | ints repeat in a regular pattern when the elements are |
| 10. | arranged in order of increasing | CIIIC | ints repeat in a regular pattern when the elements are |
| | a density | с | atomic number |
| | b. atomic mass | d. | periodicity |
| 10 | Horizontal rows of the periodic table are know | n 96 | periodicity |
| 19. | a groups | n as | |
| | h families | d. | columns |
| 20 | Columns of the noriedic table on known of | u. | columns |
| 20. | Columns of the periodic table are known as | | similarities |
| | a. groups b periods | с. d | |
| 01 | | u. | 10ws |
| 21. | Elements in the same group have similar | . | 1 |
| | a. electron structures | с. | densities |
| | b. numbers of electrons | d. | periods |
| 22. | At room temperature, most elements are | · | |
| | a. solid | c. | gas |
| | b. líquid | d. | plasma |
| 23. | Most elements are | | |
| | a. metals | c. | metalloids |
| | b. nonmetals | d. | synthetic |
| 24. | Which of the following is not a characteristic o | far | netal? |
| | a. lustrous | c. | brittle |
| | b. conducts heat | d. | flexible |
| 25. | Which groups are considered to be transition el | eme | ents? |
| | a. 1 and 2 | c. | 1, 2, and 18 |
| | b. 3 through 12 | d. | 13 through 18 |
| 26. | Almost all of Earth's atmosphere is made up of | | : |
| | a. metals | c. | metalloids |
| | b. nonmetals | d. | synthetics |
| 27. | A certain element is a gas and does not conduc | t ele | ctricity or heat. Which of the following is a possible |
| | number of valence electrons for the atoms of the | is e | lement? |
| | a. 1 | c. | 3 |
| | b. 2 | d. | 6 |
| 28. | Most semiconductors are . | | |
| | a. metals | c. | metalloids |
| | b. nonmetals | d. | synthetics |
| 29 | Which of the following elements is not used to | don | e in an <i>n</i> -type semiconductor? |
| <u> </u> | a. antimony | c. | phosphorus |
| | b. arsenic | d. | silicon |
| | | | |

- 30. An element with three valence electrons is used to dope a semiconductor. What type of semiconductor is formed?
 - a. *n* c. *npn* b. *p* d. *pnp*

Completion

Α

Complete each statement.

A- metalloid/s B- alkaline earth C- noble gas

31. The group 2A elements are known as _____B____ metals.

32. Elements that have physical and chemical properties of both metals and nonmetals are known as _____A____.

33. A(n) _____A _____ is an element that has properties of both metals and nonmetals.

- 34. An element that appears in Group 18 of the periodic table is called a(n) _____C___.
 - A- periodic law B- period C- semiconductor D- group

35. Family is another name for a(n) _____ D____ of elements.

36. A(n) ______ C _____ conducts electricity better than a nonmetal but not as well as a metal.

38. A row of elements in the periodic table is called a(n) _____B_____.

A- transition elements B- periodicity C- lanthanides D- nonmetal

39. The first series of inner transition elements is called the _____C____.

40. The ______ are the elements that make up Groups 3 through 12 of the periodic table.

41. A(n) _____ D ____ is an element in which valence electrons are tightly held.

42. The repeating pattern of the properties of elements from row to row in the periodic table is an example of _____B____.

A- actinides B- synthetic V- doping

| 43. The inner transition elements with atomic numbers from 90 to 103 make up the | A | <u> </u> |
|--|----|----------|
| 44. The conductivity of a superconductor can be increased by a process known as | _C | · |

45. Elements that are not found in nature but are produced artificially are _____B____ elements.

Short Answer

46. State the periodic law.

Answer: The periodic law states that the physical and chemical properties of elements are periodic functions of their atomic numbers.

47. Identify the representative elements from the list given below.

Na, Ca, Sc, Co, Ni, Si, N, Se, Cl, Ge

Answer: Na, Ca, N, Si, Se, Cl, Ge

48. Why is argon placed before potassium in the modern periodic table?

Answer: In the modern periodic table, the elements are placed in the order of their increasing atomic numbers. The atomic number of argon is 18 while the atomic number of potassium is 19. Therefore, argon is placed before potassium in the modern periodic table.

49. Why do elements in the same group have similar properties?

Answer: Elements in the same group have the same electron configuration and number of valence electrons. Valence electrons determine the properties of elements. Therefore, properties of elements in the same group are similar.

50. What are phosphors? Give examples from the periodic table.

Answer: Phosphors are substances that emit light when struck by electrons. Elements from the lanthanides series are used as phosphors

51. Use the periodic table to write the names of the third alkali metal and the first transition metal.

Answer: Potassium is the third alkali metal and scandium is the first transition metal in the periodic table.

52. How did the placement of tellurium in the original periodic table cause problems for Mendeleev?

Answer: When placed in sequence according to its atomic mass, tellurium did not occur in a group with other elements of similar properties.

53. Describe Mendeleev's periodic table.

Answer: Mendeleev organized the elements according to increasing atomic mass, arranging elements with similar properties in columns.

