NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ EVERYDAY CHEMISTRY: UNIT 2: ATOMIC STRUCTURE

& REDOX

**I) Learning Goals for the Structure of the Atom**

If you wish for some added support during this portion of the unit, these links may help. Of course, you are always (ALWAYS!) welcome to drop me an email to ask questions or to speak with me.

➊ <http://www.chemguide.co.uk/atoms/properties/gcse.html#top> (very good)

➋ <https://www.youtube.com/watch?v=h6LPAwAmnCQ> (not bad!)

➌ <https://www.youtube.com/watch?v=P-wDdFyeLpM> (not bad)

➍ <https://www.youtube.com/watch?v=EMDrb2LqL7E&t=596s> (Introduces Bohr electron configuration)

➎ <https://opentextbc.ca/chemistry/chapter/2-3-atomic-structure-and-symbolism/> (very good)

**Learning Goals**: For this section of Unit 1, you want to know each term's definition. We will fill in these definitions as we go along. Of course, the presence of the \* tells you that you can fill them in online, now if your wish.

Goal 1) You must be able to **define / compare / contrast / interpret** the vocabulary terms:

atom \* the smallest representative, neutral unit of an element (in which the number of protons equals the

number of electrons) capable of participating in chemical reactions

isotope \*a representative atom (species) of an element, having the same atomic number as all other atoms of

the element, but having a different mass number, due to a different number of neutrons.

subatomic particle \*any species that comprises the nucleus or electron cloud of an atom or ion.

mass number \* the unitless, whole number sum of the protons and neturons of a nucleus. The number of nucleons (mass number) of a specific isotope

nucleons \* subatomic particles comprising the nucleus (generally the protons and neutrons)

atomic number \* The number of protons of a nucleus

nuclear charge \*a positive value equivalent to the total number of protons (the atomic number) of a nucleus

ion \* any species in which the number of protons does not equal the number of electrons

Goal 2) **explain**: why all **atoms** may be said to be **neutral** particles (or 0) in overall charge,

and how an atom of an element compares/contrasts to (an) ion(s) of that element.

\*Atoms are neutral, because the number of positive protons are equal to the number of the negative

electrons. The ion of an atom has lost or gained electron(s), and thus the proton number does not equal the

electron number.

Goal 3) list facts of an atom's 3 major subatomic particles with respect to the :

* + - name
    - physical characteristics (mass, charge)
    - location within the atom

Goal 4) interpret an isotopic notation:

Note: **There is no “official”** system of isotopic notation. (I know! …odd!) Different websites/texts may use slightly different formats to impart the exact same information, regarding atomic number, mass number etc. You must rise above this issue and learn how to integrate other formats with the format in this packet. I find the following, however, quite valuable for learning.

The four corners of an element’s symbol may be used to designate different information.

Mass Number

Oxidation State

Atomic Number

Subscript

X

Goal 4 focuses only upon the interpretation of the information found in the upper left and lower left

corners of a symbol.

( #p + #n) = Mass number or # of nucleons (the upper left corner)

Atomic number = # p = nuclear charge ∴# e- X

(the lower left corner)

**For example:**

Given the isotopic notation for an atom of: you will need to identify:

the # of nucleons is 63 or rather, the atom has a mass # of 63 ... due to 30 protons  **+** 33 neutrons

the atomic # = 30 which means there are 30 protons and thus a nuclear charge of +30

and **since this is an atom, one may infer** that there are also 30 electrons

And, using the periodic table you can tell that the above represents an atom of

zinc and its specific name is zinc-63 (pronounced as: ***zinc sixty three***)

Goal 5) write the isotopic notation (as in Goal 4) for any atom or ion using information provided in a

a question and/or information.

Goal 6) interpret the charge of simple positive ions (cations) and negative ions (anions) relative to the

ion's atom (or neutral, in charge, form).

e.g) Ca**2+** is an ion. It has an unequal number of protons and electrons. The charge of +2 indicates

that it has 2 more protons (or 2 more + charges) relative to its atom (Ca0) because 2 electrons

(or 2 negative charges) have been removed/lost [Ca**2+** is the oxidized form of the element

calcium]

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

I would like to offer you a metaphor for the structure of an atom, considering our work on reaction chemistry. Note, most metaphors are limited in some way – but look for the connections and it may help. I would like you to consider an atom, like a feudal kingdom. Think of a castle on a hill, surrounded by a village.

Give me a metaphor!

**An atom is like a feudal kingdom.**

Diagram

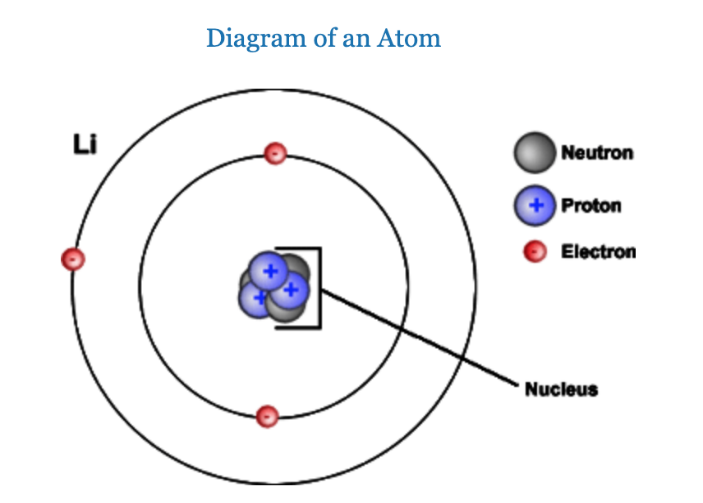
Description automatically generated

The protons & neutrons of the nucleus are like a feudal castle ... the last to be attacked. The electrons (the farms and outlying town) are the first to be lost and the first to experience growth in times of prosperity. This metaphor implies that the **nucleus is stable or unchanged (in reaction chemistry) while all the chemical activity is happening *in or to* the e- cloud.**

In case of attack or of expansion, the village is affected FIRST! The arrangement of the castle walls doesn’t change. (So, in the case of a chemical reaction, outer electrons (the village) get lost). OR…. In case of serious economic growth, the village is what grows… The castle walls stay the same. (So, in the case of some chemical reactions, the electron cloud can “grow” by having electrons from another source, added on) … The castle (the protons of the nucleus), stay(s) the same no matter what. I mean, once you build a castle wall, you don’t go around, changing it! Right?

**TAKE HOME MESSAGE:**  **CHEMICAL** change (chemistry) happening to atoms occurs

* \*in the electron cloud (the village).
* During most chemical reactions, to some extent; \*electrons (negative charge) are lost / gained or shared (equally or unequally).
* During what we term a chemical reaction, the \*nucleus (the castle) remains untouched.
* Thus, during a chemical reaction (as opposed to a nuclear reaction), the reacting species \*change in terms of their electrons.



[This Photo](https://openoregon.pressbooks.pub/nutritionscience/chapter/1b-introduction-to-molecules/) by Unknown Author is licensed under [CC BY-NC](https://creativecommons.org/licenses/by-nc/3.0/)

Electron levels represent the “village” Only the number of electrons change during a chemical reaction.

The nucleus is like a castle on the hill that does not really change during reaction chemistry. No protons or neutrons are lost/gained.

II) Elements vs Atoms

A) An atom of an element is the smallest, neutral (in charge) unit of that element capable of

participating in a chemical reaction.

B) An atom represents a specific element.

1) the term atom is slightly different from the use of the term, element.

2) Elements have chemical and physical properties.

a) the chemical properties depend upon the \*electrons of each atom

b) the physical properties refer to the interactions of multiple atoms of the element.

C) Thus, a single atom is the smallest unit of that element which represents that element in terms of

chemical possibilities.

1) A single atom cannot represent the physical attributes of an element. That is: a single atom

cannot represent the melting point, specific heat, density etc. of the element. These

attributes are a result of multiple atoms of an element affecting other atoms of that element.

D) An element is a \*substance, made up of atoms with identical atomic number

s 1) So, you can think of an element as an aggregation of only one type of atom. **The key is that**

**all the atoms have the same # of protons** (atomic number).

There may be millions of these atoms all bonded to each other ... but because every atom is of

identical atomic number, the whole mass is classified as an element!

atom element

(a group of atoms of the

same atomic number)

Try using the analogy: **atom is to element as a** brick **is to** brick wall**.**

1 atom represents the element, like 1 brick,

describes the basic properties of a brick wall

j0233413

**GIMME’ A METAPHOR**

Question: How is a string of pearls like atoms and elements?

\*The entire string of pearls is like the term, element, while each individual pearl

2) every atom of a specific element has the same number of protons in its nucleus.

a) For instance, if we sent robots to the asteroid belt and their analysis found that a

sample of rock was made of atoms with only 29 protons, then the matter would be

 classified as the element copper. Every atom of copper has only 29 protons. No other

element has only 29 protons making up the nucleus ...except for copper atoms

3) 118 elements are represented on the Periodic Table, and they are divided into:

18 vertical columns (called families or groups),

7 horizontal periods and

2 related series.

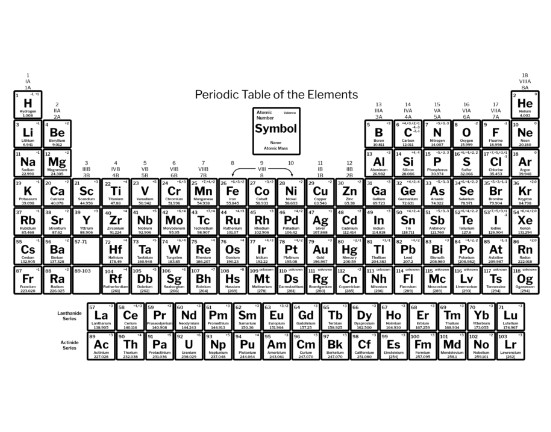
4) Every element is represented by a one or two letter symbol, at the time of publication of

these notes.

The first letter is capitalized. Any other letter of the symbol, is written in the small case

5) Per earlier conversations, the atoms of an element cannot be broken down into any simpler

substances (atoms of other elements or compounds), by ordinary chemical means.



https://www.thoughtco.com/printable-periodic-table-valence-charges-608880

III) General Atomic Structure: Atoms are made up of many, many subatomic (smaller than the atom) particles.

We focus primarily on protons, neutrons and electrons.



Check Out: <https://www.youtube.com/watch?v=WPL3pUFtpJk> Begin at 5 minutes

Bohr Model vs. Quantum Lies told in school: SciShow

A) In 1911, Ernest Rutherford published his model of the atom, based upon the results of the gold foil

experiment. Quick Review: <https://flexbooks.ck12.org/cbook/ck-12-chemistry-flexbook-2.0/section/4.14/primary/lesson/rutherfords-atomic-model-chem/>

1) Three conclusions came from his work, which hold true in our current model.

a) most of the mass of the atom was found in a dense, positively charged area, he

termed, \*the nucleus

b) the electrons were \*beyond or outside of the nucleus

c) Every atom is mostly empty space.

A metaphor which may have some meaning for you is, that an atom is like a giant

cathedral (or any large building), in which the nucleus was a fly in that building.

2) For our class, we shall generally interpret the term, atom, as referring to a singular

elemental species which is neutral in overall charge. Atoms have an overall charge \*of zero

(0), because the number of protons (positive (+) charges) are offset by or equal to the

number of electrons (negative (**-**) charges).

3) So, atoms have two main sections: the nucleus and the electron cloud beyond the nucleus.

Diagram

Description automatically generated

**An atom is like a feudal kingdom.**

B) **The Concept of Charge (Big Idea #3)**

1) Generally, the concept of charge attempts to explain what chemists mean by certain

symbolism and how the assignment of positive charge to protons and negative charge

to electrons affects that symbolism.

In truth, so many of us had issues is prior chemistry courses, because we really

did not understand what the symbols; Mg0 , Na+1 or P-3 really meant.

There was also some confusion as to the writing of the symbols. For instance, is there a

difference between the symbols; **H+, H+1, and H1+** ?

This section will attempt to eradicate any sense of confusion.

2) The important parts of the concept of charge, (Big Idea #3) are:

a) the isotopic signatures and symbols used for atoms and ions carry a lot of information.

b) the chemistry (the reactions) of an atom are \*different from those of the ion of the

element.

i) For instance, the chemical reactions of Na0 are different from those of Na+1.

c) like charges \*repel, while opposite charges attract.

d) Charge (full or partial) may evolve from a complete transfer of electrons or develop

from an unequal sharing of electrons. Partial charges are designated with δ+ or δ-

C) Protons, Neutrons and Electrons:

Fact1: **Protons**: **Atoms of the same element must have the same number of protons** (\*atomic

number)

* This fact coordinates with Goal 4.
* Protons are found clustered at the center of each atom, in a location called the nucleus.
* The total number of protons in an atom is called the \*atomic number.
* On a periodic table, this whole-number value is often (not always) found in the lower left-hand corner of the symbol or above the symbol. (There is no standard format)

13Al

Every atom of aluminum has 13 protons. Thus, we can say that every aluminum atom has

an atomic number equal to 13. This atomic number is unique to atoms of aluminum.

92

U

Every atom of uranium has 92 protons. Hence, the atomic number of uranium is 92.

This number of protons is unique to atoms of uranium.

* Every proton has a mass of approximately 1 **atomic mass unit** (**μ**) or 1.66 x 10-24 grams.
* Protons are one type of **NUCLEON** A nucleon is any subatomic particle found in the nucleus.
* Protons are the only charged type of nucleon. Each proton is assigned a \*single POSITIVE charge. or +1

* Because of this positive charge, the NUCLEUS OF EVERY ATOM has a positive charge, called the \*nuclear charge.
* Thus, every atom of aluminum (Al) has an atomic number of 13, and a nuclear charge of +13
* Every atom of uranium (U) has an atomic number of 92, and a nuclear charge of +92
* The nuclear charge due to the protons of the nucleus, is \*offset by the negative charge due to the electrons of the atom.

Write down TWO critical ideas about protons you want to remember.

1)

2)

Fact2: **Neutrons**: Neutrons are also found in the nucleus. Neutrons are ALSO some type of nucleon.

* Each neutron is assigned a charge of 0. A *neutron* is a subatomic particle, which is *neutral* in charge. (Is there anybody here who wants to know why???? HMMM?)
* Neutrons also have a mass of approximately 1 μ. *They are slightly more massive* than a proton, but for our class, we are going to treat the mass of a proton and neutron to be similar.
* When you add the number of neutrons and protons, we get the **MASS NUMBER.**
* The mass number is a whole-number value. The mass number has no unit. It is not really a dimension of matter. It is simply the **sum of the nucleons** (#p +#n) in the nucleus.
* Again, the mass number is NOT a mass, but really it is the number of nucleons of an atom.
* Often, the mass number is recorded in the upper-left hand corner of the element symbol.
* Between the recording of the atomic number and the mass number, we have the **isotopic signature.**

or C – 14 F – 18 Ca – 42 H – 1

* The atoms of most elements have both protons and neutrons in their nuclei.
* However, the number of neutrons may be different from atom to atom of a specific element. This difference leads us to the idea of \* **ISOTOPES**.
* **O-16 and O-18 are isotopes of each other or rather, they are isotopes of the element, oxygen. Isotopes** are ATOMS of a specific element:
* which have the same number of protons (atomic number). Isotopes of a specific element are atoms of the same element.
* ***but isotopes of an element have a different number of neutrons, thus, a different mass number***
* have the same number of electrons, thus they undergo the exact same chemical reactions, since chemical reactions are primarily concerned with electrons.

Diagram, schematic

Description automatically generated

vs.

p =\*8 p =\*8

n = \*8 n =\*10

mass# = \*16 mass # =18

but! e- = \*8 e- = \*8

written as: O-16 written as O-18

Write down one critical idea about **neutrons** you want to remember.

1)

Write down one critical idea about **isotopes** you want to remember.

1)

Write down one critical idea about **MASS NUMBER** you want to remember.

1)

Fact3: For our class, for an ***atom*: the number of protons = the number of electrons.**

Thus, every atom of an element is 0 in overall charge. The nuclear charge is offset by negative

electrons.

Al or Al0 is a way to write the symbol for an ATOM of aluminum. This means that

there are an equal number of protons and electrons.

Al0 has 13 positive protons and 13 negative electrons 13 + (-13) = 0

U or U0 is a way to write the symbol for an ATOM of uranium. This means that there are

an equal number of protons and electrons!

U0 has 92 protons and 92 electrons. For every 1 proton, there is one negative electron.

29Cu

An atom of copper has 29 protons.

How many electrons MUST an atom of copper have? \*29

* Fact3 is related directly to Big Idea #3, The Concept of Charge. For our class, atoms have an overall charge of 0 because the number of positive protons must be balanced

by the number of negative electrons – for us to use the term ATOM!

