T  F  1. Elements in the same horizontal row of the periodic table exhibit similar chemical properties.
T  F  2. On the Periodic Table the elements are ranked by their atomic number.
T  F  3. On the Periodic Table the elements are grouped by common properties.
T  F  4. Electrolytes conduct an electrical current when dissolved in water.
T  F  5. The melting point of an element is an example of a chemical property.
T  F  6. As one goes from top to bottom in a group on the Periodic Table, the atoms get smaller.
T  F  7. The breaking and making of chemical bonds can explain chemical reactions and energy flow.
T  F  8. An atom becomes a positive ion by gaining an electron.
T  F  9. In a chemical equation, the reactants are found on the right side of the arrow.
T  F  10. When balancing a chemical equation, the number of carbon atoms in 2 CH₄ is eight.
T  F  11. Most elements on the Periodic table are non-metals.
T  F  12. The vertical groupings on the Periodic Table are called families

13. In the Mystery Powders experiment which of the following substances reacted with the vinegar solution:
A. baking soda       B. alka seltzer       C. rock salt       D. A and B only       E. A, B, and C

14. In the Mystery Powders experiment, one could distinguish between table salt and granulated sugar by
A. physical examination with a magnifier       B. reaction with water
C. reaction with vinegar       D. reaction with iodine
E. A and D only

15. In the Mystery Powders experiment, one had an unknown composed of two substances. The following observations were made:
   Adding water – bubbles formed
   Adding vinegar – bubbles formed
   Adding iodine – blue-black color and bubbles
The most likely substances in the unknown would be:
A. Instant dry milk and table salt       B. Flour and potato flakes
C. Potato flakes and alka seltzer       D. Powdered sugar and plaster of Paris
E. Rock salt and alka seltzer

16. Bases taste
A. Funny       B. Salty       C. Bitter       D. Sour       E. A&D only

17. Acids turn neutral litmus paper
A. Blue       B. Red       C. Green       D. Black       E. None of the above

18. Phenolphthalein in a basic solution is
A. Blue       B. Pink       C. Green       D. Colorless       E. None of the above
19. The first Periodic Table was developed by:
A. Seaborg  B. Mendeleev  C. Rutherford  D. Thompson

20. The halogens all have how many electrons in their outermost energy level?
A. 1  B. 2  C. 7  D. 8

21. Atoms of an element tend to gain or lose electrons so that they will
A. have the same number of protons as electrons.
B. become electrically neutral.
C. have the same number of outer shell electrons as a noble gas.
D. have the same outer shell arrangement as a metal.

22. Which of the following statements about elements in a chemical family is false?
A. They have the same number of outer shell electrons
B. They exist in the same physical state (solid, liquid or gas).
C. They tend to gain or lose the same number of electrons.
D. They react in a similar manner with a given element.

23. When involved in a chemical reaction with nonmetals, atoms of a metal tend to

24. Sodium is a metal and oxygen is a nonmetal that react to form Na₂O, an ionic compound. How many electrons did an atom lose during the reaction?
A. Each sodium atom lost one electron.  B. Each sodium atom lost two electrons.
C. Each oxygen atom lost one electron.  D. Each oxygen atom lost two electrons.

25. In a covalent molecule you would find atoms that
A. have lost electrons to become ions.  B. have gained electrons to become ions.
C. are sharing at least one pair of electrons.  D. are sharing an electron.

26. Evidence of a chemical reaction includes
A. a color change  B. a change in temperature
C. the production of a gas  D. all of these

27. Atoms that have eight valence electrons would tend to
A. be very reactive.  B. be very un-reactive.
C. form positive ions.  D. form negative ions.

28. The element M forms a stable ionic compound MI₂. If M were allowed to react with bromine, the resulting compound would have the formula
A. MBr  B. M₂Br  C. MBr₂  D. there is not enough information to tell for sure.

29. Which combination of elements results in the formation of a white crystalline solid that dissolves to form a solution that conducts electricity?
A. metal and metal  B. non-metal and non-metal
C. metal and non-metal  D. metal and metalloid

30. When hydrocarbons burn with sufficient O₂, they
A. always give off CO₂ and H₂O.  B. sometimes give off CO₂, but never H₂O.
C. sometimes give off H₂O, but never CO₂.  D. never give off CO₂ or H₂O.
31. Air is considered to be a homogeneous mixture that is 79% nitrogen gas, 20% oxygen gas and 1% other gases. In this mixture, the oxygen gas can be considered
A. a solvent  B. a solute  C. a solution  D. saturated

32. Water solutions of ionic substances that conduct electricity are called
A. electrical solutions  B. polar solutions  C. electrolytes  D. indicators

33. A bottle of whiskey contains 40% alcohol by volume. This means that the whiskey contains 40 mL of alcohol
A. in every 100 mL of whiskey  B. mixed with 100 mL of water.
C. mixed with 60 mL of whiskey  D. in every 140 mL of whiskey.

