

Name: _____

ch. 4 & 5 atomic structure, ao, electron configuration test 40 points

honors chemistry

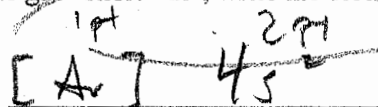
1. Fill-in the below table – there might be hypothetical isotopes. [13 points]

1 pt

symbol	# neutrons	Atomic #	# electrons	charge	Atomic mass
$^{90}\text{Sr}^{2+}$	52	38	36	+2	90
$^{33}\text{S}^{-2}$	18	16	18	-2	33
$^{120}\text{Sn}^{+2}$	70	50	48	+2	120

2. Using the noble gas "short-cut", write the electron configuration of _____. [9 points]

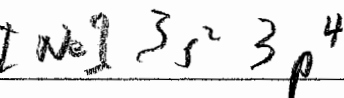
a. Calcium:



b. Arsenic:

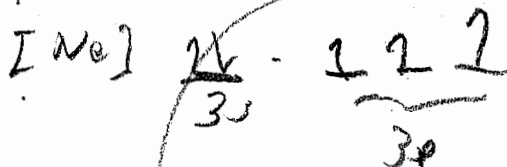


c. Sulfur:

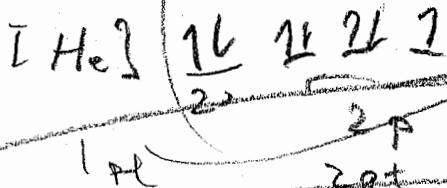


3. Sketch the orbital diagram of _____ and identify only the valence electrons. [10 points]

a. Phosphorus:



b. Fluorine:

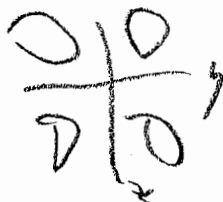


4. Sketch the atomic orbital of ____; include appropriate axis(es) and label these axis(es) to illustrate the atomic orbital's orientation with respect to the axis(es). [8 points]

a. P_z



b. d_{yz}



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1. Fill-in the below table – there might be hypothetical isotopes. [13 points]

symbol	# neutrons	Atomic #	# electrons	charge	Atomic mass
$^{80}\text{Se}^{2-}$	43	34	36	-2	80
$^{33}\text{P}^{-3}$	18	15	18	-3	33
$^{120}\text{Sn}^{+4}$	70	50	46	+4	120

2. What are the similarities and differences between _____. [14 points]

a. $2p_x$ versus $3p_y$

same shape
diff. size
diff. orientation

b. $3s$ versus $4s$

same shape
diff. size

c. d_{xy} versus $d_{x^2 - y^2}$

same shape
diff. orientation

3. What is the maximum number of electrons in the $2s$ atomic orbital? Basis / rationale? [10 points]

2 e^-

spin $\rightarrow \uparrow$

opposite spin \rightarrow opposite \uparrow

(2 pt)

(2 pt)

attraction for the opposite electrons to force

4. Identify the cation with a charge of +2, where the cation's electron configuration is $1s^2 2s^2 2p^6$? [3 points]

Mg^{+2}

$1s^2 2s^2 2p^6$