1031_1st Exam_1031015

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

1) How many moles of N_2O_4 are in 76.3 g N_2O_4? The molar mass of N_2O_4 is 92.02 g/mol.

A) 7.02×10^3 moles
B) 1.00 mole
C) 1.42×10^{-4} moles
D) 0.829 moles
E) 1.21 moles

Answer: D

2) Determine the number of protons, neutrons and electrons in the following:

$^{40}_{18}X$

A) $p^+ = 22$ $n° = 18$ $e^- = 18$
B) $p^+ = 18$ $n° = 22$ $e^- = 18$
C) $p^+ = 18$ $n° = 18$ $e^- = 22$
D) $p^+ = 40$ $n° = 22$ $e^- = 18$
E) $p^+ = 18$ $n° = 22$ $e^- = 40$

Answer: B

3) Write a balanced equation to show the reaction of gaseous ethane with gaseous oxygen to form carbon monoxide gas and water vapor.

A) $2\ CH_3(g) + 5\ O_{(g)} \rightarrow 2\ CO(g) + 3\ H_2O(g)$
B) $2\ C_2H_6(g) + 5\ O_{2(g)} \rightarrow 4\ CO(g) + 6\ H_2O(g)$
C) $2\ C_2H_6(g) + 7\ O_{2(g)} \rightarrow 4\ CO_2(g) + 6\ H_2O(g)$
D) $C_2H_6(g) + 5\ O_{(g)} \rightarrow 2\ CO(g) + 3\ H_2O(g)$
E) $C_2H_6(g) + 7\ O_{(g)} \rightarrow 2\ CO_2(g) + 3\ H_2O(g)$

Answer: B

4) Determine the molecular formula for a compound that is 70.79% carbon, 8.91% hydrogen, 4.59% nitrogen, and 15.72% oxygen.

A) $C_{17}H_{27}NO_3$ B) $C_{18}H_{27}NO_2$ C) $C_{17}H_{26}NO_3$ D) $C_{18}H_{27}NO_3$

Answer: D

5) Calculate the atomic mass of gallium if gallium has 2 naturally occurring isotopes with the following masses and natural abundances:

Ga-69	68.9256 amu	60.11%
Ga-71	70.9247 amu	39.89%

A) 69.93 amu B) 70.00 amu C) 70.68 amu D) 69.80 amu E) 69.72 amu

Answer: E

6) Which of the following elements is NOT a metal?

A) Mg B) Xe C) Ga D) Ba E) Pb

Answer: B

7) Which of the following statements is FALSE?
   A) Atoms are usually larger than their corresponding cation.
   B) Nonmetals tend to gain electrons.
   C) The halogens tend to form 1+ ions.
   D) Metals tend to form cations.
   E) Anions are usually larger than their corresponding atom.

Answer: C

8) Determine the name for N_2O_5.
   A) nitrogen tetroxide
   B) nitrogen (IV) oxide
   C) dinitrogen pentoxide
   D) nitrogen oxide
   E) nitrogen (II) oxide

Answer: C

9) The mass number is equal to
   A) the sum of the number of protons and neutrons.
   B) the sum of the number of the neutrons and electrons.
   C) the sum of the number of the electrons and protons.
   D) the sum of the number of protons, neutrons, and electrons.

Answer: A

10) What element is defined by the following information?

$p^+ = 20$ $n° = 20$ $e^- = 20$

   A) calcium B) zirconium C) potassium D) argon E) neon

Answer: A

11) When two elements form two different compounds, the masses of element B that combine with 1 g of element A can be expressed as a ratio of small whole numbers. Which law does this refer to?
   A) Law of Definite Proportions
   B) Law of the Conservation of Mass
   C) First Law of Thermodynamics
   D) Law of Multiple Proportions
   E) Law of Modern Atomic Theory

Answer: D

12) Determine the molecular formula of a compound that has a molar mass of 183.2 g/mol and an empirical formula of $C_2H_5O_2$.
   A) $C_8H_{20}O_8$ B) $C_6H_{15}O_6$ C) $C_4H_{10}O_4$ D) $C_3H_7O_3$ E) $C_2H_5O_2$

Answer: B

13) Give the formula for sulfurous acid.
   A) HSO_4 B) HSO_3 C) H_2SO_4 D) H_2SO_3

Answer: D

14) Distillation is
A) pouring a mixture through a filter paper to separate the solid from the liquid.
B) dissolving a solid into a liquid.
C) a process in which the more volatile liquid is boiled off.
D) heating a mixture of two solids to fuse them together.
E) separating a solid from a liquid by pouring off the liquid.