34. Anions are:
A. positively charged ions  B. formed by the combination of electrons with cations
C. atoms that carry no net electrical charge  D. negatively charged ions

35. Neon (Ne) is an un-reactive element because:
A. it is a gas  B. it exists only as a single isotope
C. it contains ten neutrons in its nucleus  D. it has a filled valence energy level

36. When an alkali metal reacts with a halogen:
A. an electron transfers from the halogen to the alkali metal  B. an electron is transferred from the alkali metal to the halogen
C. an electron is shared between the two atoms  D. an electron pair is shared between the two atoms.

37. Elements that lie next to each other in the same vertical column on the Periodic Table have:
A. similar chemical properties  B. identical atomic numbers
C. identical atomic weights  D. the same number of neutrons in their nuclei

38. The reaction of calcium with chlorine produces:
A. Ca₂Cl  B. CaCl  C. CaCl₂  D. Ca₂Cl₃

39. The reaction of magnesium and sulfur produces:
A. MgS  B. Mg₂S  C. MgS₂  D. Mg₃S₂

40. If C₃H₈ reacts with limited O₂ the coefficient in front of the O₂ in the balanced chemical equation would be:
A. 4  B. 5  C. 6  D. 7

41. Which of the following diagrams corresponds to the situation where a ball rolls from left to right and continually slows down? The position of the ball is marked at one second intervals.
A.   o       o       o       o       o       o       o       o       o
B.   o    o          o             o                 o
C.   o   o          o  o  o          o       o     o o
D.   o               o            o        o    o  o o
42. The slope of the straight line distance vs. time graph can be used to determine ______________.
A. the speed of the object
B. how long the object traveled
C. how far the object traveled
D. All of the above can be determined.

43. Which of the following types of motion is (are) classified incorrectly?
A. sliding – interaction of objects
B. parabolic – by the path
C. gliding – by the path
D. circular – by the path
E. C and D

44. Motion is the process of change in _____.
A. position  B. speed  C. mass  D. force

45. What is the acceleration of a car that maintains a constant velocity of 100 km/h for 10 seconds?
A. 0  B. 10 km/h/s  C. 10 m/s/s  D. 1000 km/h/s.

46. For a distance vs. time graph of a car going at constant speed, which of the following questions could not be answered using the graph.
A. How fast the car traveled.
B. How far the car traveled in a given amount of time.
C. How long the car travel for a given distance.
D. All of the above can be answered.

47. The “d intercept” of the d versus t graph _____________ in the “ticked off bubbles” experiment.
A. was zero  B. was 10 cm  C. was the slope of the graph  D. depended on the color of the tube

48. Which science process skill was not used in the “chartbeats” experiment?
A. measuring  B. observing  C. inferring  D. using instruments  E. communicating
49. The graph below shows the “distance vs. time” graph for a toy car. What was its speed?
(BE CAREFUL THE INTERCEPT IS NOT ZERO)
A. zero  B. 3.5 m/s  C. 3.0 m/s  D. 5.0 m/s
E. There is not enough information

50. The graph above indicates that _____________________.
A. the car is speeding up
B. the car is slowing down
C. the car has constant speed
D. the car’s speed cannot be determined
Complete and balance the following combustion reactions:

A. \( \text{C}_{10}\text{H}_{12} + \text{O}_2 \rightarrow \)  (Excess oxygen)

B. \( \text{C}_8\text{H}_{16} + \text{O}_2 \rightarrow \)  (Limited oxygen)

Complete the following table:

<table>
<thead>
<tr>
<th>FORMULA</th>
<th>CHEMICAL NAME</th>
<th>COMMON NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaOH</td>
<td>_______________</td>
<td>lye</td>
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<tr>
<td>__________</td>
<td>ammonia</td>
<td></td>
</tr>
<tr>
<td>H(_2)SO(_4)</td>
<td>_______________</td>
<td>auto battery acid</td>
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<tr>
<td>__________</td>
<td>carbon monoxide</td>
<td></td>
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<tr>
<td>__________</td>
<td>sodium bicarbonate</td>
<td>_______________</td>
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<tr>
<td>HCl</td>
<td>_______________</td>
<td>muratic acid</td>
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<tr>
<td>NaOCl</td>
<td>sodium hypochlorite</td>
<td>_______________</td>
</tr>
<tr>
<td>__________</td>
<td>sodium chloride</td>
<td>table salt</td>
</tr>
<tr>
<td>Fe(_2)O(_3)</td>
<td>ferric oxide</td>
<td></td>
</tr>
</tbody>
</table>