

AP Chemistry Periodic Table Test

Multiple Choice, Answer on scantron

- Alkali metals must be stored under oil because they are extremely
A. Soft B. Brilliant C. Reactive D. Radioactive
- The Hemoglobin in your blood contains
A. Iron B. Cobalt C. Chromium D. Zinc
- The reactivity of the p – block elements
A. Increases as you proceed from group 3A to group 8A
B. Steadily decreases as you proceed from group 3A to group 8A
C. Is greatest in the nitrogen family
D. Is greatest in the halogen family
- Which of the following noble gases is correctly paired with its commercial application?
A. Neon is the coldest liquid refrigerant available
B. Helium is used as an inert blanketing atmosphere
C. Argon is used to conduct heat away from the filament in a light bulb
D. Krypton produces the glowing red light in “neon” signs
- Na and K have similar properties because they have the same
A. Atomic radii B. Number of valence electrons
C. Ionization energy D. Electronegativity
- The fluorine ion is larger than the fluorine atom because
A. F^- has a stronger positive
B. F^- has more electron-electron repulsions than F
C. F^- has one fewer electron
D. F^- now has an empty valence shell
- The elements with the highest ionization energies are the
A. noble gases B. alkali metals C. halogens D. transition metals
- Which of the following is a true statement about successive ionization energies?
A. The first ionization energy is always the greatest
B. The largest increase occurs between the second and third ionization energies
C. Ionization energies increase in a smooth and regular pattern
D. For each element you can find one very large increase between a pair of ionization energies

9. The statement that atoms tend to gain, lose, or share electrons in order to acquire a full set of valence electrons is called
A. Octet rule B. Triad rule C. Rule of octaves D. Orbital principle

For questions 10 - 15 choose the group that has the indicated property:

- a) Group 1A b) Group 2A c) Group 3A d) Group 7A e) Group 8A
10. Contains the most active metals.
11. Reacts with Cl_2 to form compounds with general formula MCl .
12. Reacts with water to form M^{2+} ions plus $\text{H}_2(\text{g})$
13. Reacts with O_2 to form compounds with the general formula M_2O_3 .
14. In a given period this group has the element with the smallest atomic radius.
15. In a given period this group has the element with the smallest ionization energy.
16. Hydrogen and Lithium react very differently, although they are both members of group 1. What is the primary reason for this difference?
a) The metallic character increases going down a group.
b) The ionization energy increases going down a group.
c) Electron affinity increases going down a group.
d) Electron negativity increases going down a group.
e) There is a very large difference in the atomic radii of H and Li.
17. All of the following are semimetals except.
a) B b) Ge c) Al d) Sb e) Si
18. Which group shows the correct order of first ionization energy?
a) $\text{Na} > \text{P} > \text{Cl}$ b) $\text{Cs} > \text{Na}$ c) $\text{K} > \text{Ca} > \text{Ge}$ d) $\text{Cs} < \text{Rb} < \text{Na}$ e) $\text{Al} > \text{Si} > \text{P}$
19. The ion that aluminum is most likely to form is isoelectronic with:
a) Ar b) Na c) Ne d) Mg e) none of these
20. What are the most abundant metals in the earth's crust, oceans, and atmosphere?
a) titanium and silicon b) aluminum and iron
c) manganese and nickel d) tin and lead e) iron and lead
21. Within a group, as the atomic numbers of the elements increase, the
a) ionization energies decrease b) atomic masses decrease
c) elements become less metallic d) atomic radii decrease