54. Explain why doping increases conductivity.

Answer: The atoms used in doping each contain one more valence electron than do the atoms of the semiconductor. These extra electrons are free to move and form an electric current.

55. Explain how to determine the number of valence electrons in Groups 1, 2, and 13-18.

Answer: In Groups 1 and 2, the group number tells the number of valence electrons. For groups 13-18, the last digit of the group number is used.

Problem

56. Two elements A and B have atomic numbers 8 and 17 respectively. Identify their groups in the periodic table.

ANS:

Element A belongs to group 6A and element B belongs to group 7A in the periodic table.

57. An element has similar chemical properties as oxygen and selenium. It has an atomic number greater than krypton but less than iodine. Use the periodic table to identify the element.

ANS:

Tellurium

For each of the numbered elements (1-4) shown in the periodic table in Figure 3-1, give the information asked for in the tables.



58.

| | Group | Period | Class | Number of valence electrons | Outermost energy level | Properties |
|------------|-------|--------|-------|-----------------------------|---------------------------|------------|
| Element 1: | | | | | | |

ANS:

18, 2, nonmetal, 8, 2, unreactive

59.

| | Group | Period | Class | Number of valence electrons | Outermost energy level | Properties |
|------------|-------|--------|-------|-----------------------------|---------------------------|------------|
| Element 2: | | | | | | |

ANS:

1, 4, metal, 1, 4, good conductor and lustrous

60.

| | Group | Period | Class | Number of valence electrons | Outermost energy level | Properties |
|------------|-------|--------|-------|-----------------------------|---------------------------|------------|
| Element 3: | | | | | | |

ANS:

17, 6, nonmetal, 7, 6, poor conductor and nonlustrous

61.

| | Group | Period | Class | Number of valence electrons | Outermost energy level | Properties |
|------------|-------|--------|-------|-----------------------------|---------------------------|------------|
| Element 4: | | | | | | |

Suppose that you were asked to select an element for each application listed in the following questions. All you have on which to base your decision is the element's position in the periodic table. Refer to the periodic table in your textbook. Name the element or type of element you would choose for each application and explain your choice.

ANS:

14, 3, metalloid, 4, 3, semiconductor and lustrous

ANS:

a noble gas; Noble gases are chemically inert and will not react with the documents.

63. An element that can be used in a study of radioactive metals. Choice: ______ Reason: ______

ANS:

an actinide; The actinides are all radioactive.

64. An element for use in making photovoltaic cells that are constructed with semiconductors. Choice: ______ Reason:

ANS:

a metalloid; Metalloids are commonly used in the manufacture of semiconductors.

65. A liquid metal that can be used in electrical switches. Choice: ______ Reason:

ANS:

mercury; Mercury is the only liquid metal.

66. An element that can be used as an insulator (that is, a substance that will not conduct electricity). Choice: ______ Reason:

ANS:

a solid nonmetal; Nonmetals do not conduct electrical current, and a solid is needed to make the insulation.

67. An element that can be used as a fuel. Choice: ______ Reason: _______

ANS:

carbon; Carbon burns easily.

ANS:

phosphorus, arsenic, antimony, or boron; All are commonly used to dope semiconductors Ionization energy is the term used to describe the energy needed to remove an electron from a gaseous atom of an element. Listed below, in alphabetical order, are the ionization energies of 18 elements. Reorder the elements according to their atomic number, using the periodic table in your textbook. Then graph the data.

Element Ionization energy

| | (Kilojoules per mole) | | | |
|------------|-----------------------|--|--|--|
| aluminum | 577 | | | |
| argon | 1520 | | | |
| beryllium | 900 | | | |
| boron | 800 | | | |
| calcium | 589 | | | |
| carbon | 1086 | | | |
| chlorine | 1255 | | | |
| fluorine | 1681 | | | |
| lithium | 520 | | | |
| magnesium | 738 | | | |
| neon | 2080 | | | |
| nitrogen | 1402 | | | |
| oxygen | 1314 | | | |
| phosphorus | 1012 | | | |
| potassium | 419 | | | |
| silicon | 786 | | | |
| sodium | 496 | | | |
| sulfur | 1000 | | | |

69. Develop a hypothesis about the connection between ionization energy and the number of valence electrons of an element.

ANS:

The more valence electrons an element has, the greater is the ionization energy of the element.

70. Do your data confirm or refute this hypothesis?

ANS:

In general, the data confirm this hypothesis, although there are variations in the pattern.

2. ANS: A 3. ANS: A 4. ANS: B 5. ANS: C 6. ANS: C 7. ANS: A 8. ANS: D 9. ANS: B 10. ANS: C 11. ANS: B 12. ANS: A 13. ANS: B 14. ANS: D 15. ANS: C 16. ANS: B 17. ANS: D 18. ANS: C 19. ANS: C 20. ANS: A 21. ANS: A 22. ANS: A 23. ANS: A 24. ANS: C 25. ANS: B 26. ANS: B 27. ANS: D 28. ANS: C 29. ANS: D 30. ANS: B

1. ANS: C