## Session 2 : Lesson 1

**Rules for writing element symbols:-**

1) The symbol for an element represents a single atom of it
2) The symbol is derived from the name of the element in Latin
3) The first letter is written as a capital letter... If some elements in the first letter are similar, another letter is taken from the Latin name and written as a Small letter.

| رمز العنصر | اسم العنصر باللغة الإنجليزية | اسم العنصر باللغة اللاتينية | اسم العنصر باللغة العربية |
|---|---|---|---|
| C | Carbon | Carbo | كربون |
| N | Nitrogen | Nitrogenium | نيتروجين |
| Cl | Chlorine | Chlorum | كلور |
| Cr | Chromium | Chromium | كروم |

| رمز العنصر | اسم العنصر باللغة الإنجليزية | اسم العنصر باللغة اللاتينية | اسم العنصر باللغة العربية |
|---|---|---|---|
| Na | Sodium | Natrium | صوديوم |
| K | Potassium | Kalium | بوتاسيوم |
| Cu | Copper | Cuprum | نحاس |
| Fe | Iron | Ferrum | حديد |

### أمثلة لرموز بعض العناصر الشهيرة

| العنصر | الرمز | العنصر | الرمز | العنصر | الرمز |
|---|---|---|---|---|---|
| الهيدروچين | H | البوتاسيوم | K | اليود | I |
| الهيليوم | He | الماغنسيوم | Mg | الكربون | C |
| الزئبق | Hg | الليثيوم | Li | الكالسيوم | Ca |
| الأكسچين | O | الخارصين (الزنك) | Zn | الكلور | Cl |
| الفلور | F | النيتروچين | N | النحاس | Cu |
| الحديد | Fe | النيون | Ne | الكروم | Cr |
| الفوسفور | P | الصوديوم | Na | الأرجون | Ar |
| الرصاص | Pb | البورون | B | الألومنيوم | Al |
| الكبريت | S | البريليوم | Be | الذهب | Au |
| السيليكون | Si | البروم | Br | الفضة | Ag |

## Life application:-

- Farmers use fertilizers to improve agricultural production.

## Fertilizers:-

Chemical compounds used to improve agricultural production


- One of the most famous types of fertilizers is NPK

N refers to the nitrogen element necessary for the greening of leaves .

P helps to strengthen the roots of the plant.

K is necessary for healthy plant growth .

Excessive use of fertilizers leads to soil and water pollution and affects the health of living organisms.

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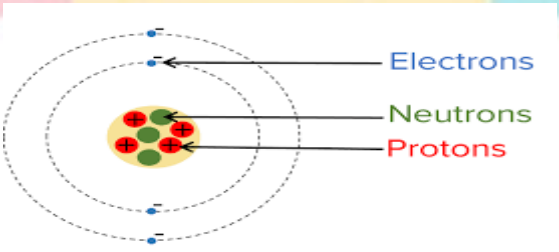
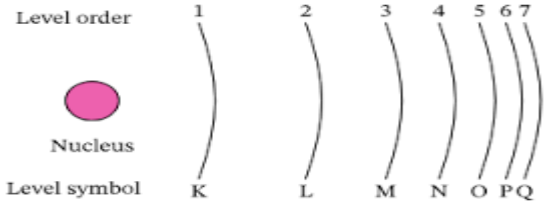
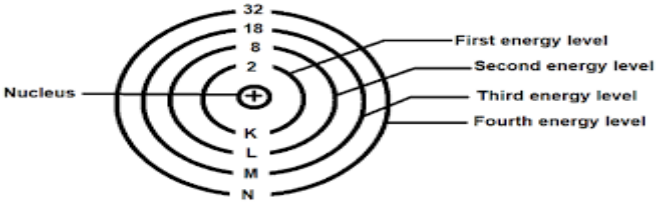
## Energy shells:-

Imaginary regions in which electrons revolve around the nucleus, each according to its energy.



| Level symbol | K | L | M | N | O | P | Q |
|---|---|---|---|---|---|---|---|
| Level number | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Each shell can hold a maximum number of electrons, determined by the formula (2n^2) , That for ( K / L / M / N ) level only.

**Example:**

The K-shell (n=1) can hold up to 2 electrons.

The L-shell (n=2) can hold up to 8 electrons.

The M-shell (n=3) can hold up to 18 electrons.

The N-shell (n=4) can hold up to 32 electrons.

