CHEM-01A

Work Session 7: Electron configuration and Chemical Periodicity

Nam	e							Date		(Grade	_
				Work	Session	7: Electro	on configuratio	on and Chem	ical Perio	dicity		
1.	Wha	at are th	ne values o		l for elect 3p	trons in the	e following orb	oitals? 7f				
2.	The	re are tl	hree 2p or	bitals. S	ketch eac	h one on a	separate xyz s	et of Cartesia	n coordina	tes.		
3.							at would the se rom question 2		n numbers	for each electr	on be? Write	e the set of
4.		4th elecches?	ctron wen	t into the	2p orbita	als, what w	yould its set of	quantum num	nbers be? V	Vhere would it	go in the #2	
5.	<u></u>	<u>-</u> 2s	$-\frac{1}{2p}$	3 s	— —		- 3d	— _			— — — —	- 6s
	and	5 place		dorbitals	s shown o	n the abov				Why are there? forbitals that a		
6.							arrows pointin			owing lines. Fil number:	l in all the ar	rows; do no
	<u>1</u> s	<u>-</u> 2s		3 s	— 3p —	4s –	<u>-</u>	$-{4p}$	- <u>-</u> -	-	$-{5p}$	
	1s	<u>-</u> 2s		3 s	$-{3p}$	4s -	<u>-</u>	$-{4p}$	- <u>-</u> -	-	$-{5p}$	
	1s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4s -	- 3d	— — — — —	- - -	<u>-</u>	— <u>—</u> —	- 6s
	1s	<u>-</u> 2s		- 3s	$-{3p}$	4s -		$-\frac{1}{4p}$		<u>-</u>	$-{5p}$	- 6s
	<u></u>	<u>-</u> 2s		3 s	$-{3p}$	- - 4s	<u>-</u>	$-{4p}$	- - - 5s	-	$-{5p}$	6 s

CHEM-01A
Work Session 7: Electron configuration and Chemical Periodicity

	<u>1</u> s	<u>-</u> 2s	2p	3s –		- 4s	<u>-</u>		- 4p	- 5s	-	 	6s
	1s	<u>-</u> 2s	2p	- 3s		- 4s				- - 5s	-	 	6s
	1s	<u>-</u> 2s	2p —	- 3s		- 4s			- 4p	- 5s	- 4d	 	- 6s
<u>1s</u>	<u>-</u> 2s	$-\frac{1}{2p}$	- 3 s	$-{3p}$	$-\frac{1}{4s}$			$-{4p}$	- - 5s			 - - 6s	
1s	<u>-</u> 2s	$-\frac{1}{2p}$	$\frac{1}{3s}$	$-{3p}$	- - 4s		3d	- - 4p	- - 5s			 - - 6s	
<u>1s</u>	<u>-</u> 2s	$-\frac{1}{2p}$	$-{3s}$	$-{3p}$	- <u>-</u> 4s		- 	$-{4p}$	- <u>-</u> 5s			 - <u>-</u> 6s	
<u>1</u> s		$-\frac{1}{2p}$	- 3 s	$-{3p}$	- - 4s			$-\frac{1}{4p}$	- - 5s			 - - 6s	
<u>1s</u>	<u>-</u> 2s	$-\frac{1}{2p}$	3s	$-{3p}$	$-\frac{1}{4s}$			$-\frac{1}{4p}$	- - 5s			 - - 6s	
<u>1s</u>	<u>2</u> s	- 2 p	- - 3s	$-{3p}$	$-\frac{1}{4s}$		- 	- - 4p	- - 5s			 - - 6s	
<u>1s</u>	<u>-</u> 2s	$-\frac{1}{2p}$	$\frac{1}{3s}$	$-{3p}$	- - 4s		3d	- - 4p	- - 5s		 4d	 - - 6s	
1s	<u>-</u> 2s	$-\frac{1}{2p}$	$\frac{1}{3s}$	$-{3p}$	- - 4s		3d	$-\frac{1}{4p}$	- - 5s		4d	 - - 6s	
<u>1s</u>	<u>-</u> 2s	$-\frac{1}{2p}$	- 3s	$-\frac{1}{3p}$	- - 4s		3d	$-\frac{1}{4p}$	5s			 6s	
<u>1</u> s	<u>-</u> 2s	$-\frac{1}{2p}$	$\frac{1}{3s}$	$-{3p}$	- - 4s		3d	$-\frac{1}{4p}$	- - 5s			 - - 6s	
<u>1</u> s	<u>-</u> 2s		- 3 s	$-\frac{1}{3p}$	- - 4s			- - 4p	- <u>-</u> 5s			 6s	
<u>1s</u>	<u>-</u> 2s	$-\frac{1}{2p}$	- 3s	$-\frac{1}{3p}$	- - 4s		3d	$-\frac{1}{4p}$	5s			 6s	
<u>1</u> s	<u>-</u> 2s		- 3 s	$-\frac{1}{3p}$	- - 4s			- - 4p	- <u>-</u> 5s			 6s	
<u>1</u> s	<u>2</u> s		- 3 s	$-{3p}$	- - 4s			- 4p	- <u>-</u> 5s			 6s	
<u>1s</u>	<u></u> 2s		- 3 s	$-{3p}$	- - 4s		3d	- 4p	- - 5s			 6s	
1s	<u></u> 2s	$-\frac{1}{2p}$	$\frac{1}{3s}$	$-{3p}$	$\frac{1}{4s}$		3d	$-\frac{1}{4p}$	- - 5s		4d	 - - 6s	