Answer: C

15) Combustion analysis of 63.8 mg of a C, H and O containing compound produced 145.0 mg of CO_2 and 59.38 mg of H_2O. What is the empirical formula for the compound?

A) C_3H_7O B) C_3H_6O C) CHO D) C_6HO_3 E) C_5H_2O

Answer: B

16) How many significant figures are in the measurement, 20.300 m?

A) 1 B) 4 C) 2 D) 3 E) 5

Answer: E

17) Which of the following statements about isotopes is TRUE?
A) An isotope of an atom with a larger number of neutrons is larger than an isotope of the same atom that contains fewer neutrons.
B) Isotopes of the same element differ only in the number of electrons they contain.
C) Isotopes of the same element have the same mass.
D) Some elements have 3 or more naturally occurring isotopes.
E) Isotopes of the same element don't usually have the same properties.

Answer: D

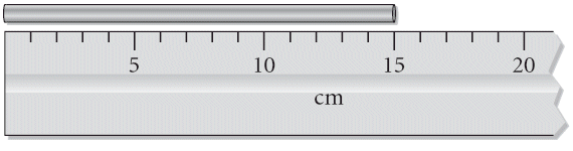
18) Two or more substances in variable proportions, where the composition is variable throughout are
A) a homogeneous mixture.
B) an amorphous solid..
C) a compound.
D) a solution.
E) a heterogeneous mixture.

Answer: E

19) Which of the following represents a *hypothesis*?
A) Nickel has a silvery sheen.
B) Sodium reacts with water to form sodium hydroxide and hydrogen gas.
C) When wood burns, heat is given off.
D) When a substance combusts, it combines with air.
E) Nitrogen gas is a fairly inert substance.

Answer: D

20) Read the length of the metal bar with the correct number of significant figures.



A) 15.000 cm B) 20 cm C) 15 cm D) 15.00 cm E) 15.0 cm

Answer: E

21) Which of the following statements is FALSE according to Dalton's Atomic Theory?
A) One carbon atom will combine with one oxygen atom to form a molecule of carbon monoxide.
B) Atoms of sodium do not change into another element during chemical reaction with chlorine.
C) All atoms of chlorine have identical properties that distinguish them from other elements.
D) An atom of nitrogen can be broken down into smaller particles that will still have the unique properties of nitrogen.
E) Atoms combine in simple whole number ratios to form compounds.

Answer: D

22) Determine the volume of hexane that contains 5.33×10^{22} molecules of hexane. The density of hexane is 0.6548 g/mL and its molar mass is 86.17 g/mol.
A) 11.6 mL B) 13.5 mL C) 12.4 mL D) 8.59 mL E) 7.40 mL

Answer: A

23) Determine the name for $TiCO_3$. Remember that titanium forms several ions.
A) titanium (I) carbonate
B) titanium (II) carbonate
C) titanium carbide
D) titanium carbonite
E) titanium (II) carbonite

Answer: B

24) Which of the following represents a physical property?
A) Aluminum has a tendency to "rust."
B) Butane is highly flammable.
C) Mercury is a silvery liquid at room temperature.
D) Argon has an unreactive nature.
E) Sodium metal is extremely reactive with chlorine gas.