When we see the symbol Na0 , that 0 informs us that we are dealing with an atom.

We may assume that the overall charge is equal to 0, because the number of protons is

equal to the number of electrons.

Fact4: Under normal chemical circumstances the ONLY subatomic particle that can change

in quantity is the electron!!!! The \*atomic number

of an element (the number of protons) does NOT change under normal chemical circumstances. Thus, a species takes on a charge (becomes an ion) , **because** \*electrons were lost or electrons were gained.

One way you may help yourself learn the above is to consider the letter symbol of an element.

If there is no change in the letter symbol, then chemists are trying to imply that **then the**

**number of protons is the same ... so just electrons changed in number.**

**+1 -1**

Consider: 2 Na0 + Cl20→ 2 NaCl Notice the Na on the reactant side and the Na on the

product side. We may assume that each symbol

represents a species with only 11 protons, as they are

the same symbol. Granted, the product side seems to

be made of charged species, but that is due to a difference

in the number of electrons, not protons.

* Ions, in turn, may convert BACK into atoms, by gaining or losing electrons.
* Students must understand that chemistry is dependent upon electrons.
* The atom and its ion cannot have the same number of electrons; thus, **their chemistries must be different from each other!**

Fact5: Most students get confused with the terms; **atom and ion**. The difference between

the two is the number of electrons and thus, charge.

The charge tells you which subatomic particle (proton or electron) is \*in EXCESS and by how

many.

* positive ions have protons in excess, due to a loss of electrons
* negative ions have electrons in excess, due to a gain of electrons.

Recall that *Atoms* have a charge of 0 and to understand that IONS have + or - charges

Fact6: When the charge is "+" there are more protons than electrons, BECAUSE \*electrons (or

negative charges) have been lost by a neutrally charged atom

Fact7: When the charge is "- " there are more electrons than protons, BECAUSE \*electrons (or negative

charge) has been GAINED by a species.

eg) Na or Na0 can assumed to be an atom, because it is an atom with an overall charge of 0

Na+1 means there is 1 more proton than electron. Thus 1 ELECTRON was lost

from Na0  during a chemical reaction.

Mg or Mg0 can assumed to be an atom, because it is an atom with an overall charge of 0

Mg+2 means there are 2 more protons than electrons. Thus 2 ELECTRONs were lost

from Mg0 during some type of chemical reaction.

S or S0 can assumed to be an atom, because it is an atom with an overall charge of 0

S-2 means there are 2 more ELECTRONS than protons (the charge tells you what

is in EXCESS!) Since the charge is negative, there are more electrons!

Thus 2 ELECTRONs were GAINED BY S0 during some type of chemical reaction.

**TAKE HOME MESSAGE:** Only the number of \*electrons may change. Thus a positive charge tells us that

electrons were lost and a negative charge indicates that electrons were gained.

IV) **IONS** As a rule, during reaction chemistry (chemical) reactions the number of protons does not change.

In most chemical reactions, only the number of electrons changes, from species to species – but

that number is conserved, overall. (recall: Big Idea # 1 and Fact2).

Free moving ions (often found in water) are called:\*electrolytes

A diagram of a test tube with light bulbs and a light bulb attached to it

Description automatically generated They can carry an electrical current!

<https://courses.lumenlearning.com/chemistryformajors/chapter/electrolytes/>

A) Any species with an UNEQUAL number of protons and electrons is called an \*ion

1) \*Cation = positive ion … Such an ion has more protons than electrons, due to a loss of

electrons

2) \*Anion = negative ion …Such an ion has more electrons than protons, due to a gain of

electrons.

3) Ions may be monatomic (a single species with a charge) OR polyatomic (multiple species in

which the charge represents an overall charge. e.g.) (PO4)-3 (the charge is delocalized)

4) So, compare an ***atom*** of Na0 with an ***ion*** of Na+1

Each has the same number of protons (the **letter symbol is the same**!!!!)

Na+1 however has one MORE proton. BUT since the number of protons did not change,

the number of electrons must have changed. It must be that an electron was lost.

Na0 has 11 protons and 11 electrons

Na+1 has 11 protons but only 10 electrons (so there is one more proton than electron)

Notice that the number of protons =11, but the

number of electrons is only 10. There is one more proton than electron, so the ion as a +1 charge

+ + + + + + + + + + +

- - - - - - - - - -

5) Compare an atom of S0 with the ion S-2

Each has the same number of protons (the letter symbol is the same: S vs. S) You may

infer that they have the same number of protons or atomic number, when the letter symbol is the same)

S-2 however has two MORE electrons ... since the number of protons did not change,

thus, the number of electrons must have changed. It seems two electrons were gained

S0 has 16 protons and 16 electrons

S-2 anion has 16 protons and 2 extra electrons making 18 electrons

Notice that the number of protons =16, but the

number of electrons is 18. There are more electrons than protons, so the ion as a -2 charge

+ + + + + + + + + + + + + + + +

- - - - - - - - - - - - - - - - - -

Don't worry *yet*, from where the extra 2 electrons came. Just concern yourself

with being able to interpret the meaning of the symbolism.

B) As previously iterated, the development of a charge is due to \*a loss or gain of electrons.

1) Ground State Electron Configuration: The order of the electrons around their nucleus, with

the lowest energy levels closest to the nucleus and those of greater energy further away.

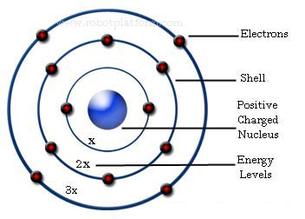
2) You do not need to WRITE an electron configuration. In fact, I have put the vast majority of

ground state configurations on your copy of the Periodic Table.

a) You need only interpret a configuration AND to use this work to grasp the origin of

the charge found on an ion.

3) So, we have classically interpreted Bohr’s work on the electrons as looking like:



<http://thehistoryoftheatom.weebly.com/niels-bohr.html>

Check Out: <https://www.youtube.com/watch?v=EMDrb2LqL7E&t=596s> (older – but pretty good!)

a) Bohr suggested a minimum of seven areas in which we are most likely to find an

electron. They are often seen as ringed areas (shells or levels) in the Bohr Model.

b) We call these general areas: Principal Energy Levels (or Shells or just Energy Levels)

Metaphorically they are like rungs on a ladder.

c) A principal energy level may have 0 electrons all the way up to some maximum

number of electrons, which is calculated for that level.

d) The **maximum number** of electrons in any principal energy = 2n2 where n = the

number of the energy level (1-7)

The first principal energy level could only hold a maximum of 2 electrons or 2 (1)2 … it may have 0, 1 or 2e- but NOT 3 e-.

The second principal energy level could only hold a maximum of 8 electrons or 2(2)2 …. It may have 0-8 electrons …but not 9.

The third principal energy level could only hold a maximum of 18 electrons.

Note: It does NOT have to have 18 electrons, that is just its maximum.

As a metaphor, consider how many logs you can carry into the house, for a

cozy fireplace…

Let’s say you can carry a maximum of 7 logs in any one trip. Every time

you go out to grab logs, MUST you bring in 7 logs?

Is it conceivable that you might bring in only 4 logs? Maybe 5?

Can you bring in 9 logs?

e) As a rule; **the valence level of an atom may hold 1 to 8 electrons only, regardless**

**of the calculation of 2n2. Generally, a valence level of electrons will have a**

**maximum of 8 electrons.**

f) It was G. N. Lewis who used Bohr’s work, to give us the classic (yet imprecise)

electron configurations of the Bohr Model.

g) G.N. Lewis also proposed the Valence Electron Theory which includes the idea that a

valence level (the outermost level) will not hold MORE than 8 valence e- regardless

of the maximum number. **This is known as the OCTET RULE.**

You want to know the term: **valence level**

i) Valence electrons are farthest from the nucleus, and in the outermost level of e-

ii) The electrons of the valence level tend to be higher in energy than the other

 electrons of the atom.

<https://en.wikipedia.org/wiki/Bristol_Motor_Speedway>

iii) Chemistry is really a study of how electrons (often – but not only valence) are

exchanged or shared.

A window with curtains and drapes

Description automatically generated

val*ance* curtain

4) For instance, sodium atom with its 11 protons (and 11 electrons) has an electron

configuration of

Na 2-8-1 In the ground state, an atom of Na has 3 distinct energy levels holding electrons.

The first energy level is closest to the nucleus. The electrons are at the lowest energy

The first energy level is “full”

The second energy level has electrons of greater potential and kinetic energy, relative

to those of the first energy level. The second level is full.

The third principal energy level is farthest from the nucleus. This electron most likely

has the greatest energy. There is only one. Hence there is only 1 valence electron.

Ca 2-8-8-2 In the ground state, an atom of Ca has 4 distinct energy levels holding electrons.

The first energy level is closest to the nucleus and has 2 electrons. It is full.

The second energy level has 8 electrons of greater potential energy relative to those of the

first level. The second level is also full according to 2n2

The third level has electrons of greater potential energy (than levels 1 and 2) and has 8

electrons. This level is NOT full. Levels do NOT NEED to be “filled” to max.

Now we come to the fourth energy level and find 2 valence electrons.

Br 2-8-18-7 In the ground state, an atom of Br has 4 energy levels holding electrons (just like Ca).

The first energy level is closest to the nucleus and has 2 electrons. It is full.

The second energy level has 8 electrons of greater potential energy relative to those of the

first level. The second level is also full according to 2n2

The third level has electrons of greater potential energy (than levels 1 and 2) and has 18

electrons and it is a filled energy level.

The fourth energy level and find 7 valence electrons.

**5) So, from where does a charge on an ion originate?**

To answer this question, I am going to use the Octet Rule. It really is a poor

approximation of what can happen – but it is “good enough” for what we need. It really

isn’t a rule, as much as it is a “reasonable guideline”.

Essentially, the Octet Rule states that ***valence electrons will be lost/gained or shared, so***

***that the species involved in a chemical reaction end up with a valence level of electrons***

***with 8 electrons or as close to 8 as is possible or as close to 2 if the valence level ends***

***up being the first principal energy level.***

As electrons are lost or gained by a species, the overall charge of the species changes.

*Generally*, we can *begin* with this idea, that when a metal reacts with a nonmetal,

**the atom with fewer than 4 valence electrons, will lose those electrons**

**the atom with more than 4, electrons will gain electrons, trying to get to 8**

Note: Bismuth and Polonium are exceptions to this

**Note: The loss of an electron = \*oxidation … a species becomes more positive**

**The gain of an electron = \*reduction …a species becomes more negative**

0

11 protons

11 electrons

electron configuration: **2- 8- 1**  thus there is only 1 valence electron

**Based upon the Octet rule, will Na0 tend to lose or gain an electron?**

That is: Will Na0 tend to be oxidized or reduced?

Notice the disruption in the number of protons vs. electrons due to a

change in the number of electrons. This disruption creates the charge.

16 protons

16 electrons

electron configuration: 2-8-6 thus there are 6 valence electrons

**Based upon the Octet rule, will S0 tend to lose or gain an electron?**

That is: Will S0 tend to be oxidized or reduced?

Again, note because of the tendency to go for 8 valence electrons, there is a

disruption in the number of protons vs electrons. This unequal value gives us

the charge of the ion.

5 protons

5 electrons

electron configuration: 2-3 thus there are 3 valence electrons.

**Based upon the Octet rule, will B0 tend to lose or gain an electron?**

That is: will an atom of B0 tend to be oxidized or reduced?

Notice that the first principal energy level ends up being the new valence level. So, 2 is as far as the species can go. Note that there is still a difference

created between the number of protons and electrons. Boron is one of those atoms which cannot get to 8 valence electrons.

**…. Notice we are now going to loop back around and review Big Idea #3 Concept of Charge**

C) A key idea to remember is that **the charge tells you which subatomic particle is in EXCESS.**

You must then realize that the proton number IS NOT CHANGING in a “reaction chemistry”

reaction. Thus, **the development of charge must be due solely to lost or gained electrons**

Compare F0 to F-1 Check your periodic table. You will note that fluorine has 9 protons.

9 protons vs. 9 protons

9 electrons vs. 10 electrons (The charge tells you that there is one more electron)

Compare Cu0 to Cu+2 Check your periodic table. You will note that copper has 29 protons

29 protons vs. 29 protons

29 electrons vs. 27 electrons (The charge tells you that there are two more protons

than electrons and since the protons can't change in number,

two electrons must have been lost)

**So some students like to think of it this way....**

**When the ion is negative, you must add the number to the number of electrons.**

**When the ion is positive you must subtract the number from the number of electrons.**

**Take out your periodic table. The periodic table only lists ATOMS. This is a good starting point.**

1) Here’s a challenge: **Determine the number of protons and electrons in the ion, Ca+2.**

Consider Ca atom compared to Ca+2 ion. How many protons and electrons does the **ion** have?

step 1: Look up Ca on the Periodic Table. Do you understand that the periodic table lists ONLY

atoms? Thus Ca0 or rather, an ATOM of calcium has \*20 p and (thus) 20 e-

step 2: Now, look at the charge of the calcium ion, Ca+2. Do you see that it is a +2?

This means there are \*2 more protons than electrons

Remember, that + is a symbol for protons, so +2 literally translates into “ 2 more protons (+) vs.

electrons”.

Remember: protons numbers don't change you can assume that: \*2 of the 20 original electrons

were lost by the original Ca0.

So if the atom had 20 protons, and the ion STILL has 20 protons, but is a +2, then that means,

two electrons were lost…..

Thus Ca+2 has 20 protons & only 18 e- …. The +2 means there are two more protons than

electrons, because 2 electrons were lost from Ca0

2) Consider the aluminum ion, Al+3 How many protons and electrons doe the ion have?

Step 1: How many protons does and atom of Al0 have? How many electrons then? (13 and 13)

Step 2: Notice the charge is +3 which means that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ there are 3 fewer electrons

or 3 electrons were lost

So... Al+3 has 13 protons and 10 electrons

3) Consider the iodide ion , I-1 How many protons and electrons does it have?

Step 1: How many protons does and atom of I0 have? How many electrons then? (53 and 53)

Step 2: Notice the charge is -1 which means that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ there is 1 more electron

So... I-1 has 53 protons and 54 electrons

**FRAYER DIAGRAMS: ATOM AND ION**

*Essential (critical: definition/recognition skill) Nonessential (true/accurate but not critical)*

**ATOM**

*Exemplars Non-exemplars*

*Essential (critical: definition/recognition skill) Nonessential (true/accurate but not critical)*

**ION**

*Exemplars Non-exemplars*

**Check your understanding:**

1) When an **atom** has an atomic number of 10, how many electrons must the atom have in the electron cloud?

2) When an atom has a nuclear charge of +7, then how many electrons must the atom have?

3) When an atom has 29 electrons, how many protons must the atom possess?

4) What is the overall charge of any atom?

5) In what ways does an ion differ from an atom? List at least two differences.

1)

2)

Ans: 1. 10 e- 2. 7 e- 3. 29 p 4. 0 or neutral 5 Ions have a charge of + or -. Ions have an unequal number of protons and electrons resulting in an overall charge.

V) **Focus: The chemistry of an atom is different from the chemistry of its ion. (Part of Big Idea #3)**

A) Chemistry appears to be associated with the number of valence electrons – with their loss, and the

gain.

1) It is reasonable to infer that chemical species with a different number of valence electrons

undergo different chemical reactions.

a) Consider Ca0 and Ca+2

2-8-8-2 2-8-8 Are the number of valence electrons the same?

Calcium atoms will react vigorously with water. Why? Well, the atoms of calcium

are losing electrons.

Calcium ion tends to form compounds with other ions in water (not react with water)

B) The chemistry of an atom and/or ion really depends upon the number of electrons.

1) Thus, when we say milk has calcium – we really mean milk has calcium ION.

2) Na0 vs. Na+1 Check Out: <https://www.youtube.com/watch?v=NTFBXJ3Zd_4>

metal ion found in compounds

VI) The Excited State of Electrons (The Origin of Light and EMS: An Application of Big Ideas 1 & 2)

A) Excited State Electron Configuration: This exists when an inner level electron absorbs

energy from an outside source and moves to a higher

energy level.

a) This is a temporary state. No electrons are lost during excitation.

b) When the electron returns to a lower energy level, the loss of potential energy is

converted to some form of electromagnetic spectrum energy. (radio waves,

microwaves, infrared, visible light, ultraviolet, x-ray, or gamma ray)

c) The configuration is NOT found on the periodic table references

d) Example: O: 2-6 O: 2-5-1

ground state one possible excited state

e) Everyday Chemistry: Neon Light Sign

Sunlight

Flashlight

B) Metaphor: Running up a hill … then tumbling down



Higher energy (Excited State)

Energy is released with the

Let there be light!

return to ground state



Lower Energy (Ground State)

e

e

1

An atom in the ground state

2

e

e

An e- absorbs energy from

an outside source

e

e

3

The absorbed energy pushes the e- away from the

nucleus. The e- is pushed to a higher energy level.

