

Chemistry and Hazards of Hazardous Materials and Weapons of Mass Destruction

Multiple Choice

Write the letter of the best answer on the blank provided.

- _____ 1. The nucleus is found at the ____ of the atom. (146)
- A. shell
 - B. center
 - C. perimeter
 - D. left corner
- _____ 2. Which of the following statements MOST accurately describes elements? (146)
- A. They rarely, if ever, differ from one another.
 - B. They never have an equal number of protons and neutrons.
 - C. They differ from one another by the lack of electrons in the nucleus.
 - D. They differ from one another by the number of protons in their nucleus.
- _____ 3. Which of the following provides the BEST definition of atomic mass? (146)
- A. Weight of an atom
 - B. Buoyancy of an atom
 - C. Output of an atom's energy
 - D. Number of an atom's electrons
- _____ 4. The alkali metals will generate flammable hydrogen gas, strong caustic runoff, and excessive heat when in contact with what substance? (153)
- A. Air
 - B. Soil
 - C. Water
 - D. Aluminum
- _____ 5. Risk of ignition increases with magnesium in proportion with the: (154)
- A. quantity of extinguishing agents used.
 - B. amount of surface area exposed to air.
 - C. number of molecules subjected to soil.
 - D. quantity of magnesium stored in a building.

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- _____ 6. The halogens family of elements includes fluorine, chlorine, ____, iodine, and astatine. (155)
- A. xenon
 - B. radium
 - C. bromine
 - D. francium
- _____ 7. When handling chlorine emergencies, what is the MOST appropriate level of personal protective equipment? (155)
- A. Structural fire fighting gear
 - B. Chemical protective clothing
 - C. OSHA-regulated safety eyewear only
 - D. ANSI Z89.1-1986 head protection only
- _____ 8. Fluorine reacts with water to form which of the following substances? (155)
- A. Hydrofluoric acid
 - B. Hypochlorous acid
 - C. Rubidium hydroxide
 - D. Potassium hydroxide
- _____ 9. Which of the following MOST accurately describes noble gases? (156)
- A. Reactive nonasphyxiant
 - B. Mixture of two or more metals
 - C. Gas incapable of cryogenic form
 - D. Nonreactive but simple asphyxiant
- _____ 10. Plasma begins as which of the following states? (156)
- A. Gas
 - B. Solid
 - C. Metal
 - D. Liquid
- _____ 11. Which of the following BEST describes a compound element? (158)
- A. Cannot be broken down into anything simpler
 - B. Comprised of two or more elements chemically bonded
 - C. Will never be represented by formulas showing multiple elements
 - D. Represented by a single capital letter followed by a lowercase letter
- _____ 12. ____ cannot be formed into sheets or wire. (158)
- A. Metals
 - B. Sodium
 - C. Nonmetals
 - D. Alkaline earths

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- _____ 13. Which element cannot be present to comprise a binary salt? (161)
- A. Metal
 - B. Oxygen
 - C. Nonmetal
 - D. Potassium
- _____ 14. Which of the following BEST describes a characteristic of a solution? (162)
- A. It can only come in liquid form.
 - B. Heat will never affect solubility.
 - C. All ingredients are completely dissolved.
 - D. It cannot be separated into its component parts.
- _____ 15. The Octet Rule states that elements will attempt to achieve ____ electrons on their outer shells. (165)
- A. 5
 - B. 6
 - C. 7
 - D. 8
- _____ 16. Gases that exist as a compound of two identical atoms are known as: (166)
- A. ionic bonds.
 - B. diatomic gases.
 - C. salt compounds.
 - D. oxidizing agents.
- _____ 17. Which bond forms a nonsalt and occurs when the elements involved share electrons rather than transfer them? (168)
- A. Ionic bond
 - B. Rotating bond
 - C. Covalent bond
 - D. Resonant bond
- _____ 18. Electrons are transferred from one atom, compound, or molecule to another in which type of reaction? (171)
- A. Exothermic
 - B. Endothermic
 - C. Polymerization
 - D. Oxidation-reduction
- _____ 19. ____ is the most common of all monomers and is capable of transforming into polyethylene. (173)
- A. Isoprene
 - B. Ethylene
 - C. Nucleotide
 - D. Amino acid