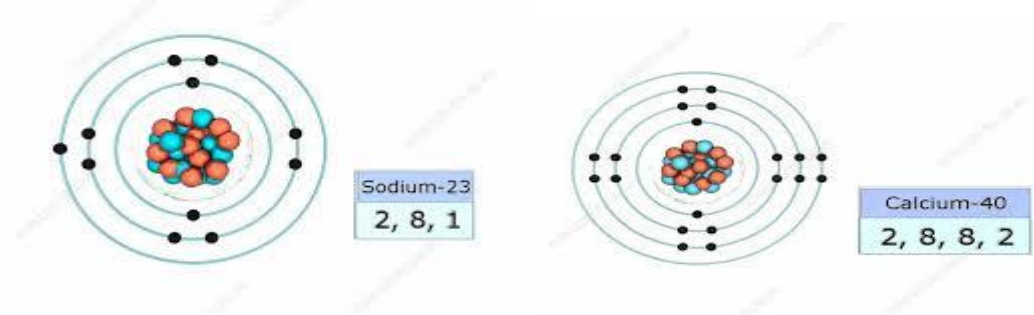
- Electrons in shells closer to the nucleus have lower energy, while those in shells farther away have higher energy.
- The highest energy level is the Q level because it is the farthest from the nucleus... The lowest energy level is the K level...
- The energy of the L level is greater than the energy of the K level, but less than the energy of the M level
- The energy of an electron is equal to the energy of the level in which it rotates. The closer the electron is to the nucleus, its energy decreases, and the further away it is from the nucleus, the energy increases.

**How are electrons distributed in energy levels?**

1) Each level is saturated with a specific number of electrons, and the excess number occupies the next level

2) The lower energy levels are filled first, followed by the higher energy levels

3) The outer level of any atom does not hold more than 8 electrons, regardless of the level number, except for the K level, which holds only 2 electrons.



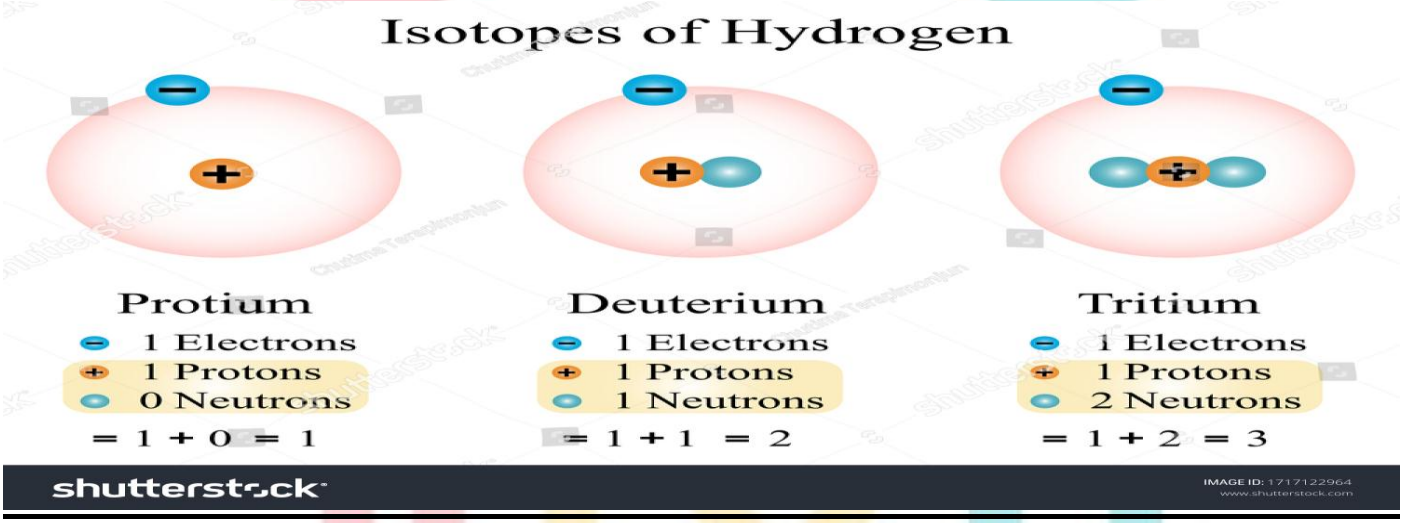
**State the electron configuration for the following elements:-**

| symbol | K | L | M | N |
|---|---|---|---|---|
| $_{12}Mg$ | | | | |
| $_{17}Cl$ | | | | |
| $_{1}H$ | | | | |
| $_{8}O$ | | | | |

**Isotopes:-**

**forms of the same element that agree in atomic number but differ in mass number**

**Isotopes differ in mass number due to the difference in the number of neutrons**



**EXERCISES: Write true or false in front of the statements:-**

**1) The K level is the closest energy level to the nucleus ( )**

**2) $_{11}$Na can be distributed in only two energy levels ( )**

**3) The number of energy levels in the heaviest atoms is 6 ( )**

**4) P element helps the plant to grow green ( )**

**5) Fertilizers are always useful chemical compounds ( )**

**6) If the last energy level of the element is N and it contains only an electron, the atomic number is 20. ( )**

**7) Isotopes are different forms of an element that agree in atomic number but differ in mass number ( )**

**8) The M level is filled before the K level ( )**

**State the electron configuration for the following elements:-**

| symbol | K | L | M | N |
|---|---|---|---|---|
| $_7$N | | | | |
| $_3$Li | | | | |
| $_6$C | | | | |
| $_{18}$Ar | | | | |