The e- is “excited”. In other words, the potential

energy of the electron increases, relative to its original

energy.

4

e

e

The excited e- is unable to maintain its excited state.

for a number of reasons. The e- returns to a lower

energy state, changing its potential energy, again.

(Big Idea 2) This return to a lower state means that

the e- is closer to the nucleus. This difference in

potential energy cannot disappear (Big Idea 1). Often

the energy difference between the excited state and ground

state is released in a form we can see (visible (colored) light)

When an electron is so energized, that it is removed from the influence of its nucleus and probably attracted to another nucleus, we have an **oxidation**

e

e



citation:

McGowan, Terry: *Scientific American: Halogen Lights* July 1996 p. 108 Scientific American Inc.

VII) The bonding of electrons is explained by a somewhat complex set of ideas. To understand some of the

basics of reactions and the making of new bonds, we will depend upon the Octet Rule and the idea of

Effective Nuclear Charge.

A) Effective Nuclear Charge is the \*pull or the attraction an electron experiences

for its own nucleus

1) A set of issues affects that “pull” an electron “experiences”. A greater number of protons does

not translate into a greater pull. Potential energy (distance from the nucleus), the number

of electrons between the nucleus and the electron each affects ENC.

2) Let us simply summarize effective nuclear charge by writing that if an electron experiences a

a) weak effective nuclear charge, then that electron is likely lost to the pull of another

nucleus. The electron is lost or mostly lost. The atom is oxidized.

b) strong effective nuclear charge for its valence electrons, then the electrons tend to

“stick around”. In fact, the atom has a chance to attract even more electrons. Hence,

electrons tend to be gained, or at least dominate the ownership of the electron. The

atom is reduced in charge.

3) We see this especially in the idea of electronegativity.

a) Electronegativity sets a value as to the tendency of an atom to gain an electron in a

chemical bond. I sometimes use it to help point to the effective nuclear charge of

atoms – although it is not really meant for that … but hey, any port in a storm!

b) Electronegativity on the Pauling Scale runs from a

low of 0.7 to a high of 3.98 (let’s say 4).

c) Metals tend to be very low in electronegativity. Metal atoms tend not to gain

electrons, as they have a poor ability to attract them (a poor or low electronegativity).

Nonmetals tend to gain electrons from atoms of lesser electronegativity – including

other nonmetals.

**Pauling Electronegativity Values**

Table

Description automatically generated

<http://www.chem.ucla.edu/~harding/IGOC/E/electronegativity.html>

B) Oxidation: The Loss of Electrons. The oxidation state becomes MORE positive

(mnemonic: LEO)

1) loss of electrons = \*oxidation

a) oxidized species become \*more positive in charge, due to a loss of negative

electrons. e.g. 0 to +2 or +2 to +5

In a 4th of July, sparkler, essentially aluminum metal is oxidized in an

exothermic chemical reaction.

+3 -2

Al0  O20 🡪 Al2O3

Aluminum is a metal. And metals, in the presence of a nonmetal like

oxygen become oxidized.

b) So, in the case of metals, you will often hear that a metal (such as iron) has been

oxidized (**or rusted**) in the presence of oxygen or some other nonmetal.

In this case, iron atom loses electrons and becomes a +3 or +2 ion

Metals are easily oxidized. 80% of the elements are metallic.

c) Oxidation does NOT require oxygen … but derives the name from oxygen.

d) You may hear that fossil fuels are *oxidized* when combusted in oxygen. This is

generally accurate, as the carbon atoms of the fossil fuel(s) *partially* lose electrons to

oxygen, and form carbon dioxide. The carbon of CO2 is in a +4 oxidation state … a

more positive state, then carbon is in the original fuel.

H

|

H – C-4– H

|

H

O = O0

O = O

O-2– H

/

H

O-2– H

/

H

O = C+4 = O-2

+

+

→

🡪

This is a good example to study. Notice that C and O are both nonmetals. And

only the nonmetal of higher electronegativity becomes reduced. The other nonmetal

is the “loser” of electrons. However, this loss and thus the gain is not complete. No

one atom can completely own or dominated the electron(s). Hence an UN EQUAL

sharing of the electron occurs….creating a type of covalent bond!

The + does not indicate the formation of an ion, but rather, an indication that the

electrons of that species are being drawn TOWARDS another nucleus. The – does not

indicate a full anion. Rather, the negative indicates that the species is drawing electrons

towards its nucleus.

e) The key is to grasp that oxidation is a loss of electrons, and many atoms can

become oxidized …. BUT(!) Metal atoms, in the presence of nonmetals are

especially vulnerable to this sort of electron activity.

f) As a general rule, metals do NOT react or bond with other metals. For our work, we

will consider it more common for

\* Metals to bond with nonmetals via ionic bonding

\* Nonmetals to bond with nonmetals thus creating molecules

C) REDUCTION: Gain of electrons.

1) Nonmetals ***tend*** to gain electrons in a chemical reaction especially when reacted with

a species of lesser electronegativity, like a metal or even another nonmetal.

(Nonmetals tend to become reduced.)

(mnemonic: GER)

a) Gain of electrons = \*reduction

b) a reduced species becomes \*more negative, due to the gain of negative

electrons.

c) fluorine is the most readily (easily) reduced element … followed by oxygen.

d) It is common for nonmetal atoms to bond with other nonmetal atoms via a sharing of

electrons: \* Covalent Bonding

A nonmetal atom bonded to another nonmetal atom forms \*a molecule

D) When an electron is totally lost by one species (complete oxidation) and it is gained by another

species (complete reduction), oppositely charged ions are produced. These ions may bond with

each other, as opposite charges attract. This type of bond is an \*ionic bond

1) Often, an ionic bond exists between metal species and nonmetal species or rather,

a metal cation and a nonmetal anion. The positive metallic species tends to be

written first.

NaCl, Fe2O3, CaCO3

Na+1 Cl-1

a) When an ionic compound is dissolved in water, the electrostatic attraction is often

disrupted, forming an electrolyte solution.

E) LEO says GER

<http://bananaoilmovies.wordpress.com/2010/11/05/a-farewell/>

**Relative Locations of the 4 Categories of Elements Found on the Periodic Table**

**Non -**

**Metals Noble**

**Gases**

**Metals**

**Metalloids**

**Metals**

IV) A Closer Look: Redox Reactions:

A) \*Electrons govern chemical reactions. They may be lost, gained, or shared (equally or

unequally) by chemical species

B) The effective nuclear charge of an atom’s nucleus is at the heart of whether a species gains or

loses electron(s).

1) The effective nuclear charge is the \*pull an electron experiences for a nucleus

2) Metals tend to have weak effective nuclear charges. Hence the valence electron tends to be

lost to Nonmetals which tend to have superior effective nuclear charges.

a) Note how this sets up the idea of some species losing electrons (oxidation) while other

species gain electrons (reduction)

C) **An oxidation number is** a positive or negative number assigned to a species. It is assigned to help

understand the number of electrons involved in bonding *to a species of a different element*, and to

indicate the degree of oxidation or reduction.

+1 -1

Given: Na0 + Cl20 → 2 NaCl

sodium chlorine sodium chloride

For instance, the sodium ion of NaCl is given an oxidation state of +1, compared to the original

Na0.

This +1 value indicates that 1 electron was involved in the bonding process to the Cl, (that's the

"1") and that the electron has been lost (that's the "+") to the chloride.

Thus, that simple symbol of the +1 oxidation state indicates two pieces of important information.

Note that the name of the \*nonmetal changes its ending to -ide, when reduced.

The chloride conversely, is assigned a -1, indicating that the chloride species is a reduced species

(compared to chlorine, Cl0 , chloride is more negative) due to a gain of 1 electron. The “gained”

electron is the same electron, as that lost by the sodium. Thus, 1 electron was lost… 1 was

gained… illustrating the Law of the Conservation of Charge.

D) Redox Reaction: Any reaction in which there is a change in oxidation number**s** (LEO says GER)

**RED**uction / **OX**idation reaction: Electrons are \* lost and \* gained generally in a change

of \* oxidation states (or numbers) *generally* for two ***species***. ⮷

any chemical entity: a(n) molecule, atom or ion

1) **For every oxidation there must be a reduction**. The processes go together….



2)Oxidation State (a.k.a: \* Oxidation Number ): An arbitrarily assigned value

which explains or predicts the number of electrons of a *species*, involved in making a bond

with a species of a ***different*** element.

3) + or – values for oxidation states apply to species of compounds, or of ions in water.

0 is the oxidation state for pure elements. [thus, the oxidation state(s) of the oxygen species in

a molecule of O2 is 0, since the molecule is produced by species of the same (not different) element(s)]

4) The charge on an ion is only **ONE category** of oxidation states. Every encounter with an

oxidation state (number), is NOT necessarily an encounter with an ***ion***

a) Oxidation states can be applied to species of a molecule as well. They are used to

describe the number \*of shared electrons in a bond between the atoms of

a covalent (molecular) substance.

5) An oxidation number of a species may be \* positive if its electrons are attracted

more strongly to another nucleus **or** \* negative if the involved electrons tend

to be gained, relatively speaking.

a) The metal ions of a compound will most likely be assigned a \* positive

number

The nonmetals of a compound **may be assigned** a negative **or** a positive number.

✯✯i) The species with the positive oxidation # is often written first in a formula

OR RATHER: \*The species with the lower electronegativity value is written

first in a formula

ii) There are some exceptions…For 1st year students, NH3 is the most important.

✯✯ b) As written, there are 2 situations of serious importance when dealing with oxidation

states:

i) We use these **+** and **–** oxidation states, when dealing with species of

**compounds or ions dissolved in water.**

In light of the definition of oxidation state, why do pure elements get an oxidation

state of zero (0) assigned to them? \* oxidation states account for the electrons

used to bond species of different elements. Thus, in pure elements, 0 electrons are

used to bond to species of different elements.

ii) When dealing **with ions** in water

✪✪✪ Ions in aqueous solution are also called \***electrolytes or hydrated ions**

**✯✯✯**6) For many species, the oxidation number is related to the ionic charge …. but first year

students must understand that virtually any single integer value may be appropriate.

Normally the values are whole numbers, but they may be fractional.

a) ✪✪it is vital to know the oxidation #s so we can track the electrons of a

reaction...

0 +4 -2 0 +2 -2

A picture containing hanger

Description automatically generated 2Mg(s) + SiO2(s) à Si(s) + 2 MgO(s)

+2

Ca

2-8-8-2

Note that there are 2 val. electrons. Will Ca tend to lose 2 e - or gain 6 e- to achieve a stable octet?

Do you see from where the +2 comes?

in a compound, every calcium will be a +2

e.g.) CaS, Ca3(PO4)2

E) A simpler means of discussing loss and gain of electrons (than effective nuclear charge) is the idea

of **Electronegativity**: \*The tendency of an atom to attract the electrons of a bond to itself.

1) Metals tend to lose electrons to nonmetals (Thus metals tend to have a much lower

electronegativity relative to nonmetals (they also have a much lower effective nuclear

charge).

2) Nonmetals can bond with metals …. BUT(!) nonmetals can bond with other nonmetals.

a) This is where electronegativity really has an impact upon our ability to predict and

to explain various phenomenon.

Guided Practice: Use the provided oxidation states to identify the oxidized and reduced species.

The idea is to compare “before” [the reactant oxidation state] to “after” [the oxidation state of the product]

**The answer to each question always comes from the REACTANT side (never the product side)**

a) oxidation of aluminum: 4 Al(s) + 3 O2(g) à 2 Al2O3(s) + 3351.4 kJ

BEFORE AFTER

0 0 +3 -2

4 Al(s) + 3 O2(g) à 2 Al2O3(s) + 3351.4 kJ

reduced species = \* O20 or O0  because its oxidation state became \* more negative as a product

oxidized species = \* Al0 because its oxidation state became \* more positive as a product

BEFORE AFTER

0 0 -3 +1

b) Making Ammonia (Haber Process): N2(g) + 3H2(g) à 2NH3(g)

reduced species = \* N20 or N0  because its oxidation state became \* more negative as a product

oxidized species = \* H20 or H0  because its oxidation state became \* more positive as a product

BEFORE AFTER

0 0 +1 -1

c) Making Table Salt: 2 Na(s) + Cl2(g) à 2 NaCl(s)

<http://listverse.com/2008/03/04/top-10-amazing-chemical-reactions/>

reduced species = \* Cl20 or Cl0  because its oxidation state became \* more negative as a product

oxidized species = \* Na0 because its oxidation state became \* more positive as a product

+6 -1 0 0

d) Purifying Uranium : ­­­UF6(s) à U(s) + 3 F2(g) notice there is only 1 reactant … but there

are 2 different species in that reactant.

reduced species = \* U+6  because its oxidation state became \* more negative as a product

oxidized species = \* F-1 because its oxidation state became \* more positive as a product

(note: F6-1 is not correct, because the fluoride ions are not bonded to each other ...each is bonded via a covalent bond [surprisingly] to the uranium)

individually to the uranium ion)

0 0 +1 -2

e) Making Laughing Gas: 2 N2(g) + 2 O2(g) → 2 N2O(g)

reduced species: \* O20 or O0 oxidized species: \* N20 or N0

+3 -2 0 +1 -2 0

f) Purifying Gold: Au2S3(s) + 3 H2(g) 🡪 3 H2S(g) + 2 Au(s)

reduced species: \*Au+3 oxidized species: \* H20 or H0

0 +4 -2 0 +2 -2

g) Purifying Silicon: Mg(s) + SiO2(s) à Si(s) + 2 MgO(s)

reduced species: \*Si+4 oxidized species: \*Mg0

0 +2 -1 +3 -1 0

h) Purifying Nickel: 2 Al(s) + 3 NiCl2(aq) → 2 AlCl3(aq) + 3 Ni(s)

reduced species: \*Ni+2 oxidized species: \* Al0

+4 -2 0 +1 -2 +1 +5 -2

i) Making Nitric Acid: 4 NO2 + O2 + 2 H2O → 4 HNO3(aq)

reduced species: \* O20 or O0 oxidized species: \* N+4

0 +2 +6 -2 0 +2 +6 -2

j) Corrosion of the Statue of Liberty: Fe(s) + CuSO4(aq) → Cu(s) + FeSO4(aq)

reduced species: \* Cu+2 oxidized species: \* Fe0

+3 -2 0 0 +4 -2

k) Ore Reduction**♣**: 2 Fe2O3(s) + 3 C(s) à 4 Fe(s) + 3 CO2(g)

reduced species: \* Fe+3  oxidized species: \* C0

**♣**N.B. Ore: a general term referring to a metal ion-containing mineral, that may be trapped in a larger mixture known as, a rock.

Iron ore: deemed valuable for its oxidized form of iron: Fe+2 and Fe+3, bonded in a compound with reduced oxygen (oxide).

The *reduction of an ore* refers to converting the metal CATION back into the metal ATOM by having the ion GAIN electrons

back. **History Buffs**: The Hall Process and later the Bessemer Process are often seen as turning points of the Industrial

Revolution in the West.

**+1 -1** **+1 -2** **0**

COOL CONCEPT!

**(Purely Honors Chemistry)**

Disproportionation Reaction: a redox reaction, in which the \* same reactant species is both the oxidized species and the reduced species.

l) **Challenge**: Teeth Whitening: 2 H2O2 → 2 H2O + O2(g)

reduced species: \* O-1 oxidized species: \* O-1

**+1 -2 +1** **0** **+1 -1** **+1 +1 -2** **+1 -2**

m) **Challenge:** 2 NaOH + Cl2→ NaCl + NaClO + H2O

reduced species: \*Cl20 or Cl0 oxidized species: \*Cl20 or Cl0

Individual Practice: Analyze the changes in oxidation states (before and after) so that you can identify the

oxidized and reduced species of each reaction. You must include the oxidation state of the species

with each answer. Remember: **The answer always comes from the reactant side!!!!!**

0 -4 +1 +4 -2 +1 -2

1) 2 O2 (g) + CH4(g) → CO2(g) + 2 H2O(l)

reduced species: \*O20 or O0 oxidized species: \* C-4

0 +3 +5 -2 +2 +5 -2

2) Fe(s) + 2 Fe(NO3)3(aq) → 3 Fe(NO3)2(aq)

reduced species: \*Fe+3 to the Fe+2 oxidized species: \*Fe0 to the Fe+2 (*interesting n’est pas?)*

0 +1 +6 -2 +2 +6 -2 0

3) Mg (s) + H2(SO4)(aq) → MgSO4(aq) + H2(g)

reduced species: \* H+1 oxidized species: \* Mg0

+3 -1 0 0 +3 -3 +1 -1

4) 4 BCl3 (s) + P4(s) + 6 H2(g) → 4 BP (s) + 12 HCl(g)

reduced species: \*P40 or P0 oxidized species: \*H20 or H0

0 +1 -1 +1 -1 0

5) Cl2(g) + 2 NaI(s) → 2 NaCl (s) + I2(s)

reduced species: \*Cl20 or Cl0 oxidized species: \*I-1

+1 +5 -2 +1 -1 0

6) 2 KClO3(s) → 2 KCl(s) + 3 O2(g)

reduced species: \*Cl+5 oxidized species: \*O-2

+4 -2 0 +6 -2

7) 2 SO2(g) + O2(g) → SO3(g)

reduced species: \*O20 or O0 oxidized species: \*S+4 to the S+6

F) The agents: The agents are the opposite of their names. In short, the "agent" is that species whose

presence enables the activity for which it is named. ... HUH????

e.g.) The presence of the oxidizing agent allows oxidation to proceed, hence the

oxidizing agent is the reduced species.