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- _____ 20. Which of the following substances will initiate the polymerization process? (173)
- A. Catalyst
 - B. Inhibitor
 - C. Stabilizer
 - D. Negative catalyst
- _____ 21. Hydrocarbons are either flammable or combustible, depending on: (177)
- A. toxicity.
 - B. ionic bond.
 - C. flash point.
 - D. pressurization.
- _____ 22. Which of the following MOST accurately describes a characteristic of oxidizers? (180)
- A. They can never explode.
 - B. They can make fire burn hotter and faster.
 - C. They cannot break down into different families.
 - D. They cannot burn continuously without air being present.
- _____ 23. A material's propensity to release energy or undergo change, either on its own or in contact with other materials is known as: (181)
- A. oxidation potential.
 - B. chemical reactivity.
 - C. synergistic reaction.
 - D. inorganic chemistry.
- _____ 24. Which of the following materials can be extremely sensitive to heat and may decompose violently if struck? (184)
- A. Water-reactive materials
 - B. Light-sensitive chemicals
 - C. Temperature-sensitive chemicals
 - D. Shock- and friction-sensitive materials
- _____ 25. Which substance releases hydroxide ions when dissolved in water and softens and dissolves tissue, creating penetrating, severe injuries? (185)
- A. Base
 - B. Acid
 - C. Metal
 - D. Plasma
- _____ 26. Which of the following statements MOST accurately describes a characteristic of nerve agents? (186)
- A. Always odorless
 - B. Generally opaque and colorful
 - C. Liquids at ambient temperatures
 - D. Least dangerous of chemical agents

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- _____ 27. At least 40 percent of the population cannot smell odors from the common types of which chemical warfare agent? (189)
- A. Nerve agent
 - B. Blood agent
 - C. Blister agent
 - D. Choking agent
- _____ 28. Which of the following chemical warfare agents can cause potentially fatal pulmonary edema with severe exposure? (190)
- A. Nerve agent
 - B. Blood agent
 - C. Blister agent
 - D. Choking agent
- _____ 29. Riot Control Agents are: (190)
- A. gases.
 - B. solids.
 - C. liquids.
 - D. lighter than air.
- _____ 30. Which of the following biological agents are incapable of basic metabolic functions and require living cells in which to replicate? (191)
- A. Toxins
 - B. Viruses
 - C. Bacteria
 - D. Rickettsia
- _____ 31. Examples of biological agents that can be transmitted from one person to another include smallpox, pneumonic plague, and: (191)
- A. diabetes.
 - B. heart disease.
 - C. chronic kidney disease.
 - D. viral hemorrhagic fevers.
- _____ 32. Which of the following statements MOST accurately describes a characteristic of explosives? (193)
- A. Oxidizer components do not make them volatile.
 - B. They are usually never sensitive to shock or friction.
 - C. Older explosives pose no immediate or long-term danger.
 - D. They have been known to detonate with little to no provocation.

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- _____ 33. The six divisions of explosives identified by U.S. administrative law were established based on what criteria? (193)
- A. How materials will react when exposed to fire
 - B. How explosives perform when tested with friction
 - C. How explosives behave under normal transport conditions
 - D. How materials will oxidize when confronted with chemicals
- _____ 34. ____ are sometimes referred to as “crop protection chemicals” to avoid negative connotation. (194)
- A. Viruses
 - B. Irritants
 - C. Pesticides
 - D. Explosives
- _____ 35. Which of the following statements about pesticides and agricultural chemicals is MOST accurate? (194)
- A. The majority can be found throughout the community.
 - B. Supermarkets are not allowed to stock such chemicals.
 - C. Agricultural warehouses are the only locations that stock them.
 - D. U.S. regulations have made their transportation in rail cars illegal.
- _____ 36. Non-ionizing radiation includes visible light, ____, and radio waves. (195)
- A. microwaves
 - B. gamma rays
 - C. alpha particles
 - D. neutron particles
- _____ 37. Which type of radiation has very strong penetrating power and is becoming more common in medical treatment? (196)
- A. Microwaves
 - B. Gamma rays
 - C. Beta particles
 - D. Neutron particles
- _____ 38. Which of the following MOST accurately describes radioactive decay? (196)
- A. Electromagnetic waves of high energy and short wavelength, with strong penetrating power
 - B. Any type of electromagnetic radiation that does not carry enough energy to ionize an atom or molecule
 - C. Spontaneous breakdown of an atomic nucleus resulting in the release of energy and matter from the nucleus
 - D. Measure of how long it takes for one half of a given amount of radioactive material to decay or change to a less hazardous form

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- _____ 39. As a rule, how many half-lives must a radioactive isotope experience to decrease to less than 1 percent of its original value? (197)
- A. 6
 - B. 7
 - C. 8
 - D. 9
- _____ 40. The strength of a radioactive source is called its: (197)
- A. activity.
 - B. half-life.
 - C. ionization.
 - D. radioisotope.
- _____ 41. Which of the following units of measure describes a quantity of radioactive material in which 3.7×10^{10} atoms disintegrate per second? (198)
- A. Ion
 - B. Curie
 - C. Neutron
 - D. Becquerel