22. Which group contains the most active metals?
a) Group 1A b) Group 3A c) Group 2A d) Group 4A
23. Which of the following is the second most abundant element in the earth's crust, oceans, and atmosphere?
a) hydrogen b) carbon c) oxygen d) aluminum e) silicon
24. Peroxides have the general formula of:
a) MO_2 b) M_2O_2 c) M_2O d) M_2O_3 e) MO
25. What ion seems to affect the levels of neurotransmitters, and thus is used in the treatment of depression or mania?
a) Ca^{2+} b) K^+ c) Na^+ d) Li^+ e) Mg^{2+}
26. One low – cost alternative to fossil fuels is
a) hydrogen b) oxygen c) carbon d) ozone
27. Which alkaline earth metal is used to produce a bright light for photographic units?
a) calcium b) beryllium c) magnesium d) barium e) strontium
28. The group 3A elements are all metals
a) True b) False
29. Which of the following interferes with detergents in hard water?
a) Na^+ b) Ca^{2+} c) Mg^{2+} d) Ca^{2+} and Mg^{2+} e) Na^+ , Ca^{2+} , and Mg^{2+}
30. The element that reacts with N_2 to form a compound of the formula MN :
a) B b) Al c) Ga d) Tl e) all of these
31. What element is found in the structural minerals that make up our bones and teeth?
a) strontium b) barium c) calcium d) silicon e) magnesium
32. The largest commercial use of lead is
a) gasoline b) paints c) semiconductors d) car batteries
33. Choose the most metallic element.
a) N b) P c) As d) Sb e) Bi
34. Choose the element with the largest electronegativity
a) N b) P c) As d) Sb e) Bi
34. Dynamite was invented by
a) Haber b) Frasch c) Nobel d) Priestly

35. The process of transforming N_2 to a form usable by plants and animals is
a) fertilization b) nitrogen fixation c) Ostwald process d) nitrogenation
36. Which compound does N have the maximum oxidation state?
a) N_2O_5 b) NO c) NO_2 d) N_2O_3
37. The Ostwald process is used to
a) manufacture ammonia b) produce nitric acid c) produce sulfuric acid
38. Which has the highest ionization energy
a) F b) Cl c) Br d) all the same
39. Which has the largest radius
a) F b) I c) F^- d) Cl^-
40. What element in Group 6 A was discovered in pitchblend ore by the Curies?
a) S b) Po c) Se d) O
41. All of the following are true about ozone except
a) it causes cancer b) is formed in the pollution of car exhaust
c) exists naturally in the upper atmosphere d) shields UV light from the sun
42. Which noble gas can form a compound?
a) He b) Ar c) Kr d) Xe
43. Which metal ion has a d^5 electron configuration?
a) Pd^{2+} b) Ag^+ c) Fe^{3+} d) Co^{2+}
44. Which metal is used mostly in your home for electrical systems?
a) silver b) copper c) gold d) tungsten
45. What transition metal is used in bicycle frames for resiliency?
a) platinum b) tungsten c) nickel d) titanium
46. The ----- contradiction is responsible for the similarity in atomic size and chemistry of 4d and 5d elements
a) transition b) coordination c) isomeric d) lanthanide
47. The strength of steel is due to the addition of this element to iron.
a) copper b) zinc c) sulfur d) carbon e) aluminum
48. An element common to bronze and brass is
a) nickel b) tin c) copper d) iron e) zinc
49. This molecule is toxic, causing asphyxiation if abundant in the air
a) CO_2 b) CO c) CH_4 d) NH_3

50. The gas in the Goodyear Blimp is
a) H₂ b) N₂ c) He d) CO
51. Romans died because of what substance in their pottery and plumbing?
a) As b) CN c) Pb d) Hg
52. What 2 elements are in a match stick?
a) S, Mg b) S, C c) S, P d) P, Mg
53. Glass is made of
a) SiF₄ b) CaCO₃ c) SiO₂ d) Na₂S
54. Which 2 elements can have a triple bond in compounds?
a) C, Si b) C, O c) O, Br d) C, N

Match the color of the solution with the chemical (may use more than once)
A) red/pink b) green c) yellow d) blue e) brown ab) purple ac) white

55. cobalt ions
56. nickel ions
57. bromine gas
58. chlorine gas
59. iodine gas
60. copper ions
61. iron ions

Free-Response: Answer on the back of the scantron.

1. Draw the resonance for Ozone, O₃.

Write an equation for questions 2 through 7.

2. Sulfur dioxide + H₂O →
3. Sodium + excess oxygen →
4. Lithium + oxygen →
5. Calcium + hydrogen →
6. Barium + water →
7. P₄O₁₀ + H₂O →
8. Sugar + sulfuric acid. → Write equation and describe result and why.
9. The famous dirigible (hot air balloon) that exploded during WWII was _____.
10. What element "literally melts" in your hand?
11. What are the allotropes of carbon?
12. What is the Haber Process?
13. What is a patina?
14. Write the electron configuration for copper and chromium. Why are they exceptions?