

INSTRUCTIONS:

1. Fill in your social security number carefully on the test score sheet.
2. It will be to your advantage to answer all questions.
3. Only one answer per question is allowed. Select the *best answer* from choices given.
4. Use a #2 soft lead pencil.
5. Erasures must be complete.
6. Marks must blacken the entire space in the circle.
7. Answer sheets must not be torn or have holes.
8. This is a 100 point exam.
9. THIS EXAM HAS 35 QUESTIONS. PLEASE MAKE SURE YOUR EXAM IS COMPLETE.
10. Answer number 1 - 35 on your answer sheet.

Useful Information:

Avogadro's Number (N_A) = 6.022×10^{23}

$$?^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}\text{F}) \times \frac{5^{\circ}\text{C}}{9^{\circ}\text{F}}$$

$$?^{\circ}\text{F} = \frac{9^{\circ}\text{F}}{5^{\circ}\text{C}} \times ^{\circ}\text{C} + 32^{\circ}\text{F}$$

1. Which one of the following is a substance?
 - A. diet coke
 - B. air
 - C. tomato soup
 - D. carbon dioxide
 - E. orange juice

2. Which one of the following is a compound?
 - A. silver
 - B. helium
 - C. water
 - D. aluminum
 - E. platinum

3. Which one of the following properties is intensive?
 - A. density
 - B. area
 - C. weight
 - D. height
 - E. none of the above

4. Which one of the following is equal to a centimeter?
 - A. 100 meters
 - B. 10 meters
 - C. 0.1 meter
 - D. 0.01 meter
 - E. 0.001 meter
 - F. 0.0001 meter

5. A piece of iron with a density of 7.8 g/cm^3 has a mass of 35.1 g. What is its volume?
 - A. 273.78 cm^3
 - B. 0.22222 cm^3
 - C. 4.5 cm^3
 - D. 27.3 cm^3
 - E. 7.8 cm^3

6. Normal human body temperature is 98.6°F. This is equivalent to
- A. 22.8°C
 - B. 37.0°C
 - C. 54.7°C
 - D. 66.6°C
 - E. none of the above
7. Which one of the following distances is the longest?
- A. 100 centimeters (cm)
 - B. 0.1 kilometer (km)
 - C. 10 meters (m)
 - D. 0.01 micrometer (μm)
 - E. 1000 millimeters (mm)
8. Which one of the following is an SI unit?
- A. yard
 - B. °F
 - C. pound
 - D. liter
 - E. kilogram
 - F. mile
9. The scientific notation for 0.0102 is:
- A. 102×10^{-2}
 - B. 102×10^{-4}
 - C. 10.2×10^{-3}
 - D. 1.02×10^{-3}
 - E. 1.02×10^{-2}
10. What is the number of significant figures in 0.00907020?
- A. 8
 - B. 7
 - C. 6
 - D. 5
 - E. 4

11. To the correct number of significant figures, what is the answer to the expression:
(107.2 + 0.0234 - 7.365)?
- A. 99.8584
 - B. 99.858
 - C. 99.86
 - D. 99.9
 - E. 100
12. To the correct number of significant figures and also in scientific notation, what is the answer to the expression: $(3.00 \times 22.32 \div 4.3325)$?
- A. 1.5455×10^1
 - B. 15.455
 - C. 1.546×10^1
 - D. 15.46
 - E. 1.55×10^1
 - F. 15.5
13. The speed of light is 3.0×10^8 m/s. What is the distance in miles that light can travel in one minute? (1 mi = 1.609 km)
- A. 1.8×10^{10} mi
 - B. 2.9×10^{10} mi
 - C. 1.1×10^{10} mi
 - D. 1.8×10^7 mi
 - E. 2.9×10^7 mi
 - F. 1.1×10^7 mi
14. The density of copper is 8.9 g/cm^3 . Which one of the following is this equivalent to?
- A. 8.9 kg/dm^3
 - B. $8.9 \times 10^{-2} \text{ kg/dm}^3$
 - C. $8.9 \times 10^6 \text{ kg/dm}^3$
 - D. $8.9 \times 10^{-6} \text{ kg/dm}^3$
 - E. $8.9 \times 10^3 \text{ kg/dm}^3$
 - F. none of the above
15. Which of the following statements is false?
- A. The charge on an electron is negative.
 - B. The charge on a proton is positive.
 - C. The mass of an electron is almost equivalent to the mass of a proton.
 - D. The mass of a neutron is almost equivalent to the mass of a proton.
 - E. Most of the mass of an atom is located in the very small, central "nucleus" of the atom.