1) Oxidizing Agent: \* The reduced species

(a.k.a. an *oxidizer or oxidant*)

a) a strong oxidizing agent is reduced, easily (readily).

b) a weak oxidizing agent *is* reduced, but more slowly when compared to a stronger one.

2) Reducing Agent: \* The oxidized species

(a.k.a. an *antioxidant….Wait a minute … I have heard this term before …. Hey!* )

3) Spectator ions: Not always present … but these are ions which do not change in oxidation

state.

 **TIME FOR A METAPHOR ... MAKE SOME CONNECTIONS!!**

Think about a **sports agent**: Does the sports ***agent*** play the sport?

Does the travel ***agent*** take the arranged trip?

Does the insurance ***agent*** purchase the prepared policy?

So, is the oxidizing ***agent*** the oxidized species ????

**Interpret:** The N+5 of NaNO3 is a strong oxidizing agent (oxidizer)

\*N+5 is easily / readily reduced (oxidizing agents or oxidizers are reduced species)

**Interpret:** The Mn+7 of KMnO4 is a strong oxidizing agent(oxidizer)

\* Mn+7 is easily / readily reduced

**Interpret**: Sodium hypochlorite is a stronger oxidizing agent than 3% hydrogen peroxide

\* Sodium hypochlorite is more easily reduced than hydrogen peroxide

G) A “real world” application: CLOROX bleach / Pool Chlorine

Recall that an oxidizing agent is any substance which causes another substance to \* lose one or more electrons.

The decolorizing action of bleaches is due in part to their ability to remove these electrons which are activated by visible light to produce the various colors. The hypochlorite ion [(ClO)-1], found in many commercial preparations, is reduced to chloride ion and hydroxide ion forming a basic solution as it accepts electrons from the colored material as shown below.