CHEM-01A
Work Session 7: Electron configuration and Chemical Periodicity

<u>1</u> s	<u>-</u> 2s	_ <u></u>	3 s	— 	4 s	3d	$-{4p}$	<u></u>	-		- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4s		— _	<u>-</u> 5s	<u>-</u>	— <u>—</u> —	6s
<u>1s</u>	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	- 4s		- - -	- - 5s	-	$-\frac{1}{5p}$	6s
<u>1s</u>	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}$	<u></u>	-	$-{5p}$	- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4s		$-{4p}$	<u></u>	-	$-\frac{1}{5p}$	- 6s
<u>-</u> 1s	<u>-</u> 2s	$-{2p}-$	- 3s	$-{3p}$	- 4s		$-{4p}$	<u>-</u> -	-	— <u>—</u> —	<u>-</u> 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	- 3s	$-{3p}$	- 4s		$-{4p}$	<u></u>	-	— — — — 5p	- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}-$	<u>-</u> 5s	-	$-{5p}$	- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}$	<u>-</u> 5s	-	$-{5p}$	- 6s
<u>1s</u>	<u>-</u> 2s	- 2 p -	3 s	$-{3p}$	- 4s		$-{4p}-$	<u></u>	-	$-{5p}$	6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}$	<u>-</u> 5s	-	$-{5p}$	- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}$	<u>-</u> 5s	-	$-{5p}$	- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	- 4s		$-{4p}$	- 5s	-	$-{5p}$	6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	- 3s	$-{3p}$	- 4s		$-{4p}$	<u></u>	-	— — — — 5p	- 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}$	- 5s	-	— — — — 5p	6s
<u>-</u>	<u>-</u> 2s	$-{2p}$	${3s}$	$-{3p}$	- 4s		- - -	- 5s	<u>-</u>	$-{5p}$	6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	4 s		$-{4p}$	- 5s	-	$-{5p}$	6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	- 3s	$-{3p}$	4 s		$-{4p}$	- 5s	-	— — — — 5p	<u>-</u> 6s
<u>1</u> s	<u>-</u> 2s	$-{2p}$	3 s	$-{3p}$	- 4s		$-{4p}$	- 5s	-	— _	6s
_	_		_		_						_

CHEM-01A
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1s	2s	2p	3s	3p	4s		3d	2	4p	5s		4d		5p	6s	
<u>1</u> s	<u>-</u> 2s		- 3 s	$-\frac{1}{3p}$	$\frac{1}{4s}$		3d		- 4p	<u>5</u> s				5p	6s	
<u>1</u> s	<u>-</u> 2s	$-{2p}$	- - 3s	$-{3p}$	- - 4s		3d		- 4p	- 5s				5p	6s	
<u>1</u> s	<u>-</u> 2s	$-\frac{1}{2p}$	- 3 s	$-{3p}$	- - 4s		3d		 4p	- 5s				5p	6s	
<u>1</u> s	<u>-</u> 2s	$-{2p}$	- - 3s	$-{3p}$	- - 4s		3d		- 4p	- 5s				5p	6s	
<u>1</u> s	<u>-</u> 2s	$-\frac{1}{2p}$	3s	$-{3p}$	$\frac{1}{4s}$		3d		- 4p	<u>-</u> 5s				5p	6s	
<u>1</u> s	<u>-</u> 2s	$-{2p}$	- - 3s	$-{3p}$	$\frac{1}{4s}$		3d		- 4p	- 5s				5p	- - 6s	
	1s	<u>-</u> 2s	- - 2p		- - - - -	- 4s	$\frac{1}{3}$	- — — d	-	- 4p	- 5s		 4d			
	<u>-</u> 1s	<u>-</u> 2s	2p	3s –	3p	- 4s	$\frac{1}{3}$		-	- - - -	- 5s		 4d			- 6s
	<u>1</u> s	<u>-</u> 2s	2p	3s –	3p —	- 4s	$\frac{1}{3}$		-	4 p	- 5s		 4d		5p	- 6s
	<u>1</u> s	<u>-</u> 2s	2p	3s –	3p —	- 4s	$\frac{1}{3}$		-	4 p	- 5s		 4d		5p	- 6s
	<u>-</u> 1s	<u>-</u> 2s	2p	3s –	3p	- 4s	$\frac{1}{3}$		_	4 p	- 5s		 4d		5p	<u>-</u> 6s
	1s		2p	- 3s	3p	- 4s	$\frac{1}{3}$	d	_	- - -	5s Oops	! One of	4d your arro	ws is cro	5p ooked. Star	6s

7. Rewrite the electron configuration for element 32, Ge, using the 1s² type of notation. Rewrite this using a condensed notation.

8. Show the diagram for the sodium electron configuration, from above, in an excited state (There are many possibilities for this.)

CHEM-01A

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9.	Explain why the radius of the atoms decreases going from element 11 to element 18. Explain why element 19 is larger than element 11.
10.	Which of the elements 21 to 30 would be paramagnetic, and which would be diamagnetic? Explain.
11.	What do elements 4, 12, 20, 38, and 56 have in common in terms of electron configuration?
12.	Write out the Pauli Exclusion Principle and Hund's Rule.
13.	The element chromium is sometimes said to be a special case of Hund's Rule. Explain why this is so