16. An ion of the isotope chlorine-35 that has a charge of -1 contains
- A. 35 protons, 35 neutrons, and 36 electrons
 - B. 35 protons, 34 electrons, and an unknown number of neutrons
 - C. 17 protons, 18 neutrons, and 18 electrons
 - D. 17 protons, 18 neutrons, and 16 electrons
 - E. 18 protons, 17 neutrons, and 17 electrons
 - F. 18 protons, 17 neutrons, and 19 electrons
17. What is the symbol for iron?
- A. Ir
 - B. I
 - C. In
 - D. Fe
 - E. Au
18. Which of the following elements is most likely to be a good conductor of electricity?
- A. Ne
 - B. Cl
 - C. Se
 - D. I
 - E. Pb
19. Which of the following elements is an alkali metal?
- A. lithium
 - B. magnesium
 - C. aluminum
 - D. titanium
 - E. lead
20. Which of the following pairs of elements is most likely to form an ionic compound?
- A. Al and Zn
 - B. N and S
 - C. Li and Mg
 - D. Ca and Pb
 - E. Co and I

21. Elements in group VIIA (17) of the periodic table prefer to have a charge of
- A. +1
 - B. -1
 - C. +2
 - D. -2
22. The empirical formula for caffeine, $C_8H_{10}N_4O_2$, is
- A. $C_8H_{10}N_4O_2$
 - B. $C_4H_5N_2O$
 - C. $C_2H_{5/2}NO_{1/2}$
 - D. CHNO
23. The correct formula for aluminum (Al^{3+}) dichromate ($Cr_2O_7^{2-}$) is
- A. $AlCr_2O_7$
 - B. $Al_2Cr_2O_7$
 - C. $Al_3(Cr_2O_7)_2$
 - D. $Al_2(Cr_2O_7)_3$
24. The proper name for $Ca(NO_3)_2$ is
- A. calcium nitrate
 - B. calcium nitrite
 - C. calcium dinitrate
 - D. monocalcium dinitrite
 - E. cobalt(II) nitrite
25. The molecular formula for methane is
- A. CH
 - B. CH_2
 - C. CH_3
 - D. CH_4
 - E. CH_5
26. The proper name for N_2O_5 is
- A. oxygen nitride
 - B. nitrogen oxide
 - C. pentoxygen dinitride
 - D. dinitrogen pentoxide
 - E. oxygen dinitride
 - F. nitrogen pentoxide

27. HBrO_3 is the formula for bromic acid. The proper name for the acid HBrO_2 is therefore
- A. perbromic acid
 - B. bromous acid
 - C. hypobromous acid
 - D. bromate
 - E. bromite
28. The correct formula for potassium sulfate is
- A. PSO_4
 - B. P_2SO_4
 - C. KSO_4
 - D. K_2SO_4
 - E. KHSO_4
29. 1 amu is:
- A. 6.02×10^{23} g
 - B. The mass of a single ^{12}C atom
 - C. 1/12 the mass of a single ^{12}C atom
 - D. 12.01 g
30. The atomic mass of Cu is 63.55 amu. The most likely reason that this mass is not closer to the integers 63 amu or 64 amu is:
- A. There is 1/2 of a neutron in the nucleus of a copper atom
 - B. There are several naturally occurring isotopes of Cu with different atomic masses
 - C. There are so many electrons in a Cu atom that they affect the atomic mass
 - D. There is only one naturally occurring isotope of Cu
31. What is the average mass in grams of a single atom of Ar?
- A. 39.95 g
 - B. 1.51×10^{22} g
 - C. 1.51×10^{-22} g
 - D. 6.64×10^{-23} g
32. How many moles of Ca are present in 12.50 g of Ca?
- A. 3.119×10^{-1} mol
 - B. 3.206 mol
 - C. 7.525×10^{24} mol
 - D. 0.5217 mol

33. How many grams of P are present in 5.55 mol of P?
- A. 30.97 g
 - B. 172 g
 - C. 9.22×10^{-24} g
 - D. 5.58 g
34. How many H atoms are present in 46.0 g of H₂O?
- A. 92
 - B. 1.54×10^{24}
 - C. 2.55
 - D. 3.07×10^{24}
35. How many moles of sulfur hexafluoride, SF₆, are there in 3.25 g of the substance.
- A. 0.0223 mol
 - B. 0.0325 mol
 - C. 0.0636 mol
 - D. 0.101 mol
 - E. 0.325 mol