

HW05 - H Atom and Electron Configuration

 This is a preview of the published version of the quiz

Started: Sep 25 at 6pm

Quiz Instructions

Homework 05 - H Atom and Electron Configuration

Question 1

1 pts

Which of the following experiments provided evidence that the electrons in atoms are arranged in distinct energy levels?

- the existence of elements with non-integer atomic weights
- the scattering of alpha particles by a metal foil
- the results of the Millikan oil-drop experiment
- the observation of line spectra from gas discharge tubes

Question 2

1 pts

Assume n_1 and n_2 are two adjacent energy levels of an atom. The emission of radiation with the longest wavelength would occur for which two values of n_1 and n_2 ?

- 8,7
- 4,3
- 7,6
- 2,1

Question 3

1 pts

Use the Rydberg formula for atomic hydrogen to calculate the wavelength of the photon emitted in the transition of an electron from $n=4$ to $n=2$.

- 486 nm
- 94.9 nm
- 8.63 nm
- 205 nm

Question 4**1 pts**

What is the name given to the spectroscopy series to which the transition described in question 3 belongs?

- Brackett series
- Lyman series
- Balmer series
- Paschen series

Question 5**1 pts**

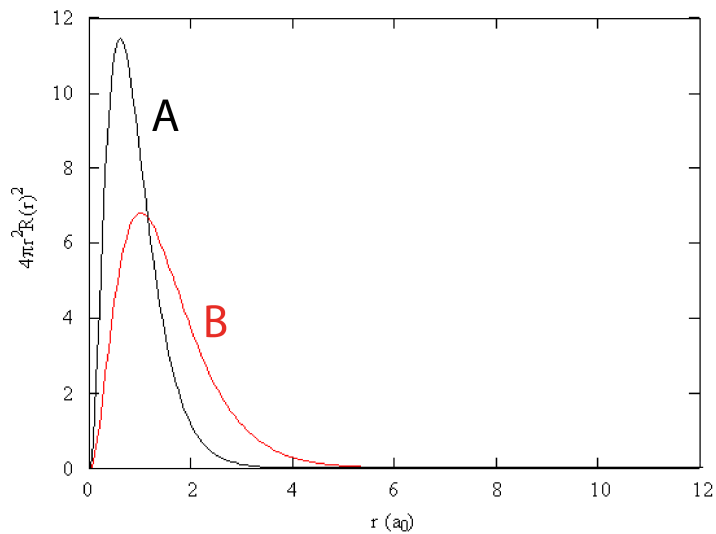
In what region of light will the photons emitted in question 3 lie?

- visible, red
- visible, yellow
- visible, blue
- ultraviolet

Question 6

1 pts

The graph below shows the radial distribution plots for the 1s wavefunctions for H and He^+ . Which plot (A or B) is the 1s wavefunction for the He^+ ion?



- B
- A
- There is no way to know.

Question 7

1 pts

What is the maximum number of electrons that can have the quantum number $n=2$ in an atom?

- 8
- 18
- 6
- 2

Question 8

1 pts

The three quantum numbers for an electron in a hydrogen atom in a certain state are $n=4$, $\ell=2$, and $m_\ell=1$. The electron is located in what type of orbital?

3p

4d

3d

4p

Question 9**1 pts**

The number that describes the main energy level of an electron in an atom is...

the magnetic quantum number, m_ℓ .

the atomic number, Z .

the principal quantum number, n .

the angular momentum quantum number, ℓ .

Question 10**1 pts**

Can an electron in an atom be in an energy level described by the set of quantum numbers $n=5$, $\ell=3$, $m_\ell=-2$?

No, because m_ℓ cannot be negative.

No, because m_ℓ must equal ± 1 .

No, because ℓ must equal $n-1$.

Yes.

Question 11**1 pts**

An electron in a 3d orbital could have which of the following quantum numbers?

- $n=3, \ell=2, m_\ell=0$
- $n=3, \ell=3, m_\ell=1$
- $n=3, \ell=2, m_\ell=-3$
- $n=3, \ell=1, m_\ell=-1$

Question 12**1 pts**

How many p electrons does Se (atomic number 34) possess?

- 18
- 34
- 4
- 16

Question 13**1 pts**

For which H-atom wavefunction are you most likely to find the electron farthest from the nucleus?

- 2s
- 2p
- 4p
- 3p

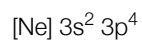
Question 14**1 pts**

The transition metals are elements with partially filled...

- f subshells.
- s subshells.
- d subshells.
- p subshells.

Question 15**1 pts**

Which element is predicted to have the ground-state electron configuration shown below?



- aluminum
- chlorine
- sulfur
- silicon

Question 16**1 pts**

Which of the following is the valence electronic structure for a halogen?

- $ns^2 np^6$
- $ns^2 nd^{10}$
- $ns^2 np^5$
- ns^2

Question 17**1 pts**

In the Aufbau order of occupancy of electronic energy levels, the level occupied just after 5p is...

 3f 6s 5d 4d**Question 18****1 pts**

The electron configuration for the Mn atom is...

 $1s^2 2s^2 2p^6 3s^2 3p^3$ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^5$ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$ **Question 19****1 pts**

The ground state electron configuration of a neutral silver atom is $[\text{Kr}] 5s^1 4d^{10}$ instead of $[\text{Kr}] 5s^2 4d^9$. This observation can be explained (theoretically) by the fact that...

 the 4d subenergy level has higher energy than the 5s subenergy level. only one electron can occupy a 5s orbital. an enhanced stability is associated with filled sets of equivalent orbitals. the magnetism measurement shows one unpaired electron.

Question 20**1 pts**

Which of the following atoms has the largest radius?

 Ne Br Cl F**Question 21****1 pts**

As an atom's radius decreases...

 its ionization energy does not change. its ionization energy increases. its ionization energy decreases. its ionization energy will either increase or decrease depending on whether you are going up a column or across a row.**Question 22****1 pts**

Which of the following would be expected to have the highest first ionization energy?

 Ar Si Cl Na Xe

Question 23**1 pts**

How many s electrons does P (atomic number 15) possess?

 6 2 5 4**Question 24****1 pts**

How many values of the quantum number ℓ are possible when $n=5$?

 4 7 5 6**Question 25****1 pts**

How many values of m_ℓ are allowed for an electron in a 5f subshell?

 7 6 5 4

Question 26**1 pts**

How many values of m_ℓ are allowed for an electron in a 2s subshell?

- 4
- 1
- 3
- None of these.

Question 27**1 pts**

How many subshells are there in the shell with $n=3$?

- 2
- 3
- 4
- 1

Question 28**1 pts**

The diameter of the electron density of an atom is roughly...

- None of these.
- 10 - 50 nm
- 1 - 5 nm
- 0.1 - 0.5 nm

Question 29**1 pts**

For which of the following elements would the size of the neutral atom (atomic radius) be the largest?

 Rb Na Sr Ca**Question 30****1 pts**

Write an equation that represents the second ionization energy of nickel.

 $\text{Ni(g)} \longrightarrow \text{Ni}^{\text{+}}(\text{g}) + \text{e}^{-}$ $\text{Ni(g)} \longrightarrow \text{Ni}^{\text{2+}}(\text{g}) + 2\text{e}^{-}$ $\text{Ni(g)} \longrightarrow \text{Ni}^{\text{2+}}(\text{g}) + \text{e}^{-}$ $\text{Ni}^{\text{+}}(\text{g)} \longrightarrow \text{Ni}^{\text{2+}}(\text{g}) + \text{e}^{-}$

Quiz saved at 6:01pm

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