Answer: C

25) Determine the name for $CoCl_2 \cdot 6H_2O$. Remember that Co forms several ions.
A) cobalt (II) chloride hexahydrate
B) cobalt (I) chloride
C) cobalt (II) chloride heptahydrate
D) cobalt chloride hydrate
E) cobalt (I) chloride heptahydrate

Answer: A

26) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.71 g/mL, 1.73 g/mL, 1.67 g/mL, 1.69 g/mL. If the actual value for the density of the sugar solution is 1.40 g/mL, which statement below best describes her results?
A) Her results are accurate, but not precise.
B) Her results are neither precise nor accurate.
C) Her results are precise, but not accurate.
D) Her results are both precise and accurate
E) It isn't possible to determine with the information given.

Answer: C

27) Calculate the molar mass of $Ca_3(PO_4)_2$.

A) 246.18 g/mol B) 87.05 g/mol C) 310.18 g/mol D) 279.21 g/mol E) 215.21 g/mol

Answer: C

28) Determine the density of an object that has a mass of 149.8 g and displaces 12.1 mL of water when placed in a graduated cylinder.

A) 18.1 g/mL B) 12.4 g/mL C) 1.38 g/mL D) 8.08 g/mL E) 11.4 g/mL

Answer: B

29) What answer should be reported, with the correct number of significant figures, for the following calculation?
(965.43 × 3.911) + 9413.4136

A) 13189.2 B) 1.32×10^4 C) 13189 D) 1.319×10^4 E) 1.3×10^4

Answer: C

30) In a chemical reaction, matter is neither created or destroyed. Which law does this refer to?

A) Law of the Conservation of Mass
B) First Law of Thermodynamics
C) Law of Modern Atomic Theory
D) Law of Definite Proportions
E) Law of Multiple Proportions

Answer: A

31) Molecules can be described as

A) mixtures of two or more pure substances.
B) homogeneous mixtures.
C) two or more atoms chemically joined together.
D) heterogeneous mixtures.
E) mixtures of two or more elements that has a specific ratio between components.

Answer: C

32) What species is represented by the following information?

$p^+ = 17$ $n° = 18$ $e^- = 18$

A) Ar B) Cl C) Kr D) Cl^- E) Ar^+

Answer: D

33) A covalent bond is best described as

A) the sharing of electrons between atoms.
B) a bond between a metal and a polyatomic ion.
C) the transfer of electrons.
D) a bond between two polyatomic ions.
E) a bond between a metal and a nonmetal.

Answer: A

34) Which of the following statements about the phases of matter is TRUE?
A) Gaseous substances have long-range repeating order.
B) Liquids have a large portion of empty volume between molecules.
C) There is only one type of geometric arrangement that the atoms or molecules in any solid can adopt.
D) Solids are highly compressible.
E) In both solids and liquids, the atoms or molecules pack closely to one another.

Answer: E

35) How many iron atoms are contained in 354 g of iron?
A) 9.50×10^{22} Fe atoms
B) 2.62×10^{25} Fe atoms
C) 4.69×10^{24} Fe atoms
D) 3.82×10^{24} Fe atoms
E) 2.13×10^{26} Fe atoms

Answer: D

36) Which of the following does NOT describe a metal?
A) good conductor of electricity
B) tends to gain electrons
C) forms ionic compounds with nonmetals
D) good conductor of heat
E) found on the left side of the periodic table.

Answer: B

37) How many argon atoms are contained in 7.66×10^5 mmol of argon?
A) 3.24×10^{26} Ar atoms
B) 1.15×10^{28} Ar atoms
C) 7.86×10^{20} Ar atoms
D) 1.84×10^{28} Ar atoms
E) 4.61×10^{26} Ar atoms

Answer: E

38) Identify a gas.
A) definite volume and definite shape
B) no definite shape and no definite volume
C) definite volume and no definite shape
D) no definite shape and definite volume

Answer: B

39) What answer should be reported, with the correct number of significant figures, for the following calculation?
(433.621 - 333.9) × 11.900
A) 1.187×10^3
B) 1.186799×10^3
C) 1.1868×10^3
D) 1.18680×10^3
E) 1.19×10^3

Answer: E

40) All of the following are SI base units of measurement, EXCEPT

A) kelvin B) meter C) second D) mole E) gram

Answer: E