

HW05 - H Atom and Electron Configuration

ⓘ This is a preview of the published version of the quiz

Started: Sep 18 at 12:47pm

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

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 ?

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

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 $n=2$.

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

Question 4

1 pts

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

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

Question 5

1 pts

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

- visible, blue
- visible, red

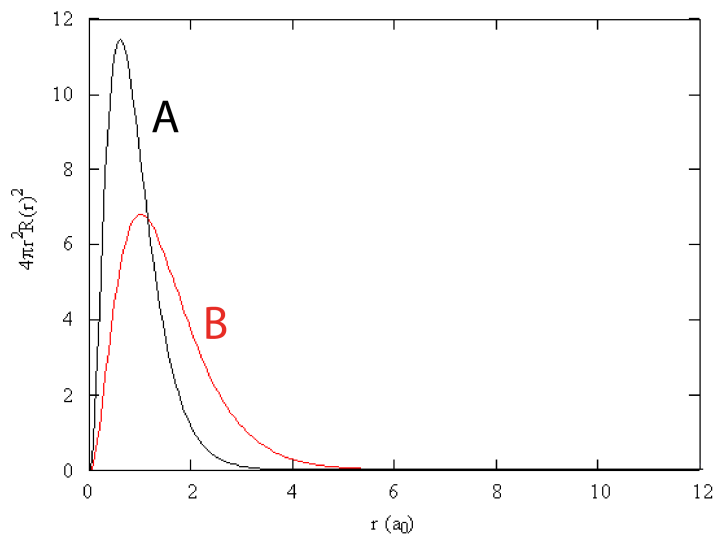
visible, yellow

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

There is no way to know.

A

Question 7

1 pts

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

18

6

2

8

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

3d

4d

4p

Question 9

1 pts

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

the atomic number, Z .

the angular momentum quantum number, ℓ .

the principal quantum number, n .

the magnetic quantum number, m_ℓ .

Question 10

1 pts

Can an electron in an atom be in an energy level described by the set of quantum

numbers $n=5$, $l=3$, $m_l=-2$?

- No, because m_l cannot be negative.
- No, because l must equal $n-1$.
- No, because m_l must equal ± 1 .
- Yes.

Question 11

1 pts

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

- $n=3$, $l=1$, $m_l=-1$
- $n=3$, $l=3$, $m_l=1$
- $n=3$, $l=2$, $m_l=0$
- $n=3$, $l=2$, $m_l=-3$

Question 12

1 pts

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

- 18
- 4
- 16
- 34

Question 13

1 pts

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

 3p 2p 4p 2s**Question 14**

1 pts

The transition metals are elements with partially filled...

 p subshells. f subshells. s subshells. d subshells.**Question 15**

1 pts

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

$[\text{Ne}] 3s^2 3p^4$

 chlorine aluminum

silicon

sulfur

Question 16

1 pts

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

$ns^2 nd^{10}$

$ns^2 np^5$

$ns^2 np^6$

ns^2

Question 17

1 pts

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

4d

3f

5d

6s

Question 18

1 pts

The electron configuration for the Mn atom is...

- $1s^2 2s^2 2p^6 3s^2 3p^3$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^5$

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.
- an enhanced stability is associated with filled sets of equivalent orbitals.
- the magnetism measurement shows one unpaired electron.
- only one electron can occupy a 5s orbital.

Question 20

1 pts

Which of the following atoms has the largest radius?

- N
- Cl
- F
- Br

Question 21**1 pts**

As an atom's radius decreases...

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

Question 22**1 pts**

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

- Na
- Si
- Xe
- Cl
- Ar

Question 23**1 pts**

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

- 4
- 2

5

6

Question 24

1 pts

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

5

6

4

7

Question 25

1 pts

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

5

4

7

6

Question 26

1 pts

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

1

None of these.

4

3

Question 27

1 pts

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

4

1

2

3

Question 28

1 pts

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

None of these.

0.1 - 0.5 nm

10 - 50 nm

1 - 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.

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

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

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

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

Quiz saved at 12:48pm

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