

Chem!stry

Name: ()

Class:

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Assignment on Atomic Structure

1. An atom of element **P** has the electronic configuration of 2, 8, 8, 1. Which one of the following statements about element **P** is correct?
- A** Element **P** is in Period 1 and Group 4 of the Periodic Table.
B Element **P** has an atomic number of 19 and is in Group 4 of the Periodic Table.
C Element **P** is in Period 4 and Group 1 of the Periodic Table.
D Element **P** has an atomic number of 17 and is in Period 4 of the Periodic Table.

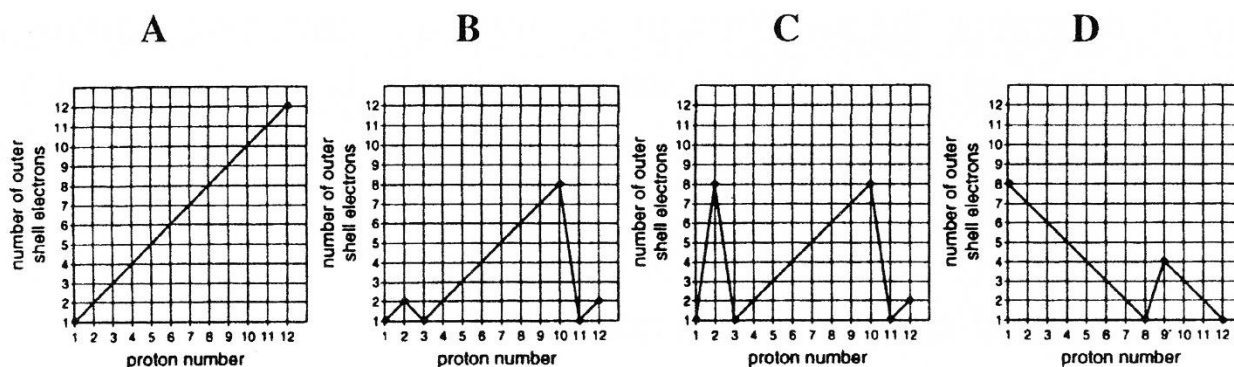
2. Which one of the following ions does *not* exist?

A Na^{2+} **B** Mg^{2+} **C** Ca^{2+} **D** Al^{3+}

3. How many *electrons* are contained in a single molecule of ethane, formula C_2H_6 ?

A 16 **B** 18 **C** 24 **D** 30

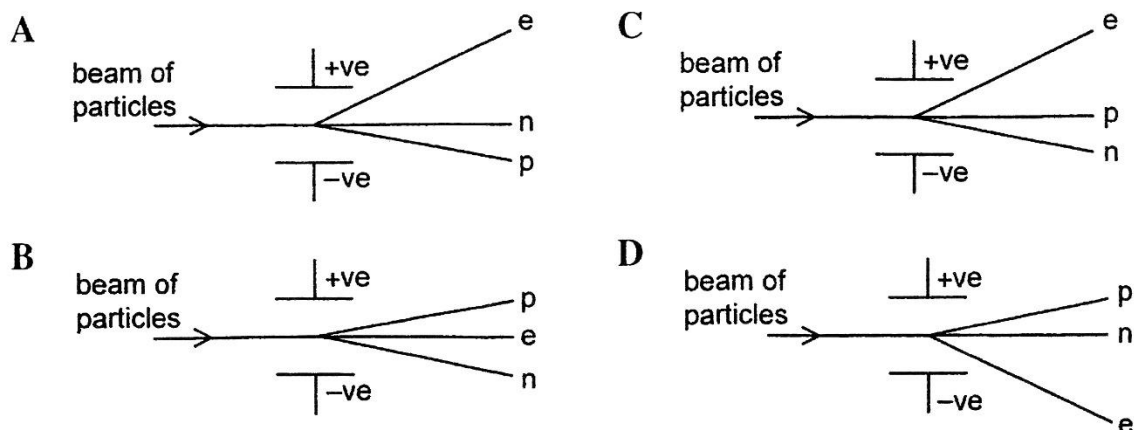
4. The number of outer shell electrons for the atoms of the first 12 elements in the Periodic Table was plotted against proton (atomic) number of the element. Which graph was obtained?



5. The symbol for an atom of sodium can be written as $^{23}_{11}\text{Na}$. The nucleus of this sodium atom contains.

A 11 protons and 12 neutrons. **B** 11 neutrons and 12 protons.
C 12 neutrons and 11 electrons **D** 11 protons and 12 electrons.

