

**quantum numbers practice problems pdf**

6. Describe the electrons defined by the following quantum numbers:  $n \ l \ m_l$  3 0 0 3s electron or orbital 2 1 1 2p electron or orbital 4 2 -1 4d electron or orbital 3 3 2 not allowed ( $l$  must be  $< n$ ) 3 1 2 not allowed ( $m_l$  must be between  $-l$  and  $l$ )

**Orbitals and Quantum Numbers Practice Questions**

f. The number of orbitals in a shell with  $n=3$  is  $1+3+5=9$  (s, p, d). g. The number of orbitals with  $n=3$  and  $l=1$  is 3. h. The maximum number of electrons with quantum numbers with  $n=3$  and  $l=2$  is 10. i. When  $n=2$ ,  $l$  can be 0, 1. j. When  $n=2$ , the possible values for  $m_l$  are -1, 0, 1. k. The number of electrons with  $n=4$ ,  $l=1$  is 6.

**QUANTUM NUMBERS WORKSHEET answers**

12. What is the maximum number of electrons in an atom that can have the following quantum numbers: (a)  $n = 3$  (b)  $n = 4, l = 2$  (c)  $n = 4, l = 3, m_l = 2$  (d)  $n = 2, l = 1, m_l = 0, m_s = -\frac{1}{2}$  13. The quantum numbers listed below are for four different electrons in the same atom. Arrange them in order of increasing energy.

**Name: Date: Quantum Number Practice Worksheet**

3. Sketch the general shape of the orbitals that are described by the following sets of quantum numbers. a. 1,0,0 Sphere See text. b. 2,1,1 Dumbbell See text. c. 3,2,2 Double dumbbell or dumbbell and donut See text. CHEMISTRY 151 - QUANTUM NUMBERS KEY 1. Write the quantum numbers associated with each of the following. a.

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QUANTUM NUMBERS WORKSHEET Name \_\_\_\_\_. 1. State the four quantum numbers and the possible values they may have. 2. Name the orbitals described by the following quantum number

**QUANTUM NUMBERS WORKSHEET**

11. How many electrons in an atom can have the quantum numbers  $n = 4, l = 1, m_l = 1$ ? 12. How many orbitals have the value  $n = 3, l = 1, m_l = 1$ ? 13. How many electrons can be described by the quantum numbers  $n = 3, l = 1, m_l = 1$ ? 14. The number of unpaired electrons in the outer subshell of a Cl atom is 1 / 15.

**Energy level Principle sublevel orbital spin c.2p  $n=2, l=1$**

What is the maximum number of electrons that are allowed to have the following set of quantum numbers in one atom?  $n = 4$  and  $m_l = +2$  Answer: \_\_\_\_  $n = 3$  and  $l = 1$  Answer: \_\_\_\_  $n = 1$  and  $m_s = +\frac{1}{2}$  Answer: \_\_\_\_ 6. Provide the possible values for the other three quantum numbers for electrons in  $n = 3$ . 7.

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