

- 1) C
- 2) E
- 3) A
- 4) B
- 5) B
- 6) E
- 7) E
- 8) C
- 9) B
- 10) C
- 11) B
- 12) B
- 13) C
- 14) D
- 15) B

16. (4 points each) Provide names for the following compounds:

a) SrS strontium sulfide

b) Cr₂O₃ chromium(III) oxide

17. (4 points each) Provide chemical formulas for the following compounds:

a) potassium nitride K₃N b) tin(IV) bromide SnBr₄

18. (4 points each) In each pair, circle the lower energy orbital

3s on Mg OR 3s on S 5s on Sr OR 4d on Sr 4s on Ca OR 4p on Br

19. (5 points each) Write the valence electron configurations of

a Ge atom 4s² 4p² an Fe atom 4s² 3d⁶

20. (12 points) SET UP the following calculations, showing the conversion factor(s) you would use. You do NOT need to calculate an answer. You will be graded on your set-up.

How many individual atoms are in 12.8 g of Si?

$$12.8 \text{ g} \times \frac{6.02 \times 10^{23} \text{ atoms}}{28.09 \text{ g}}$$

1. Which of the following samples contains the greatest mass?

- A) 1.5 mol of C B) 3×10^{23} V atoms C) 1 mol of P D) 3 mol of Li E) 6×10^{23} F atoms

2. Which of the following samples contains the least number of atoms?

- A) 1.5 mol of Li B) 28 g of N C) 80 g of Br D) 27 g of Be E) 0.5 mol of Kr

3. When two like charges interact, which of the following gives the highest energy?

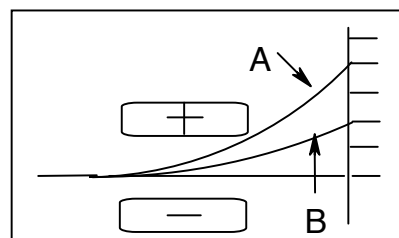
- A) large charges close together
B) large charges far apart
C) small charges close together
D) small charges far apart

4. Which subatomic particles are in the nucleus?

- A) protons and electrons B) protons and neutrons C) electrons and neutrons
D) protons only E) electrons only

5. The paths of particle A and particle B as they move through an electric field are shown at the right. Which of the following statements could be true about A and B?

- A) if of equal charges, the mass of A is twice the mass of B
B) if of equal masses, the charge of A is twice the charge of B
C) both of these statements could be true
D) neither of these statements could be true



6. The Thomson cathode ray experiment:

- A) measured the mass of the electron
B) measured the charge of the electron
C) showed the existence of quantized energy levels
D) showed the presence of a nucleus in an atom
E) none of the above

7. What is the symbol of the isotope that contains 22 protons, 26 neutrons and 20 electrons?

- A) $^{48}\text{Ti}^{2-}$ B) $^{48}\text{Cd}^{2+}$ C) $^{22}\text{Ti}^{2+}$ D) $^{22}\text{Cd}^{2-}$ E) None of these

8. (6 each) Consider the following transitions in the Bohr model of the atom:

- A) $n = 4 \rightarrow n = 6$ B) $n = 6 \rightarrow n = 3$ C) $n = 3 \rightarrow n = 5$ D) $n = 2 \rightarrow n = 1$

Which corresponds to the absorption process of greatest energy?

9. Blue light has a greater frequency than red light. It also has:

- A) a greater energy and a greater wavelength
B) a greater energy and a smaller wavelength
C) a smaller energy and a smaller wavelength
D) a smaller energy and a greater wavelength

10. What is the highest occupied orbital in a Ta atom?

- A) 3d B) 4d C) 5d D) 6s E) 6p

11. How many unpaired electrons are present in a Se atom?

- A) 1 B) 2 C) 3 D) 4 E) 0

12. Which statement below best describes what is meant by the phrase “atomic energy levels are quantized”?
- A) They have non-zero values
 - B) They occur only at certain discrete energies rather than being continuous
 - C) The energy levels should be thought of as photons
 - D) They are evenly spaced
 - E) The energies have a unit (most commonly Joules)
13. Which of the following statements about levels and sublevels is correct?
- A) The $n=3$ level contains two sublevels
 - B) The $2s$ sublevel contains two orbitals
 - C) The $4p$ sublevel can contain up to six electrons
 - D) The $3d$ sublevel contains ten orbitals
 - E) The $n=3$ level contains six orbitals
14. Which of the following atoms has the greatest ionization energy?
- A) Al B) As C) Mg D) S E) Sr
15. Quantum Theory differs from the Bohr model in that:
- A) Only quantum theory explains the emission spectrum of the hydrogen atom
 - B) Only quantum theory treats electrons as waves
 - C) Only quantum theory has different energy levels for different modes of motion
 - D) Only quantum theory models the atom as a hard sphere
 - E) Only quantum theory treats the motion of protons

PLACE YOUR ANSWERS FOR #16-20 DIRECTLY ON THIS PAPER

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