6. Protons (symbol p) neutrons (symbol n) and electrons (symbol e) were fired between two charged plates. Which one of the following diagrams correctly shows how the protons, neutrons and electrons were deflected as they pass between the two charged plates?



7. What is the atomic structure of a phosphorus atom?

- A Protons = 16 Neutrons = 15 Electrons = 15
 B Protons = 16 Neutrons = 15 Electrons = 16
 C Protons = 15 Neutrons = 16 Electrons = 16
 D Protons = 15 Neutrons = 16 Electrons = 15

8. Which one of the following particles contains 10 electrons, 11 protons and 12 neutrons?

- A $^{24}_{12}\text{Mg}^{2+}$ B $^{23}_{11}\text{Na}^+$ C $^{22}_{10}\text{Ne}$ D $^{21}_{10}\text{Ne}$

9. How many protons and neutrons are there in one atom of the carbon isotope which has a mass number of 14?

- A Protons = 6 Neutrons = 6 B Protons = 6 Neutrons = 8
 C Protons = 6 Neutrons = 14 D Protons = 8 Neutrons = 6

10. Two naturally occurring isotopes of uranium can be represented as $^{235}_{92}\text{U}$ and $^{238}_{92}\text{U}$. Based on this information, which one of the following statements is correct?

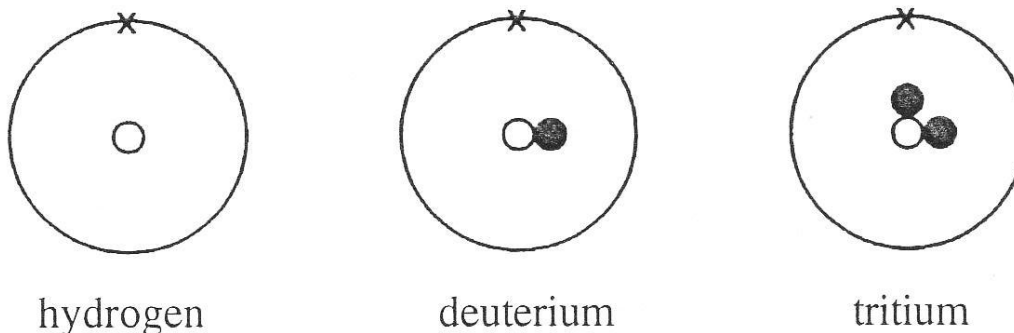
- A The $^{235}_{92}\text{U}$ atom has the same number of neutrons as the $^{238}_{92}\text{U}$ atom.
 B The $^{235}_{92}\text{U}$ atom has fewer electrons than the $^{238}_{92}\text{U}$ atom.
 C The $^{235}_{92}\text{U}$ atom has 92 protons and 144 neutrons.
 D The $^{238}_{92}\text{U}$ atom has 92 electrons and 146 neutrons.

Write your answers to the multiple-choice questions in the table provided below:

1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

Question 11.

Hydrogen (Symbol H) deuterium (symbol D) and tritium (symbol T) are isotopes of the same element. Their atomic structures are shown below:



a) Use the information in the diagram above to complete the following table:

Symbol:	Name of Particle:	Relative Charge on Particle:	Relative Mass of Particle:
○			
●			
x			

b) Explain why the three atoms are *isotopes* of one another:

.....

c) What is the relative molecular mass of a molecule of tritium, formula T₂?

.....

d) Explain why the three isotopes have similar chemical properties:

.....

Question 12.

Four isotopes of iron are known to exist. Their mass numbers and percentage abundance are given in the table below:

Isotope	Percentage Abundance
⁵⁴ Fe	5.80%
⁵⁶ Fe	91.6%
⁵⁷ Fe	2.20%
⁵⁸ Fe	0.40%

Calculate the *relative atomic mass* of this sample of iron based on the data that is provided. Give your answer to three significant figures:

Question 13.

The table shows the atomic structure of six particles, represented by the letters **L** to **Q**. The particles are atoms or ions. The letters are not the symbols of the elements.

Particle	Electrons	Protons	Neutrons
L	6	6	6
M	2	2	2
N	12	12	12
O	10	12	12
P	6	6	8
Q	10	13	14

Use the letters **L** to **Q** to answer the following questions.

a) Which *two* particles are ions?

.....

b) Which particle is an atom of an element from Group VIII?

.....

c) Which *two* particles are an atom and an ion of the same element?

.....

d) Which *two* particles are isotopes of the same element?

.....

e) Which particle has the highest atomic mass?

.....

- Scan the QR code below for the answers to this assignment.



https://www.chemist.sg/chemical_bonding/atomic_structure/atomic_assignment_ans.pdf