+1 -2 -1

(ClO)-1 + 2e- + H2O → Cl + 2(OH)-1

Robert Asato, Ph.D, Leeward Community College

![A picture containing graphical user interface

Description automatically generated](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RDcRXhpZgAATU0AKgAAAAgABAE7AAIAAAAGAAAISodpAAQAAAABAAAIUJydAAEAAAAMAAAQyOocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAE93bmVyAAAFkAMAAgAAABQAABCekAQAAgAAABQAABCykpEAAgAAAAM0OQAAkpIAAgAAAAM0OQAA6hwABwAACAwAAAiSAAAAABzqAAAACAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAMjAyMzowNDoxNyAxMjowMzo1NQAyMDIzOjA0OjE3IDEyOjAzOjU1AAAATwB3AG4AZQByAAAA/+ELGGh0dHA6Ly9ucy5hZG9iZS5jb20veGFwLzEuMC8APD94cGFja2V0IGJlZ2luPSfvu78nIGlkPSdXNU0wTXBDZWhpSHpyZVN6TlRjemtjOWQnPz4NCjx4OnhtcG1ldGEgeG1sbnM6eD0iYWRvYmU6bnM6bWV0YS8iPjxyZGY6UkRGIHhtbG5zOnJkZj0iaHR0cDovL3d3dy53My5vcmcvMTk5OS8wMi8yMi1yZGYtc3ludGF4LW5zIyI+PHJkZjpEZXNjcmlwdGlvbiByZGY6YWJvdXQ9InV1aWQ6ZmFmNWJkZDUtYmEzZC0xMWRhLWFkMzEtZDMzZDc1MTgyZjFiIiB4bWxuczpkYz0iaHR0cDovL3B1cmwub3JnL2RjL2VsZW1lbnRzLzEuMS8iLz48cmRmOkRlc2NyaXB0aW9uIHJkZjphYm91dD0idXVpZDpmYWY1YmRkNS1iYTNkLTExZGEtYWQzMS1kMzNkNzUxODJmMWIiIHhtbG5zOnhtcD0iaHR0cDovL25zLmFkb2JlLmNvbS94YXAvMS4wLyI+PHhtcDpDcmVhdGVEYXRlPjIwMjMtMDQtMTdUMTI6MDM6NTUuNDkzPC94bXA6Q3JlYXRlRGF0ZT48L3JkZjpEZXNjcmlwdGlvbj48cmRmOkRlc2NyaXB0aW9uIHJkZjphYm91dD0idXVpZDpmYWY1YmRkNS1iYTNkLTExZGEtYWQzMS1kMzNkNzUxODJmMWIiIHhtbG5zOmRjPSJodHRwOi8vcHVybC5vcmcvZGMvZWxlbWVudHMvMS4xLyI+PGRjOmNyZWF0b3I+PHJkZjpTZXEgeG1sbnM6cmRmPSJodHRwOi8vd3d3LnczLm9yZy8xOTk5LzAyLzIyLXJkZi1zeW50YXgtbnMjIj48cmRmOmxpPk93bmVyPC9yZGY6bGk+PC9yZGY6U2VxPg0KCQkJPC9kYzpjcmVhdG9yPjwvcmRmOkRlc2NyaXB0aW9uPjwvcmRmOlJERj48L3g6eG1wbWV0YT4NCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgCiAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAKICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIAogICAgICAgICAgICAgICAgICAgICAgICAgICAgPD94cGFja2V0IGVuZD0ndyc/Pv/bAEMABwUFBgUEBwYFBggHBwgKEQsKCQkKFQ8QDBEYFRoZGBUYFxseJyEbHSUdFxgiLiIlKCkrLCsaIC8zLyoyJyorKv/bAEMBBwgICgkKFAsLFCocGBwqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKioqKv/AABEIAjgDEQMBIgACEQEDEQH/xAAfAAABBQEBAQEBAQAAAAAAAAAAAQIDBAUGBwgJCgv/xAC1EAACAQMDAgQDBQUEBAAAAX0BAgMABBEFEiExQQYTUWEHInEUMoGRoQgjQrHBFVLR8CQzYnKCCQoWFxgZGiUmJygpKjQ1Njc4OTpDREVGR0hJSlNUVVZXWFlaY2RlZmdoaWpzdHV2d3h5eoOEhYaHiImKkpOUlZaXmJmaoqOkpaanqKmqsrO0tba3uLm6wsPExcbHyMnK0tPU1dbX2Nna4eLj5OXm5+jp6vHy8/T19vf4+fr/xAAfAQADAQEBAQEBAQEBAAAAAAAAAQIDBAUGBwgJCgv/xAC1EQACAQIEBAMEBwUEBAABAncAAQIDEQQFITEGEkFRB2FxEyIygQgUQpGhscEJIzNS8BVictEKFiQ04SXxFxgZGiYnKCkqNTY3ODk6Q0RFRkdISUpTVFVWV1hZWmNkZWZnaGlqc3R1dnd4eXqCg4SFhoeIiYqSk5SVlpeYmZqio6Slpqeoqaqys7S1tre4ubrCw8TFxsfIycrS09TV1tfY2dri4+Tl5ufo6ery8/T19vf4+fr/2gAMAwEAAhEDEQA/APpGiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKAGTzR21vJPM22OJC7tjOABkmsb/hM9A/5//wDyDJ/8TV7XP+Re1H/r1l/9ANeN142Y4+rhZxjBLXv/AMOe7leXUsZCUqjas+lv8j1b/hM9A/5//wDyDJ/8TR/wmegf8/8A/wCQZP8A4mvKaK8z+2sR2X4/5nrf2Dhv5pfev8j1b/hM9A/5/wD/AMgyf/E0f8JnoH/P/wD+QZP/AImvKaKP7axHZfj/AJh/YOG/ml96/wAj1b/hM9A/5/8A/wAgyf8AxNH/AAmegf8AP/8A+QZP/ia8poo/trEdl+P+Yf2Dhv5pfev8j1b/AITPQP8An/8A/IMn/wATR/wmegf8/wD/AOQZP/ia8poo/trEdl+P+Yf2Dhv5pfev8j1b/hM9A/5//wDyDJ/8TR/wmegf8/8A/wCQZP8A4mvKaKP7axHZfj/mH9g4b+aX3r/I9W/4TPQP+f8A/wDIMn/xNH/CZ6B/z/8A/kGT/wCJrymij+2sR2X4/wCYf2Dhv5pfev8AI9W/4TPQP+f/AP8AIMn/AMTR/wAJnoH/AD//APkGT/4mvKaKP7axHZfj/mH9g4b+aX3r/I9W/wCEz0D/AJ//APyDJ/8AE0f8JnoH/P8A/wDkGT/4mvKaKP7axHZfj/mH9g4b+aX3r/I9W/4TPQP+f/8A8gyf/E0f8JnoH/P/AP8AkGT/AOJrymij+2sR2X4/5h/YOG/ml96/yPVv+Ez0D/n/AP8AyDJ/8TR/wmegf8//AP5Bk/8Aia8poo/trEdl+P8AmH9g4b+aX3r/ACPVv+Ez0D/n/wD/ACDJ/wDE0f8ACZ6B/wA//wD5Bk/+Jrymij+2sR2X4/5h/YOG/ml96/yPVv8AhM9A/wCf/wD8gyf/ABNH/CZ6B/z/AP8A5Bk/+Jrymij+2sR2X4/5h/YOG/ml96/yPVv+Ez0D/n//APIMn/xNH/CZ6B/z/wD/AJBk/wDia8poo/trEdl+P+Yf2Dhv5pfev8j1b/hM9A/5/wD/AMgyf/E0f8JnoH/P/wD+QZP/AImvKaKP7axHZfj/AJh/YOG/ml96/wAj1b/hM9A/5/8A/wAgyf8AxNH/AAmegf8AP/8A+QZP/ia8poo/trEdl+P+Yf2Dhv5pfev8j1b/AITPQP8An/8A/IMn/wATR/wmegf8/wD/AOQZP/ia8poo/trEdl+P+Yf2Dhv5pfev8j1b/hM9A/5//wDyDJ/8TR/wmegf8/8A/wCQZP8A4mvKaKP7axHZfj/mH9g4b+aX3r/I9W/4TPQP+f8A/wDIMn/xNH/CZ6B/z/8A/kGT/wCJrymij+2sR2X4/wCYf2Dhv5pfev8AI9W/4TPQP+f/AP8AIMn/AMTR/wAJnoH/AD//APkGT/4mvKaKP7axHZfj/mH9g4b+aX3r/I9W/wCEz0D/AJ//APyDJ/8AE0f8JnoH/P8A/wDkGT/4mvKaKP7axHZfj/mH9g4b+aX3r/I9W/4TPQP+f/8A8gyf/E0f8JnoH/P/AP8AkGT/AOJrymij+2sR2X4/5h/YOG/ml96/yPVv+Ez0D/n/AP8AyDJ/8TV6w1nT9UBNhdJKR1UZDfkea8bqazu5rG7S5tnKSRkEHPX2PtV086q8y54q3lf/ADM6uQ0eR+zk7+dv8ke2ZoqlpOox6rpkN3F0kXkf3T3FXa+nhJTipR2Z8lKMoScZboKKKKokKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKAKOuf8i9qP8A16y/+gGvG69k1z/kXtR/69Zf/QDXjdfL53/Eh6H12Qfwp+oUUUV4B9IFFFGKACiijNABRRRQAUUZooAKKKKACiiigAooooAKKKKACiiigAoo/P8AKigAooooAKKKKACijp1oHPSgAoozRQAUUfn+VFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFAHU+Bta+xakbCdsQXJ+XP8L/8A1/8ACvSc14aCVYMp2kHII7H1r1jwzrA1nSI5WP7+P5JV9D6/jX02T4q6dCXTY+SzvB8svrEdnv6m1RRRX0J80FFFFABRRRQAUUUUAFFJkUuaACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKAKOuf8i9qP8A16y/+gGvG69k1z/kXtR/69Zf/QDXjdfL53/Eh6H12Qfwp+oUUUV4B9IdfoGlaQ/hafU9UtXmMMjZKSMDjjjAYDvT7bSfD3iO3mTRYp7O6iXcBISQfTOSeM07Sf8Akmeoe7t/7LVX4eZ/t24x937OQfruX/69e9TUOajScVaS10169T5uo6ijXrKbThLTXTp02Kvhzw9HqP2m41F2itbPIkA6kjk8+gFadrpvhnX/ADLTS457W5UFkZ2OG98EkY/KrWlkHwx4jCc/vZ+h7baxPA3/ACMyH0ifPHTippwpwdKnyp8+9997adiqlSrUVarztcmyT02vqupg3ED2t1Lbzffico31BrrfDXhqx1fw3LJLGRcmRkSXeflOBg4zg9a5/wAQY/4SO/8AT7Q/8zXVeHLuSx8BXd1BjzIpWZc8j+GufB06axElNXik/wADpx9Sq8LCVN2k3H8TB0HR45fFQ03VIt2zeHXJGSBkdDU0fh2O/wDGF1p1vmC1gYs2DkhRjjJ+tdhZQWusX1jr9mQrbGWRe/Ixg+4rP0IgeO9Z7ZH9RXbHBU48kHqnLR91a5wSx9WTqTTs1DVdpXs9Cglp4SudQ/sqOK4Wct5YuNxwW6Y6/wBMVm/YtL8P6xdWmvW814mFaBojg4OeuGH0/CqOng/8JfbDHP25c/8AfdaXj4j/AISQYP8AywX+Zrkc4youtyJOMrbaW811O2NOUa6oc8mpRvvrddn0Ne7sPC1pokGpyaZOYJyAqrKxYZBPI3+1cbqkllLqEj6XC8NqcbUkOSOOe5711Ot/8k30v/fT/wBBauLqcfNJxhGKWieiS6GmWwbUpyk3ZtatvRM7Hw14bsdY8NyzTRf6UXdEl3MNpwMcZx3rm7HS57vWk00qUlMm1/8AYweT+GK7DwxeHT/AtzdKNxhmLEeo+XIrRmfTdOjufEsJDNcQLsGOpP8AU8Z+ldf1SlVpU3tZXl6a6/gee8bWo1qsdXd2j5PTT8b/ACOd8XaHp+lNp62Vv5YmciQ72O4Db6njrUXi3TNP0XVLP7LagQsheSMyMd/PrnI/CtLxu5ki0V2xlixP1O2q3xE/5CFn/wBcT/6FU4qnTj7Zxilbltp3ReDq1ZOgpSbvz313sR614bt7i1sb3w9DiG4IRk3E4LdCcnj0NQeKdP0vR7e2srSDfebQ0sxdjgfTOMmt/wADrNaaGZL2QJBPKPIVvU8cfU9K47xHb3Vv4guhetukZtwbH3lPQj2xx+FRiYQjh1VjCznb5ena5eEnUninQlUuoX6u8vXvYg065sbZpDqGnC9DAbR5zR7fyrevDoNppdheHQQ4vA5CfbJBs2nHXvXK1vaz/wAivoH+7N/6EK4qFRqnPRaLTRPqu6PRxNJOrDVq7s7Sa+y30fkN0u0sdSOrzfZPLSG0eWGPzGPlke/f8awxyw+tdH4QeONNXeaPzY1sXLx7tu8dxkdM+tQDVNBJAHhvB9ftzn+lOVOE6UJOSi9ej7+SYo1ZwrTiouSVuq0082ia80myi8dLp0cOLQyRrs3HoVBPOc9TSXd5oNnfXFsfDu/yZGj3fbZBnBx0q9qBx8T4s9fOi/8AQFqrqWpaKmrXazaCJpFncPJ9scbzuOTgdK6pqMHOzivea1V/0Zx05Tn7PmUpe4npK2vd+8ilaWtprmvRQWdr/Z9vtJkXzTJwASTk1M194cL+T/ZFx5XT7SLk7yPXb0/Cs2DUjYat9u06AQKrEpEWLgA8YJPXir/2vw9duftGnXFm7Hl7ebeo98N29q5oTi07OPNfqtGvLSy/A6qlOSkm1LltpZ6p9b63f4iaBYWV/wCJPs7o09phygkJUkAZGcGnDVNBzg+HeT/0/Sf4VoaBpraV45+yl9+2NmRxxuBXIPtWcNU0H/oXPx+2v/hWqj7Olq4xd2tVfa3kzFy9rWdlKS5YtWlbe/8AeRk3csEt08lrb/Z4WPyxby23j1NRUrEM5ZV2rngZzgUleY3d3PYirKwUUUUhhRRRQAUUUUAFFFFABRRRQAUUUUAFbXhXWTo+sI0rYt5sJKPQdj+H+NYtFaUqkqU1OO6Mq1KNam6c9me4hgcEHIPSlrlvBGtf2hpv2SZsz2oAyerJ2P4dK6nNfeUK0a9NVI9T85xFCWHqunLdBRRRW5gFFFFABmkJyCAcGsS68S2i3ElraOJriNijKQRtI4x71Lol7Neee07hgpGMDp1rmWJpyqezi7s6JYarGHPJWOB0zxdqenzEyTNdRMctHKxPfseo/l7V3mjeJdP1lQsMnlz94ZOG/D1rybOKAdjBkLKwPBBwa+UwuZVqDs9V2Z9ni8qoYhXj7su6/VHuORS5rnPBV9c6hoLPeSmV45jGGPXAVT/Wsb4peKdU8K6ZYT6PLHG88xRy8YbIC5719fRqqtTVRdT4qvSlQqypy3R3lGaqaVPJdaPZ3ExzJLAjsQMZJUE1weteMtYsvi3YaDBLGLCYxB0MYLHdnPNamJ6PRRmkyKAFzRXBfEKz8aXV/p58ISusC584RyqhD54LZIyuO1dzCJBCgmKmQKN5HQnvQBJRRketJkZx3oAWiijNABRmkyD0rkb7Udc1vxPeaN4eu4dNg05U+1XskPmuzuNwVFPGMdSaAOvorC0S38SWl7JDrd7aajabMx3KReTLuz0ZBlce4NbuR60AFGaQmsDwvqV3qNxrq3kvmLaapJbw/KBtjCoQOOvJPJoA6CijNGaACjNVLHVLPU/tP2Kbzfss7W83ykbZFxuXkc9RyOKpR3+qnxZJYvpm3TFtxIt95n3nyPlx+f5UAbFFGaM0AFFJkUuaACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAo65/yL2o/wDXrL/6Aa8br2TXP+Re1H/r1l/9ANeN18vnf8SHofXZB/Cn6hRRRXgH0h0+heIdMsvD8mm6nb3EyyOSwjAwQccZ3A9qm/4SjStLtJU8O6dJDNKMGSY/d/Uk1ykUbzSiOFGkduiqpJP4VLcWN3aAG7tZoA3TzYyufzrvjjK6guVLTS9tV8zzZYHDyqPmb953avo/kaWgeIpNGlmEsf2i3n/1kZPX3/8ArVqp4n0XTElk0PTJI7mUEF5TwP1PHtxXKiCY25nETmJTtMgU7QfTNR1FPF1qUVFdNtNvQupgaFabk+u9no7d0OkkeaZ5ZDl3Ysx9Sa3rHXra28I3OlPHL58rMVZQNvOOvOe1ZEGm311H5lrZ3EyZxujiZhn6gU+TSNShjaSXT7tEQZZmgYAD1ziopSrU7yit01t3NK0aFRKEns09+xo+GPEf9hXEizK8lrIMlEwSrdiM/lTR4ha28Uz6rZITHKxzG/BKnt9axQCxAUZJOAB3p00UlvIY543jdeqspBH4U1iayhGKekXdCeEoOpKbWslZ+aOu/wCEl8PxXR1CDSZft55ySNufXr+uK5jU9Qm1XUJLy5xvfoAeFHoKhWCZ4XlSKRo48b3Ckhc+pqMDJwOT6UVsTVqx5ZaLfRW+YUMJRoyco6vbV3sux0Goa9bXfhO00uOOYTQMpZmACnAI4wc965+pvsdyLoWxtphOf+WRjO7pnp16UkVtPNI0cMMkjoCWVUJKgdcioqzqVZJyWu33GlGFKjFqD0eu/c27HXra28I3OlPHL50rMVZQNvOOvOe1Yj3Vw9stu88rQpysRclV+gqKnyQSxLG0sTosgyhZSAw9vWidapNJPorfIIUKVOTa3k7/ADN/xB4htdWi05beOZTa537wBnhemD7UeIdc0/XNUtJClwlvENso2ruIznjnFYltY3d4pNpazzgdTFGWx+VROjxuUkVlYdVYYI/CtZ4mtJNyWkrdO2xhTwlCDioPWN7a7X3N7xF4jTU/ssOmpJb2tsAVUgA7hwOh7Cna9r9jrml2xlhmTUYRguFGxvUdc471zoBYgKCSegAzmr39iar/ANAy8/C3b/Cn9Yr1ebrzb6fcH1XDUeTW3Le2vff1KP0rS1DUorvRtNtI0dZLRZA7EDB3MDxWfLFJBIY5o3jdeqMpBH4Vb/sXVCMjTbwjsRAx/pWEPaWlGK30f33/AEOip7JuMpPbVa+Vv1JtH1KHT4NQSZHY3Vq0KFcYBPrzWYODUk0E1tJ5dxE8T/3ZFKn8jTre0ubxitpbyzsvURIWx+VJuckoW2Gowg5VL7mvda5bz+Ml1dUlECyI2wgbsBQDxnHb1p9zP4Yu7qa4lGrh5pGkYL5QAJOawp4JbaQx3EbxOOqupBH4VYi0rULiJZILC6ljb7rJCxB/ECt1WqybTje7vt1OZ4ejFRak1ZWWvQsC40m01VZbW0murTZho7sgNk9SCvSrQn8LpIJhaajIwORA7p5efTPXFY9xaXFowW6t5YGPQSIVJ/Om+RL9n8/yn8ndt8zaducZxn1qFVnFtcq+7Y0dGEknzvtvubdn4jA8VNq1+jbWVlCQgHaNuABnFM/4pXH/ADGf/IVY0UUk8qxwo0jt91VGSaawKMVcFWBwQRgg01iJ295J6t6rq9xfVafN7ra0S0fRXsTXf2b7W/2Hzvs+fk87G7p3xxUNWZNNvooPOlsrhIuu9omC/nim21jd3gY2drPcBfvGKMsB+VYuM3K1tTojOCj8Wi8yCir39iar/wBAy8/8B3/wqqLeZrgwLDIZg20xhTuB9MdaTpzjuhqpCWzRHRU9zY3dmoN3azQBjgGWMrn86gqWnF2ZUZKSumFFFFIYUUUUAFFFFABRRRQAUUUUAXdI1KTSdVhu4uiHDr/eXuK9etrhLq3jnhbdHIAykdwa8UrufAOs536VcNyuXhz6d1/r+de5lGK9nU9jLZ/n/wAE+ezvB+0p+3jvHf0/4B3NFGaK+rPjgoPSig8DmgDxvWmKeItQZSQRdS4I7fOa2fD/AIvbTHeO/jaaKTH7xfvLj+dZGvxSQ+IL7zUZN1xI67hjKliQaz6+D9tUoV3KDs7s/Rfq9LE4eMZq6sjtb3wpYaxbte+G7lRnJ8kk7T/VT7H9K42WGW3k2TRlGB7iu2+HP+q1H/ej/k1WItAk1IFLmHbFnBaQc/hXoVMKsTThVpRs5Xultp+R5VPGywladGrLmjG1m99V+JN8PP8AkXpv+vpv/QVrlvjrzoelY/5+W/8AQa9D0fR4NFsjbWpdkLlyXOSSf/1VhfEfwrN4r8LNb2e37XbyCeEMcbyAQVz7g/nivpMJTlSoxhLdHzOMqxrV51I7Nm/oRB8O6bj/AJ9Iv/QBXlXiXn9oLSsf3oP5GotJ+J2ueF9Li0fWvD001xbIIonYtGSAMAEbTnHHIPNW/BWg654l8enxf4jtWtI4zuhjdSu5tu1QAedqjnJ6n8a6TkKHim58SX/xku9E0LV7m1afYiJ57LGg+zqzHH0yeBmo9Xi8VfC7UrG+k1uTUrW5ciSJ5GKtjBKlWJ6jOGFa32W4/wCGk/tHkS+T/wA9Nh2/8emOvTrVv43209zoumC3hklIuHyI0LY+X2oAq/F/Wr61fw/Lpd/c2qXCyMfJlZN4/d4zgjPBPWn+P9Q1Twf480zXYby7fS7hgJrYzMY8gYYBScDK8j3Bqh8V7S5uLLwoILeWUpAwbYhO3iPrjpXonjfw9/wk3hK8sVXM4Hm259JF5H58j6GgDkPij4nu5Z9I0Hw1dyJdX7JNvt5CrFWOEGR2JOfoKzfFOq67N4g0/wAA+Hb+ZZYYkS5unlbfK5TcSz9QoXk//WqD4R+G7288Qya1rMc4XT4lgtxOpB3bdoxnsqjH4ir3j3SNY8OePoPGeiWrXcZAMyKpbYQmwggc4K9+3NAGH4u0Hxd4H0iOf/hJ7m4s55RG/lzujK+CRxnp8p5B7Vt+ONW1G1+Enhm6tr+6huJhD5k0czK75hJOSDk5rA8Z+NtV8c6IltbeH57a0gmEkkg3S5fBAGQoA6nitrx5aXMvwe8LxRW8ryIINyKhLL+5I5FAGt4H8LeJZtQ07xJr+vSTI0fmCzMjMGVoyFJOcZ5Bxg10Oq+H9WtNcn1zwrcwLc3KqLuzugfKuNowpyOVbHGa2PDalPCulIwKstlCCCOQdgrHu/GR0PVLm38S2E1nab91rfQRtNFImBwxUEq2e2P/AK6GWdC8U/2jfPpWqWMul6tGm820x3LIvdo3HDCsqwfWPGjTahBrE2k6OJWjtEtEXzZwpwZGZgcAkHAx2plvejxf470rUdJt5xpukpOXvJYmjE7SKFCIGAJA65qPQ9Yh8CWraD4jSa2treRzZXywtJFNEzFgCVB2sMkYNAjR06+1XQvE9toet3n9o21/G7WV20YSQMgy0bgcHjkHvVDS7may0Hx5dWr+XNBf3kkbgZ2sIVIPPuKsWlxL4u8YafqVrbzw6RpKyNHPPGYzcyuu35VODtAyckDrS6Fp0l7p3jKxcND9t1K6jRnUgYaJVz7igZ0WhXEt34c024uH3yzWsUkjEdWKAk/nXP2Mmqa7e+ILNNXnsvsmoqkMsUaFlTywduCMck1U0LxtY6NoVrpOvxXdlqllCsBthbO5lKjaChUENnHrVjwBLc3N74ivLyymsmuL8SLFMPmC7Fx+lAGX4O0HVJpdZaLxJeQiHWZ0kVYoyJmG3LHI4J9q6ZNQu/8AhZM2nGc/Y10lLgREDG8yspb16AVj6HrNr4Y1zWdL1zzbWS91V7m0kMLsk6ybcAMARkEYNaKxM3xXuHaNjEdERN2PlJ85uM0AUdNOs+NYn1SPWJ9J0lnZbOK0RfMlUHHmOzA4yQeB2q1pd/qujeJ4dB128GoRXkTy2N4Ywjkpy0bgcEgHOaztC1yLwPYjQfE6z20dm7raXohd4riIsSvKg4YZxg+lWrGaXxZ4ystYgtpoNJ0qOUQTTxmNrmWQbSQp52hR1OKAKejJ4k8TalrSS67LY6dZ6nPbx/Zo0859p4XcR8qqCO2Tk1paXdaroni2LQdWvjqVreW7y2VzIgWVCmNyNtwCMEEGpPA0ckQ8Q+ajJv126ZdykbgSuCPUUutRu3xE8NOEYosN4GcDgZRMZPagDGs57jxLr2qQ3vii50m6tbx4LfT7Z0jIRfuuQwJfd144rt9OguLawghvbs3lxGuHuGQIXPrgcCuN1vW/C1/JPa+KtDuo7mNikYmsWd5R2MboD1+ora8CxahB4Stl1QTCTc5iS4OZEi3HYGPrtxQB0dFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFAFHXP8AkXtR/wCvWX/0A143Xsmuf8i9qP8A16y/+gGvG6+Xzv8AiQ9D67IP4U/UKKKQ9K8A+kOjtJn0jwf9ss8R3d1cGLzgPmRAOgqvZeIpxFNbau8t7azIQVkbcyt2YE9KnWJ77wKi2ymR7S7LSIoyQpH3selZul6RNqfnPu8q3hQvJMw+UY7fWvQlKqnCNPay9PP/AIJ5UY0XGpKrvzPXr5efoaNt/wAk/u+v/H6vX6Cufrftv+Sf3f8A1+r/ACFYGaxxG0PT9WdOF3qf4n+SOptP7Q/4QaL+yvtPnfbTn7MW3bdv+z26Vl3c3iCO3P2+TUkgf5W88yBTntzxV9Lqe08AwyWk8sDm+I3RuVJG31FYlxqN/dR+XdXtxOmc7ZJSwz+JretOKhFXd+VehzYenKU5uytzPfcu+GLZJtXW5n/1FmhuZOOy8j9cVZ8RN/adjY60FCtOphmGOjr0/MVa0y1tLXwlIb6++wtqL4VzCzkop6YHvUtnZadPoV/plhqgvZWH2iJPs7R7WXrjPXI4rWFJ+xVPTVX3V79NL32/MxqVo+3dbX3XbZ2ts9bW3f8A5KN8LXcNn4c1Sa6j82DzI0kU/wB1jtP6GsbVdMOl6qkanzLeUiSCTs6Grmm/8iRrXr5kP/odSaLKmtad/Y102J4W82ykbse6fQ/57VLSqUqdJ72uvW70+f5+pSvSq1ay2vZ+nKtflfXyNKX/AJKwvTqv1/1NU/C0nk+KNQlUZMcErAfRgauyn/i7CfVf/RNZ3hs48Qap/wBe8/8AOuhtqvf+/L9Dlsnh3/17j+pU8QWUP7rVdOX/AEK852/88pP4lNWNbj86y8PxZ+/bBfzIqt4fv4VMumagf9CvPlJI/wBW/wDCw9K0PE0J0xtEilOTbRYZh3wwrmtGVKdVbO1/J3X4Pf8A4Y6nKUK0KMt1ez7qzt81s/v6kXiTVbqx1Z9N02eS0tbUKipA2wk4yTkdaz9T1garYW/2uMtfRHa04wPMTtn3FXvEbXeneKX1K0JCykSQTBdynKgcZ4P0qfWr2+n8IW/9sSE3c13vjVkCsYwpGcADjJqqvNKVVOT0vpbS19OunloKjyxjRkorW2t9b216a+epzVt/x9Rf74/nXQ+KtU1C28TXcVvf3MMa7dqpMwUfICeK562/4+os/wB8fzrq/EniXVtP8QXdtZ3flwoV2r5SHqoJ6j3rGg4qhLmk1qtvR+aOjEKTxMOWKfuvfTrHyZT1l5rnwnY3OphvtpnZEdxhmjx1PrzU3i3U7611zy7W9uIY/JTCxyso6egrnr2/utRuDNezPM/QEnp9B2rrPEXiPUtL1tYLSfECxxsYyinPc84zWyqxnCcnJpe6r7vZ+a/M5nRnTqQiopv3nbZatbaP8jPvJZ7zwTFcaoWe4W62W8kg+d0xk+5Ge9Lrd9PotvZaZpcjWsf2dJZGiO1pHPct1qPxa0t1PbalHM8tlcx7oRniM45X8KPFMT3H2DUYVL20lpGu9RkKw6gmnVlKPPy7pJX6td/noFGMW6fNazcnbon29Vr8x5upNa8H3kl8fOuNPkjMcxxvKscYJ707VL27s/DOh/ZLmaDfHLu8qQrnDD0+tRWsL2PgnUZLhfL+2vEsO4YL7WycU3XP+RZ0D/rnL/6EKTlL2bk9+Revx/5WCMYOqope7zu3b4P87/Mm0q8uNa0vUrDUZWuvKtmuIXlOWRl9+vpUCj/i3bf9hH/2nT/DiNa6bquoTKUgNm8KuwwGZugHrRZxve+Bbm3tlMksN4JnReTtK4ziiPNKC5t3GQ58sakuXSKlH0v1/Qq+Ff8AkaLH/fPf/ZNXdGRI9U1e/dBI9nHJLEGGQH3cGq/hC1lfX4bkqVgttzyyEfKoCnqan0Fxd3GtW8R/eXdvJ5I/vHOQPxqMOrQhfu7fcv1KxTTnUt/LG/8A4E7/AIFK38T6pDfC4lvJplJ+eGRsow7jb0HFQT6pJHe3EmkTXFlbzNuEaSlcfl+lQ2um3V5frZwwv55bBUr933PoKbf2ostQmtlmWYRNt3r0J71zOpWcLtu1/wATtjTw6qWile23l/Wx0GuanqEOn6O0N7cRmW13OyzMCxz1PrTdGluj4d1C500ySam8w8xh80nl9yO/X0qv4h/5BeiY/wCfMfzrNtoNQht2v7NZ440O0zREjHfqO1dM6so176vT7tFqcdOjCWGSVlr99pPRk8us6vHby2t5czsky4ZLj5uPUbuR+FZtdVoF/f6w89tqztc6eIXMrypnyyBwQ3rXK1z1k3GM+ZtPudeHklOUOVJq17ba/JBRRRXKdgUUUUAFFFFABRRRQAUUUUAFS21xJZ3cdzA22SNgyn6VFRTTad0JpSVmeyaRqMeq6ZDdxdJF+Yf3T3FXq818D619h1I2M7fuLk/KT/C//wBfp+VelZr7jA4lYiipdep+e4/CvC13DpuvQKKKK7jgKeoaVaanbmK9gWVexPBX6HtXB614Fu7PdNpjG6hGT5Z++o/r/OvSKTBxXFicFRxK99a9+p3YXH18K/cenZ7HE/DpWRNRDqVO9BgjHPzf4122KQLjoMZp1aYWh9XpKne9jLF4j6zWlVta/wDkFFFFdJzCYzRS0UAJilxRRQAmPWgUtFACAY/+tS4oooATFGKWigBMflRjjpS0UAJijFLRQAlAGKWigBKMdfelooATFGKWigBMUYNLRQAgFBFLRQAmKMUtFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQBR1z/AJF7Uf8Ar1l/9ANeN17Jrn/Ivaj/ANesv/oBrxuvl87/AIkPQ+uyD+FP1CiiivAPpCeyvrnT5/OspnhkxglT1/DvVq/1/VNSi8u9u2kjznYAFB+uAKzqK0VWajyJu3YydGnKfO4q/e2poafruo6VA0On3HkozbiPLVsn8QfSrE3i3XJ4JIZb3ckilWHlIMgjB7Vj0VaxFaMeVTdvVkSwtCUueUE33sjSsfEOqaZb+RY3Iij3bseWp5P1FTXPivWbq3kgnvN8UilXXykGQeD0FY9FCxFZR5VN29WDwtBy5nBX9EWLm+ubxIEuJN626bIwFA2j8KbZ3lxp90lzaSeXMh+VsA44x0NQ0VlzyvzX1NfZw5eS2hZXULpLS4tll/c3LBpU2D5iDkduKgjkaGZJYmKuhyrDqCKbRRzSdtdhqEVey3Lp1e/OrDUjcZux0k2L/d29MY6VHb6hdWlxLPby7ZJlKu20HIPX6fhVaiq9pO97+fzJ9jTtblW1tunYPWrN3qN3fJEt3MZRCuyPIHA+veq1FSpNJpPcpxi2m1qjSsfEOq6bD5Vneskf91lDgfTPSqd3eXF9cGe8meaQjG5zn/8AVUNFU6s5R5W3YiNGnGTnGKTfW2oqsUYMpwQcg1LeXk9/dvc3b+ZK+NzYA6DHb6VDRUcztboacq5ua2oVPe31zqFx593J5ku0LuwBwOnSoKKOZpWBxTd7alj7fc/2f9hMubbfv2FQcH1B6iprDW9R0tWWwuniU9UADL+R4qjRVqpNNST1RDo05JxcVZlm/wBSvdTmEl9cPMw6ZOAv0A4q5a+J9YsbVLe1vNkUYwo8pDj8xWVRTjWqxlzKTv3uTLD0ZRUJRTS6WVi9qGs6jqmBf3TSqvRcBRn6Diq9pe3NhcCazmaGQD7yH9D61DRSdSblzt69ylSpxjyKKt2toaV74h1XUYPKu7x3j7qoCZ+uBzWdG7xSLJE7I6nKspwQfXNJRRKpOb5pO7CFKnTjywSS8jWl8Va3Nb+S9++wjBwqg/8AfQGayev86KKJ1J1NZtv1CnRp0vgil6KxPcXtxdxwx3Em9IE2R8AbR6U+x1S+0xy9hcvCT1A+6fqDxVWikpyUuZPUHSg48jSt2NK+8Q6rqMJiu7x3jPVAAoP1wBms3pRRROpOo7zd35jhThTXLBJLyCiiioLCiiigAooooAKKKKACiiigAooooAAWVgynDA5BHY+teseGdZGsaSkjnM8fySj39fxryetrwtrJ0fWUeRsW82ElHoOx/D/GvSy7FfV62vwvR/5nlZpg/rND3fijqv8AI9YopAwIBHelr7U+CCiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAo65/yL2o/wDXrL/6Aa8br2y8theWM9s5KrNG0ZI6gEY/rXKf8K6s/wDn9n/75FeHmeDrYicXTWyPocpx1DCwlGq7XZ59RXoP/CurP/n9n/75FH/CurP/AJ/Z/wDvkV5H9k4r+X8Uez/bOD/mf3M8+or0H/hXVn/z+z/98ij/AIV1Z/8AP7P/AN8ij+ycV/L+KD+2cH/M/uZ59RXoP/CurP8A5/Z/++RR/wAK6s/+f2f/AL5FH9k4r+X8UH9s4P8Amf3M8+or0H/hXVn/AM/s/wD3yKT/AIVzZ/8AP9P/AN8ij+ysX/L+KD+2cH/N+DPP6K9A/wCFc2f/AD/T/wDfIo/4VzZ/8/0//fIo/srF/wAv4of9s4P+b8Gef0V6B/wrmz/5/p/++RR/wrmz/wCf6f8A75FH9lYv+X8UH9s4P+b8Gef0V6B/wrmz/wCf6f8A75FH/CubP/n+n/75FH9lYv8Al/FB/bOD/m/Bnn9Fegf8K5s/+f6f/vkUf8K5s/8An+n/AO+RR/ZWL/l/FB/bOD/m/Bnn9Fegf8K5tP8An+n/AO+RR/wrm1/6CE3/AHwKP7Kxf8v4oP7Zwf8AN+DPP6K9A/4Vza/9BCb/AL4FH/CubX/oITf98Cj+ysX/AC/ig/tnB/zfgzz+ivQP+Fc2v/QQm/74FH/CubX/AKCE3/fAo/srF/y/ig/tnB/zfgzz+ivQP+Fc2v8A0EJv++BR/wAK5tf+ghN/3wKP7Kxf8v4oP7Zwf834M8/or0D/AIVza/8AQQm/74FH/CubX/oITf8AfAo/srF/y/ig/tnB/wA34M8/orv/APhXNr/0EJv++BR/wrm2/wCf+X/vgUv7Kxf8v4oP7Zwf834M4Ciu/wD+Fc2//QQm/wC+BR/wrm3/AOghN/3wKP7Kxf8AL+KD+2cH/N+DOAorv/8AhXNv/wBBCb/vgUf8K5t/+ghN/wB8Cj+ysX/L+KD+2cH/ADfgzgKK7/8A4Vzb/wDQQm/74FH/AArm3/6CE3/fAo/srF/y/ig/tnB/zfgzgKK7/wD4Vzb/APQQm/74FH/Cubf/AKCE3/fAo/srF/y/ig/tnB/zfgzgKPxH513/APwrm3/6CEv/AH7FJ/wrmD/oIS/9+xR/ZWL/AJfxQ/7Ywf8AN+DOB/EfnR+I/Ou+/wCFcwf9BCX/AL9ij/hXMH/QQl/79ij+ysX/AC/ig/tjB/zfgzgfxH50fiPzrvv+Fcwf9BCX/v2KP+Fcwf8AQQl/79ij+ysX/L+KD+2MH/N+DOB/EfnR+I/Ou+/4VzB/0EJf+/Yo/wCFcwf9BCX/AL9ij+ysX/L+KD+2MH/N+DOB/EfnR+I/Ou+/4VzB/wBBCX/v2KP+Fcwf9BCX/v2KP7Kxf8v4oP7Ywf8AN+DOB/EfnRXff8K5g/6CEv8A37FJ/wAK4g/6CMn/AH6H+NH9l4v+X8V/mH9sYP8Am/B/5HBU6ONpZFjjG53O1QO5Nd3/AMK4g/6CEn/fof41qaN4PsdImE4L3E4+68mML9BWlPKcTKSU1ZeqMqudYWMG4O79GbdqhitYUc5ZUUE/hU1Jilr69KysfEt3dwooopiCiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAoozSZFAC0UZooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiig9KADNFcRfeOtVXxlf+HtF8N/2nPZosjP9vWHKsqnOGXHBcDrV3w340XXG1G1utPk0/UtNz59q7hse4YDkUAdVmjNc/4M8T/8Jd4fGp/ZPsmZWj8vzN/THOcD1qn4r8Y3Ph3WNM02w0j+07jUdwjX7SIcEY4yVI70AdZRmuc0fWfEl7qSw6t4V/sy2Kkm4/tGObB7DaozzVXxp48tvBs2nxzWxuTeOdwEm3ykBGWxg569OM0AdbmjNUNU1iz0jRp9UvZMWsMfmMyjO4dgPUnIA+tcf/wsy6tra21LV/DN1ZaNdsFivfPV2wejNGBlRjn/ABoA7/NGa5m48XrD490/w3HaCVb60Nyt2Jvuj5+NuOfudc96dd+LPsvxBsfDBs9/2u1Nx9p83GzG/jbjn7nXPegDpKKM0ZoAKM1z/jLxJL4U0FtUjsPtqRyKkieb5e1Txuzg55I/Oq/ifxpb+HfC1trMVt9sF20a28Ik2b943DnB7c9KAOoozXLp4uk/4Ti18Nz6cI5ZrP7S03nZ8s4OUxjnp1zVfQPiBa614v1Lw/NbC0uLOaSOJjLuE+xiGI4GDxnHPGfSgDsM0Zrl9N8Y/wBo+Jtb0cWPlnSl3eb52fN9sbePzNY2jeP/ABH4g0/7do/gv7Tb7ygf+1Y05HUYZQaAPQaM1y2seMm0DRLKfVNLkXVL5/Lh02GUSMz5xjcOD1HPvUOm+N528QQ6L4k0SXRb26Utbbp1mjl9t6454PFAHX5ormPHHjOHwXpcF1JbG6lnl8tIRJsOMZLZwenH51rPq0X/AAjj6xbgTRC0N0ihsbxs3AZxQBo0V5za/ErWrjQP7dHg6Q6SuWe4j1BGYKrbWOzaDwQf/wBXNd1pWpW2saXb6hYuXt7hA6EjHHoaALlFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABkUV4x8RNd1PT/GdzBPql9YWwVDarFO8KuuxdxG0jd8xIPpiudt/FGqyXUSabrmpXF2zfuIReSy+Yw5A2End9PSvRhl850vaqSt6niVc5pU8Q6DhJu9ttPzPonNFNBHHNOrzj2wooooAKKKKACiiigAooooAKKKKACiig9KAGSTRxLulkVF9WOBUQv7QkAXUJJOAPMFcD8XdD1LxJY6Vpmiok92bh5zC5XlFTBb5iBwXUf8CFeYz/AAi8bLbSN/ZtscL0Tyd34Yb+XNJnHWr1oT5YU7rvf/gH0pkUVjaXr2mXC29mt/F9s2AeRLmKUkDn92+G/StnNM7AooooAKKKKACiiigAooooAKTPFGeKxfE/iey8L6Uby9O5jkQwqfmlb0H9T2pNpK7NKVKdaap01dvZB4n8TWXhfSmu71gzNlYoQfmkb0Ht6ntXmkPiPxjpNwni3UoHfTLxgslseBHHn5Tj+HqcHueuM1seGvDN94u1YeJ/F65iODZ2RHyhexI/u9wOp6n39Hlto57d4JkWSJ1KsjDII9CKytKeu3Y972uFy39w4qpJ/G+iX8sfNd+6K2j6vZ63psV9p8wlik9OqnupHY1oZryfUdPv/hfrX9q6OGn0C4fFxbk/6r/POD+B9/SNH1ez1vTYr7T5hLFJ6dVPdSOxq4yvo9zgxuCVJKvQfNSls+q8n2a/E0KKM0VZ5gUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUHpQB5Mf7c/4Xh4g/wCEa/s77T9kj3/2h5mzZsh6bOc5xU3gvzofGni2HXdp1xot8jwHMJjwDhc8916+n1rpNS+HlnqHiO61qPV9Y0+7ulVZDY3KxAhVCgfdz/CO/Wr2heDdO0Bbt7eW6ubq9BE95dy+ZK4+uMfpTEYPwa/5J+P+vqT+lUPiR9s/4WB4S/svyPtm+TyftGfL3ZX72OcVq2XwttNOt/I07xH4itIdxby4L4IuT1OAlXNV+H1nq6aabrVdWSfTVKw3UdwomOSPmZypOeOtAGhoX/CVfaJf+Em/sfydv7v+z/N3bs99/bFeT+JNZ0LX/G3iF9dvlght7R7LTwYnceaD975QcfNn04Ir1HSvB/8AZV79pHiPX7w7GQR3l75icjGdu3qO1WvDPhey8KaY9lp7zSrJKZnknYM7McDkgD0FAzzO71ptd/Z8lLMXmsnitps+iuu0n8CteiWuoaTY+CdNudWlgisTawgGcZX7gwOaLDwTpdhcawymaaDWHL3NtKymLJJJ2gAEfePf+VZlv8LdFilgE91qd3Z27b4dPuLrdbxHthQB+WaBHO+Jmv5PjNoTeGvsf2ltKzB9rDCLb++67eRx0pIv7b/4Xno3/CSf2f8AavsD7PsG/ZsxNjO/nOc/pXeXHhWyufGFp4jeWcXlpAbeONWURlfm6jGc/Oe9Lc+F7O58Y2viSSWcXdpAYEQMvllTu6jGc/Oe9AGhfy3UFqXsrT7XLkDy/MCceuTXKeFbvUF1C/WPTN6S3hM7+eo8gk8jH8WPau2PINVLPTbawedrWPYZ5PMk+Ync3rzXFVoTnVhNSsl6f5fedtHEQp0Z03G7du/+a+X4kWvaWmteH73TZeBcwsgb+6SOD+Bwa8Z8K3Vz4r1zwx4fvI2CaCZJbkEdSjfKPwwq/jXu1YOkeENN0XX9S1iz803OotulDkFUydx24HGTyck9K7TiOXuf+TgLT/sGH/2euJ/sG8vtd8X61ozsup6NqzTw7T95fMkLDHfoPryO9ewv4Ws5PGEfiQy3H2yODyFTcvl7eecYznn1o0PwtZ6BqOq3tnLcSSapP584lZSqtlj8uAMD5j1zQB518ONW/t7xX4n1TyzEbm1V2TPQ9x+Yo+Gf/CY/8IgP+Ee/sP7H57/8f3neZu4z9zjFd5o/gfStC1TUr7TjOj6iCJYi42Jkk/IMcde+ayrL4XWmm2/kad4j8R2kO4t5dvfKi5PU4CYoAzfG3mp8QPAz3uzf5xDlM7fMymduecZI6+1S+IdW13S/H2iWU01hdW2oXmIoxbZkgjDr/Ee+CeR/drpb7wdp+q+HoNJ1OS6vFtzmO6mlzOrZ+9vx1qLRvAunaPq39qPcX2p34XYlzqFx5rxr6LwB/wDrNAHA+Mtb0PVPigbPxFdiDTNMtJIQTGz7pnXB4UE5GRz/ALFaPgDWxqHwr1jTnk3yabBNEDjrGUYqf5j8BXb+HvCtn4blv5bSa4nlv5jPPJcMrMW57gDjk/nUI8F2C61q2pxz3UcmrQGC4iV18vG0DcBtyG49SOTxQB5VYeKNW0r4Rw6d/YyJYX/nWianJcgoN7sGygBI4LDJPbjNeueENHGgeFLDTBMs5hj5kU5DFiWJHtljiq8PgjS4vBZ8MMZ5rEhvmkYGRSWLZBAxkE8cVp6JpC6HpEGnRXNxcxW67Ue5YM+3sCQB06UAaFFFFIYUUUUAFFFFABRRRmgAooozQAUUUUAFFFFABRRRQAUUUUAFIxAUliAMck0tZHihnHhq7hiYrJdBbRGH8LSsIgfwL5oAz7LQtO8S2I1TXLCC8e9/ewCePLQwn/VqueVO3BOP4iayPE3gHRLLQ5b/AEuxjtp7Im48wOxKqFYEjJ6gEsAMZKgd67xEWONUjUKqgBQOw9KZdW0V5ZzWtwu6GeNo5Fz1UjBH5GmpNK1yXCLfM1qcdZah5VnBM17q2gNIobytVjaaDd/tSPlgM9AZEJz0FbbatfaaC2tWivajk31mSyKP7zxn5kHuC4A5JAqTRLxrizaw1Fw9/aDyrlWHMgGQJMf3XAz+JHUHEL6ZcaNmbQV32/WTTWbCEf8ATInhD/s/dPT5clqRRto6yIrxsGVhlWByCKdXNaZeQ6dJbm0YnRdQfFvuBBtJif8AVEHlVJyADja3y91A6QEHpQAtFFJuFAC5pMj1rznxn8W9P8PTyWGkxrqF+h2ud37qJvQkdT7D8xXCr48+JOukzaTFdeSScCzsAyD/AIEVP86xlWinbc+hwvDuNxFNVZWhF7OTt/wT6ByKTcPWvAYvih468P3Cpr9sZVP/ACzvbTyWP0IC/wBa9S8G/EDSvGEOyDNreoMyWsh+bHqp/iFONWMnYyx2RYzBU/aySlDvF3X+Z1tFICD0pa1PDCqmpalb6XZNc3JYgEKiIMvIx4VVHck8VLd3cFjZy3V3II4IlLO57Af56VlabaT6heLrGqxlJACLO1Y5+zIf4m/6aMOp/hHyjuWAJdJ0+dbiTUtU2m/uFC7FOVto+oiU9/Vm/iPPQKBa1e+/svRL7UPL8z7JbyT7M43bVLY/SrfSmzwx3NvJBOgeORCjqejAjBFAHL6lp11ClpLrl82pW006wXlu8aLCnmHCNGANwIkKYJYkAk5rT0GWZBd6bdStNLp83lrLIfmliZQyMT3OG2k9yjGqdlA+p+F77QryU/a7ZHsnlP3j8v7uX6lSrZ7Nn0pNLvjcavpWpMvljWdKVnHZXTDqo/CaX/vmgDpaKKKACiiigAooooAKTIxS1V1CeW00+e4t7Z7qSOMssKEBnIHQZoHFOTSXUzvFHiex8LaS15fMCxyIoQfmkb0Ht6ntXGeGvDN94u1YeJvGCnyic2liwwoXtlT/AAjsOp6n3zfCEMXjvxZc6p4nuFee1P7nTTkBQDxweqg9uuevv6nqf21NJuho4h+3CB/syzcJ5mDt3Y7ZxWMf3mr2PoMQ1lMXh6f8Vr3pdk+kf1f3HC/GD4iz+APD9p/ZccUmo6g7pB5oJWNVA3PjuRuXA9++MV4PH8b/AIgpdCY69vAbPltaw7CM9MBen6+9eiatpHjq6sdPi8eeFz4lWxlZHa1kjZriKUqxPygMrJ5e3IxkPj1zyNtZaF/wnEmp/wDCL2N3p1zutY/DkGoq93G4Vf3mwHknkYBPO7uK2Pn0e5fDfxinxG8D/br61hScO1tdwLkoWAB4B7EMD3x0zXPajp+ofDDWv7U0dWn0G4b/AEi3Jz5XP/68H8D3zgeH7b4iWOnJbeDPC66LBPeC5l+2eXH5cSnYsOCMkkKWZsbsMPqfcJoYriB4Z41kjkUqyMMhgeoNRKPN6nfgsa8K3GS5oS+KPf8A4K6MraRq9nremxX1hMJYpPTqp7qR2NaGa8bkkk8A/EJbHwzJ9utrxh5unKclCT93PTIBJHf14ya9gjJZFJXaSMkHt7UoS5lrui8wwSw0ozpu8Jq8b7281+uz6ElFFFaHmBRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFB6Gig9KAODv/Gl3azawV1TRoXsLhoodPmiYz3ACqQARJnLFsDCHntW/B4gCXWqHU/Ltbawjhcscll3puIPrzwMdazbjQtb+z65YwW2mS2uqXEkglnuH3Rq6KvMflkEjaT94U2+8J39zDqVolxE0N3BbFJ2ldZBLAVxkAdG28sGyPTvQI3E8S6XJZy3Kyz7YpBE8ZtZRKHOCB5RXecggjik/4SbSjp4vFuHMbTG3CCCQyeaOqeXt37hg8YzWEPDOqLaTtbpHa3E00TSqusXMjTxoG+QzsN69c/KO2KLHwvqtikVzH9la8g1CW6SGW6llRkePYVMrKX3DruwfpTAuT+MrSDWLVGMjWNxZyThltJWlDo6qQUC7gACc5XjFbjapZrpf9o+eGtDGJRIgLZU8ggDk/QVnWum6i+v22qX4tUZLKS3kjhkZsM0isMEgZGF5Jxz2qvbaFqVp4At9GtrlIb6G2jh82ORlXK4yAwGVBAIyBkZzSAuN4r0dLG4upbmSKO2dI5lltpUkRnICgxlQ3ORjilHinSDZyXJuJFWOZYGja2kWUSNjavlFd5JzxxzWDB4S1IrembyYzcXVnMqPfTXRVYZAzZkkXcSQOBjH061av/DWoy61calaPbs63tvdQRSuyhtkTRsrEKduQxIIB6CmBf0PWpdcs9RmtvLXybqSCAvG6dFUjepwQcnkcHiqln4mub6z0DyYoVu9QkYXMbAkRCMHzsc9QwCjOetXvDmm31hDfPqf2cT3d49xttmLKoYKMZIBJ464qrpPhmXTvFmp6pJMr203/HpECcxFyGmzx3dQRikA+PxdpUFpatdXpnkngNwGtrKYho84L7QGKge5q1eeJ9IsfKNxdEiSEThoonkCxno7FQdq/wC02B19Ky9E8MXmmpbCeSBjDpf2MlGb7+/dkcDj9azU8D38FvaL+6uSNMhsbiP+0bi2QGMMNw8sfvFO4/KwHTgjJpgdJqHivRtMmeK8umUxqrO0cEkixhvu7mVSFz2BPNSy+IdNg1EWU0siSmVYQxt5PL8xsYTzNuzccjjOea4jxJE+m/2npdhcae8mpfZgLVpm8+MqqJhE2neCEU7iRjkmtfUPDOsXutLMZUkgXUYbpHe/mXZEjIxjEAXy8/KcMTmkBv2PiPTdSvntLKWaWSN3jZvs0oQMhww3lduQfeobvxfoljd3FtdXUiPbMqTt9mlMcTMAQGcLtGQRjJqXQdMm0uxlhnMbO93cTgoSRiSVnHUdcMAazL/w1eXVlr0KPAG1K8iniLMcBUWIENxwf3bdM9R70AXW8SWM9jPNbXfkNbyRpKLm0lVk3sAuYyFYbs4B6d+cVOviHTXuBbpOzzmV4fKWF9wZF3NlcZAwQc9DkYJyKy9W8N3d/earLDJAq3i2Qj3MQR5MrO2eO4IA69OcUtroGpQeL5deeS1Z7gmCWEZwtuANhVtuS+Vyc8HOM/KKALGheLLPWLW1kdJLWa6mlhiikikG4x7icMVAPyrn65HUEVYn8U6RAE33EjtJPLbokVvJI7SRkh1CqpJwQe2Kxrfw3q9jb6ebcWUs2mXk8sQeZ1WeOXfncQhKMN/QBgcds8TaR4c1G1uLG4vntTJBd3lxKImYj98xYBcgdM80AaX/AAlWj/aIoTdOGkEfJgk2oXAKB224QnIwGIPNWdU1qx0ZIG1CV0+0S+TEscLyM74J2hUBJOAa5298I3E2t3s6xx3Npezxzssmo3EIjKqoI8pPkk+4CCcYJ5yAKteLPtQv/Dx09IpJxqJKrM5VGHkS5BIBI474PNAy5J4v0WOG2k+0yv8AajIIkjtZXcmM4cFFUsCM8ggGpH8UaRHdJbyXLK77ASYJNsZcZRXbbhCcjhiDyPWs3S/Dd/bavZ6hdyW+9ZbuadImYhWmKbQpIGQAvJOPpTb7w5qU0+o29u1r9h1O6juJpXdhLFtCBlVQMNnyxg5GMng0CLGp+LbW2v7aysZPNuJL+O0k3QSGMZI3KJMbd4BzjOfatOLXNOmhtJo7jKXk7W8B2MN8i7sjpx/q25PHH0rnz4d1hbpLeL7CbAav/aJlaRxLgvvKbQuMgk4O7pxii18Oaxb3Gl2rGyNhp2oS3YlEr+bIriTA2bMAgyf3jnHamBsp4o0h3mAumCQq7NM8MixEJ9/bIV2tj2JpYvFGkS2dxci5dI7YKZRLBJG6hvunYyhjuPAwDk8DNYyeGtWPhebw3IbNbIQPDFdLK5kbnKFk2gD3wxz7UkXha7ayvTcWNo91PFHGPO1S6uA4Ry2C7/MnPI2g4PPNAHS2GpW2pRO9qZRsbYyzQPEynryrgHv6VlX/AItsY7HUDp8rS3NrBO8Za3k8l3jUkgSYCtgjBAb1qbw9pt/p63X9oSfLLIGig+1yXPlDaAf3kgDHJ5x0FZ0Wh63DoF3oSiwa0eC4iiuGlfzG3htm5NuBgtydxzjOKQD5fGNvJ4Zv7ywbdfWunm78maCSMN8pIIDAFlyMZBI960bzxJpmmyrFqFz5cvlLK+2J3WNScbnZQQik55YgcVm6l4Xur+GWJZYUWTRpNPySeHbGDjH3eP8A61Q3ug63crqAiXT0/tayW1ut0zt5BAZdyfJ842v0O3B74oA2j4k0w6pLp0c0z3MTiOTZayskbFdw3OF2jg55NUk8YaTb2tsbq+M7zWi3Ze3spipiOf3hADFF4P3jx3qxpGjS6dNqpZo2S7nV4cMchRCkfzcdcofWs7SvC17Y28aTSwMy6JFpxKMf9Yu7J6fd+Yc9fagDWvPE+kWEqR3N2ctGsuY4nkVEY4DsyghFJ7sQKt3+p2mmWf2m9l2RblUbULszMcAKqgliSegBrjpPBF+I4kxDdJJp0FncxnULi2UNGhUnEY/eKQfutj681teJ4Vg0a0mW5tbX7BcwzIbuQpEdpxtZ8EgYJ+bBx1oGWIvFekT2zzwS3EgSc2zRpZzGQSBQxXywm7gEE8cU6TxTpCWtvOtzJMlyrNEsFvJK5CnDEqqlgAeDkDB4PNcppFjq+sW17eW8kPlS6vLM0VvfS28dwnkogKzIu4gMDzgBiKtweE9TtdHsbf7PZz3Fu9yxkXUri3dPMlZwBKi7mGCMgjk/TlgdpDNHcQRzQtujkUMpx1B5FPrH0htQtXt9Lvka58iyjaTUGb/WSZKlcevGc5rYpAFFFFABWRrg8250i3P3Zr9S3/AI3lH/AI9GK1653xBq9hpfiHQxqdwtvG7TMruCFDBAvJ6KMOeTgUAdFRUVtdW95CJbSeKeM9HicMD+IqXNAFG/0iz1Ly2uYiJYs+XNG5jkjz/ddSCPcZwe9VRZa1Z/8empRXsf/PO+iw/0EkeAB9UY+9bGaKAMe10Pdo11ZamUk+2SSSSrDlVQuc/JnkY6565yeKl0G6mudLUXjBrq3d7edgMb2Riu7HbcAGx23VavNRstOjD393BbKeAZpAgP51k+E7+31O0v7uzcvDJfy7WKld2MDoQPSgDfPSvPviz4wk8N+HUtLGQpfahuRHXrGg+8wPY8gD6+1eg14D8YGfUPiXa2LsRGsEUS+25iSf1/Ssq0moaHv8PYWnicwiqmsYpyfy/4Nja+F3w3t7ixh1/xBCJzJl7W2flQP77DuT2B/wD1ewKipGERVVVGAqjAFMhhjtreOCFdscShEAHRQOBXFfET4iQeErU2liyTarMvyRk5EI/vt/Qd6Eo0omVeri88xto6t7Lol/wOrIPih4207QtKk0ryYL6/uUwIJVDLECPvsP5CvFLfT9c0KysfE0EUttA02ILgHGWAz09Dz7Gu1+H/AMP7vxdqB8QeKDI9m778Sn5rpvU/7P8APoOK9K+I+nQXPw31SDy1VIIPMjVRgIUIIx6dMVg4yqXm/kfU4fGYXJ6kMvo++5NKo+mulkvK/wDT21PCWvx+J/DNpqkY2tIuJV/uuOGH51t15R8Brl30HVLYklI7lXXnoWXB/wDQRXq56V005c0Uz4/NsLHCY6rQhsnp6PVfgzEv0Gp+I7Swfm3tEF7MpH3n3bYQfUZDt9UWtrHNeefEfxJf+Eta0q80hLdpbyGaGYXCMysqFGXgMOQXbHP8Rrlf+FweJz9230n/AMBpf/jtNyS3PnK+ZYXDz9nVlZ+jPbqK8OPxj8TCRY/K0gyN91FtZSzfQCXJqaX4reMbeLzbjTLOGPGd8mm3Crj6mTFHMiY5phZq8W2v8Mv8j1a/0d7i+F7Y3slhdmMQySRorCRASQGUjBKkkg9sn1xUN1ojQaPp0GkFRNpJRrUTNw21DGVYgfxIzDODgkHBxivKk+MXiV1DLFpDKe628n/x2lb4weJ9pIt9J/G3k/8AjlLniZf2zgf5/wAH/kexaZfrqVjHcpG0RLMjxvjKOrFWU444ZSOODV2sHwYzTeDdMu5MeZfQi9kAGAHmJlYD2y5reqz1wooooAKKKKACg9KKKAOA8Z+CriS7HiLwuTb6rAd8iR8efjvj+9jt3rT8F+NIPE9oYbgC31KAYng6dONy+38q6w9K4Dxp4KuJLoeIvC5Nvq0B3yJHgefjuB/e9u9YyTg+aJ7mHxFPGU1hcU7NfBPt5S/u/l6GJqPxCuPH2pXPhHwho+ow3EM4W81C6RY0sjHJlXK5O4bk+6cEjIxXCab8HPHMN9b266fYWBgmB/tLfFLHhTw6octu44+Uc8kivY/AnijTtdhnC2sNlqxbdeRJGFMrDjf6n8eR0+vYkgitYtSV0eViKFTDVHSqqzR5t4S+IVpY6lYeB9d0nUdK1mGNbeFJgJlnVVwJPMXrkKSTjGc81oeNfGsmmzLonh5Tc6zcnYNgz5Of/Zsc47dTxUHjjxNBY6rDY6DZw3fiORTDFcCJXe2VuoDdcnrjOO56Vo+CPBMfh2F76+P2nV7r5ppmbdsz1VSf1Pes5ScnyxPUw2HpYWksXi1e/wAMf5vN/wB38w8EeCY/DsL318ftOr3XzTTM27Znqqk/qe9dfijFLWkYqKsjzMTiauKqurVd2wooopnOFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUHpQBmR+ItLl+xhLsZvpJIrcFGG948hxyOMFSOcfqKypvGdnFrUMQdpbGS2mfzIrWWR/MjkCHAUElR83OMcdaqXfg2+kvtVubW5gVmcT6WHB/cSllkk3YHRnQHjPBNaOk+G5dL1HTpUeNobTTGtGJJ3u5dGLdOh2kn3NMRa/t+wEjzNqMH2RLJLs4ibhGJw+/OCDjAXGeKo6l4wtraKymtfN8uW+S2nWa0mWRVZGYYjKhiTgY4Oc1mQ+CL9dJjtZLi3EkWl21srKWZfOhlMgJyPuE4Hr14rYn0/WNUk0+TUI7G3NnfJcFIZnkBQRup5KLzlgcYxjvSGa2n6naapa/aLGQugco25GRlYdQVYAg+xFVLfxPpN00vk3EjLGjyGQ28gjZUOGKOV2vj/AGSaXS9Mls/7TE5RlvLt5k2E8KyqMHjrway7TSPENr4bbRIpbOBILNre2vY5XMjEDCMV2gIcdcE88jFAGh/wlujLaXNxLcSwpahDMs1rLG6hzhTsZQxBPcDHWrem6xZasJfsUkhaFgskcsLxOhIyMq4BGR0OK5MeDtUma/eb7PF9pjtY0R9Qnuz+6nMjEvIucEHgDgH6k10tnpk9t4k1O/dkMN3HAqKCdwKBs5GP9od+1Ah//CQ6adTNgJpDOsnlErBIYw+M7TJt2Bsds5qGHxVpE5lC3EqGKFrg+dbSx7o1+8y7lG8D/Zz1FVbLTNX0y7u4LX7GbK5upLgTvI3mp5mWI2bcHDHglugAxWRY+ENWa7jfVJkIGnz2ksx1Ce5aV5Ag3hJAFj+6flX1HoMMDqJvEGl26o092savateKWVgPKUqC3T1deOvPSox4m0v7DPdyTTQxW5VZBPbSxOC3CgIyhiTnjAOa59fDmuTvH9ug0p44NKewSPzpGWVi0Z3N8gKjCdASQe5pJPCWrXWnXMUtwIf30E1rbHUbidUaNiW/fNh13AgfL93AIoA6nTtTtNUgaWydmEbmN1eJo2jYdmVgGU4I6jvVaHxNpM00qR3LbYg5aVoXWIhPvkSFdrY74JqPw9pEmmR3Lz28cM1zKHfbezXRbChRuklwSePQcYrMg8N6r/wjE/huc2a2BtZbaO6SRjKwIIQlNoAPPPzHNIDVj8V6NJbTTi6dEgCNIJbeRGCucKwVlBKk9CARVi613TbJrtbq5EZs445JgUY7Q5ITGBySVIAGTn6isG98N6trMd9LqJsba4ktEt4Et3aRMq+/cxKggEgDABwO5qrqekamw1XVdXm06xLfYngAnd40MEjP+8Yovykt1xwPXHLA0b/xpYxW8c1jIzCO+itrpJbaVXjDgnGwgNuxjAwetX4tfs7x7Q2d4qia6a2McttIHLqjMUwcGNsDPzDp25Fczo9vd+IdSvr9XtPLXVbeYPBKZInWOIBgj7RuPPXAFa6eG7xdbF4ZYfLGrtfY3HPlm18nHT727n0x3zQBf03xXo2rSxx2N07mVGeJnt5I1kC/e2sygNjvgnFLp/inSNUvo7SyuXeaWNpY91vIiyIpALKzKAw5HIJB7Vk23hO6TTNBtbiWEf2dHMlwyMed8TJ8uRzywPOOlY2iXly+taaIGsNQTSNImjDWEzPvP7sKH+UbGbZ93kjn1pDOw8Sao+i+HrrUI9ha3UH94MrgsAc4Poaibxboy2slzLcyRpDKkTrJayq6s/3PkK7uc8HGDSazZXuveEJLeOOO0vbmJG8uZiyxPkMVJHXGMcVmy+HNVv8AUn1C++xwzNc2beVFKzqscDs5O4qMsd54x6c0AasvizSIII5ZZrhRIHYIbObzFVDhmZNm5VB/iIA96feeJtKstv2i4fY0ayeckEjxKrcKzSKpVQfUkVna/wCHLu+1mLULPbL/AKObeSFr6a043bg26LO7v8pH41l6z4N1a80yXT7N4hbNYx20EZ1K4ijtiqkN8igiUHjlznigRc1Pxr9mXW0htmR9JuIYzJNFJskVzGGPQDIDnAyc4yMitRvEdjcWjy2t35DR3EUMgubSUMpdlCqUIVhu3ABunOeaz9Q8M39zc60IWtjDqU9rOrSOwZDEYwyldpGCIyQc9TjHepdS8OXl5fXs8UkKrcXFjKgZjkCGQM+eOpA4/XFAF2HxTpE2ofYkuH84TtbZNtIsfmrnKbyu3dweM80qeKtHk1KOxS6czSTNBGRbyeW8ig7lEm3aSMHODx0rO/4Rq8+xiISQBv7b/tAnccGPzt+On3scY6e9YdqZV1/RtFt7jT7uKx1OeZjBMTOilZT+8TaAmC+Op3ZBFMDsdT8R6ZpFylvfTSrNJG0qpFbySkouNzfIpwBkVHN4r0eCaGI3EkrzQLcoILaWXMTHAf5FOBnuay9WOpL49tTpEVrLN/ZcwK3UjIuDInOVVuc9scjvVjw/4Zm0S7tmaaOWKHS4bPIGGLqzMTjHC/NxzSA0IfEelXWomwhuiZy7xrmJwjuv3lVyNrEYOQCSMH0rJ0Pxnb6rocUrts1F7Z5hGYJEjdkHzBGYYbHGQpOKSy8N6lDNY2s72v8AZ+n3sl3FKjt5su7ftVl2hRjzDkgnOBwKq6V4W1mO20yz1NrGOHTYZkSW3kd2lZ1KDKlRgAMe5yfSmBqweK7GDRtOudVlMc91ZpdOkEEkmxSoJYhQdqgnqeKnvPFmi2F09vc3bB440lkKQSOiI2drM6qVVeDyTiuePg/VSlk8iW8kkOnJYSxJqlxAhCE7X3RqC2dxypH0Per7eFbn+z9btofs8Yv9KisYF3sQjJHInJIJ2/OOeT1zSA1IPFOj3ENxKt2yJbxefIZoXi/dno6hlG5TjqMirOn6ta6oJPsvnAxEB0nt5IWGeR8rqDWPfeHbu4fcqWkw/ss2RjnZtrvuU84GcYB5HINR6dbaxoTSSNbtcx3M0EUdmuoS3IgG4h5PMlUHGCDt6fL70DOoAxTqKKAExS0UUAFFFFABWHqtrBeeI9NhvII54ntrgNHIgZTzEeh+lblZN9x4o0o/9Mbgf+gf4UAZ1x8PvDc0xmFk0U3Z0lb5fopJUfgKgn8H2lnA8r+JNZs4EGTtvVjVR/3zV7xR4oi8N2qO9tLPJJkIAMID/tN0H061zGmaRqHjrZqWvX6CxDZjtLZ+/v8A3fxyfpXZSwzlD2tR2j+fojy8RmChV+r0I81Ttsl5tlGG/wBDl1U2p8V+JkiPC3L32Iyf++cj6mupXwRZ3EatLrmr3sTDIE10sgYfXbWlL4X0ebSV057CMW6/dCjDKfXd1z755rjr6HVPh5KkthfR3emyN/x63D4YfQf1X8RWio0MQ+Wi2pdn1+fRnO8VjMGufFJSh1cfs/LqvPc6iz8BeGrOQvHpqOzDDCV2dW+qk7f0q34cjSO2vUjRURb6YKqjAADYwAPpS+Hteh8QacLuCGWHnayyLxn2boR9KXw//wAet4fW/uP/AEaw/pXDOEoScZLVHsUqsKsFUg7pmtXhnxw02W18SafrEQYJNEIiwH3XQkj9GH5V7melYvinw3beKfD8+m3nyh/mjkAyY3HRv89iaxqR5o2PbybHrAY2FaXw7P0f9XOK1/4u2dn4RtLjSys+q3kORF1Fu3Ri/wBCDgd/pXK/D/wBdeLr8+IfFBkezd/MAkPzXbev+5/PoOK4+/0O58G+JoovEWmfaIYpd3l7iqXKD0Ydv8mvZtL+MHhCa0RZ5ZtNKjAikt2YL9CgIxXNF88v3j2PscVhqmXYS2U03P2m81q0uiVtf677d9HEkMSxxKqRoMKqjAA9q4P4wa/FpfguSwV/9K1EiJEHUIDlm+nAH41T1v42aDZwMNFin1GbHykoYkB9ywz+lcLomg698U/Ex1PWN62QYCSfBVVUf8s4x+P4dSfXWdRNcsNWeLleT1aFRY7Hrkpw113bWytv/md/8EtJew8GSXky4a+nLpkdUUBQfz3V6RUFpaxWVrDbW0axwwoERFHCgDAFT1tCPLFI+ex2KeMxU67+0/8AhvwPJvjb/wAfXh/6XP8A7SrzFVkkmhhiVWknmSJdzbRlmCjJPQc16d8bf+Prw/8AS5/9pV5bKheBkU4JHB9D61lP4j84znl+v+9tpc92+Gvhe98M6JcxavbW0d5Lcs4khIZmjwuNzYycHdj2xXZkVn+H9UGteHNO1IYBu7eOUqP4WK5I/A5FaRrc+2pwjCmox2SPEPiZ4W1Gy1u/1+GztItMYwpmJwrszEKWK45O5vyFcK33D9K9Y+NN/tsdJ0xf+W073L89o1wAfxkB/wCA15NJ/q2+hrCpbmPh87hTji/c3er9T6M8Ef8AJP8Aw7/2C7b/ANFLW9WF4J/5EDw9/wBgu2/9FLW7W592tgooooGFFVr3UbLTYPO1G7gtIs7fMnkCLn0yeKLHUrHU4PO028t7uLON8Eodc/UUAWaKrxahZz28s8F3BJDCWWWRJAVQr1BPbHfNM/tXTxbwXBvrYQ3LrHBL5q7ZWPRVOcMTg8CgC3QelU5NY02LUV0+XULVL1/u2zTKJG+i5yaguvEuhWV09tea1p9vOhw0Ut0isvfkE5FAHJ+NPBVy91/wkXhYm31aA73SPgT474/ve3eseb4pXmoaNDYaVYumv3DeS6hcrGehZR3+h6d69FuPEeiWsohutYsIZGUMEkukViD0OCe9VYdO0Gy8Sm8iW1i1W9j+UbwHkUdSq/zIrJ03f3Xa57mHzKi6Shi4c7h8L/SXeP8Aw2xl+CPBMfh2F76+P2nV7r5ppmbdsz1VSf1PeuvxWfe69pGmXAg1HVbG0lI3COe5SNiPXBOe1TXWq6dZWiXV5f21vbyY2TSzKqNnphicGtIxUVZHl4nE1cVVdWq7t/1Yt0VVbU7BVt2a9twLptsBMq/vT6Lz834VH/bWlf2h9g/tK0+2Zx9n89fMz/u5zTOcvUVTbWNMTUBYPqFqt43S2MyiQ/8AAc5qRdQs3luI0u4GktgDOgkBMQIyNw/h455oAsUVFb3MF5bpPaTRzwyDKSRsGVh7EVLQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFB6UAc5p3iy1m1K6sb6Typo75rWIrBJsPTaC+CoY9hkE9q049c06WGGWO4yk1y1rGdjcyqWBXp6q3PTisA+HNYkup7eT7CLCbVl1HzllbzQFZWCbduMkp13cA9DSQeHNYgntLVPsX2C21SS+EnnP5rKzO23ZswCC553dqBGmvjPQ3tprgXUv2eFSzzG0mCYDBThiuDgkDAJpzeJbCexnmtrvyGt5I1l+02kqsm9gFyhCt82cA9O/OKqf8I3df8IL/Yu+D7R/fydn+t3+mentTNW8M3l/qGpzwyQKl3HZrGGZsgwzF2zx3B49+uKANFfFGkHUTZfaX85Z/szN9nkEYl/ub9u3J7DPNL/wlOj/ANpLYfaX89pzbKRBJsaUDJQPt2kjByM8YNZ0/hq8ksZ4UeAPJrEd+CSceWsiOR0+9hT7e9YSvJFr2naHbXNjdpBrMt0yxSlrhFJkciRNuFALkbt3PGBTGdtqOtWWlMgvGmy6lwIbaSbCjqTsU7Rz1OKqXXi/RLSQJLdsxNut1uit5JFELZxIWVSAvB5Jqt4j0bVNTvI3s5Q9uIHjaA381qA5Iw+YgS/HG04FVLDwpfWum3EEksBkk0O305WDH/WRrICTx9351wevXikBZ8UeMbPQ9KvXtpRLewW3nIohkkjGc7N7KNqgkcZIzW3Pf21pPaw3MhSS6kMUPykhm2lsZ7cKep7VyOo+FNbbS9RsdOawcalZQwSyTyupidE2EgBDuBAGMkYPrXQ+JNLutU0cx6dLHDfwyJNayy52pIpzzjnBGQfY0CHxeJNJnjjkivFZZblrVCEbmRQSw6dAFJz0461SvPGemwaTfXVuLiWW1tWuVt5LWWJpVHddyZK5IBYAgZyeKo2PgybTtYWW0uo0tIbPbCuMutyY1iMpHT7iD8SapweDNWme5+3yxqZ9In09pTqE90zSSbP3mJFAQfKTtX2oA3z4u0qG1t5ruWWAzQicobaUmJM43ONuVXOfmYAcZqeTxJpcWpnTzNK9yCm5YraSRU3/AHNzKpUA+pNc9d+EtSuJ0uXit5HmsY7S4gXVLiCNShbDAxqPMBDcqwGOx5Od7StHk0/U76c+WIp0gSJEYkqETac5/TrQBYt9d067Fl9nuN/29Wa3HlsC4UZbII+XHvjnjrUV34i0uxvxZ3NwyzZQNiF2SPecLvcAqmT03EVh+E7KKTxDq+oWsyz2EczQ2LKcqN5Ek209wZCB/wABpNV8IXN5rWoXCxx3NtqBjaRJNRuIAhVQpHlx/LICFHXHPrQBvjxBphhjl+1YSS4a1XMbA+Yu7cpGMrjY3JwMDPSo7bxTo13FPJFebUghM7tLE8YMXPzruA3Lx1XIrnoNIi1jxhrXk3G+xijdPk5WK6lQJLg+oVBkdjI3epdO8JXkFrKl5aWc0wsXtEkm1G5uFkDbcgo/EanaMhc9gDQB0unavaaqJPshmzHjcs9tJCeehw6gkH16Vdrm9E0nWNMkuJHEflusaR2j6lNcKuCdz+ZIu4HB4UDHyjkZzXSDPf8AGgYtFFFABRRRQAUUUUAFJilooATHNLRRQAUUUUAFFFFABSc0tFABRRRQAUUUUAFFFFABWPqLovifRwzAF0uFUE/eO1Tx+ANbFc54y0GLWbG2lmtnuPsU/nGOL/WMm0q233GQwHcoB3oA3Z7aG6geG4jSWNxhkdcg/hXF3/gq90i7Oo+DrlreTq9ozfI/sM9fofzFT2Xh++ktUuPDvjK8MD9HuVF1+AyQBj0xxVoaV4ui4XxBDc+8tuifoqn+db0a86L93bqujOPE4OjiUudarZrRr0Zi/wDCc63dKNMtNGZNZztcEHan+1g9PxOPc1e0rwIZrj+0PFVy2o3jc+UWyi+x9fpwParYsvGW4n7bpqkjBYA5/wDQKU6R4tm+94mjtj/0ztI5B+qitpYvlVqMeW+/f7+xyQy3mkpYqbqW2T0S+XV+bOmSNY1CooVV4AHAFZfhshtPuWBznULvp7TuK53VNBlhhU694k1K+mlJSKzsz5P2k/3NmSD7ngAckgc10fhjRU8P+HLTTkVFMYLOEJKh2Ys2CecZJxnnFcR6+xrUHpRRQBR1LSLHWLM2uqWkV1Cf4ZFzj3HofcVxN58E/CtzKXh+22gznZDOCv8A48rV6JRUyhGW6O3DY/F4XShUcfR6fccHpnwe8KadIJJLae+ZeR9qlyPyUAH8a7eC3jtoUht4kiijGFRFACj0AFS0URjGOyIxOMxGKd683L1YUUUVRynkvxt5ufD/ANLn/wBpV5jXtXj7wrN4w17SLG2vkszbW9xM8jwmTILRKAAGX3/KsH/hSd3/ANDHD/4AH/47WU4tu6PlM0yzE4nEupTWll1Nz4Paj9p8GvYsfmsLqSNRnko2JAfplyP+A16ATxXjz/AqSV98ut2rPjBJ03Of/In1pP8AhQ3/AFGLP/wWf/bKu7tsevh54qnSjCVO7StujG+J+oDUfiDdIpyljBHbrg8E43sf/H8f8BrkJf8AUv8A7pr0yP4H3ESbItft0XrhdOI5/wC/lEvwRvGiZR4jhywI/wCPBv8A47WbjJu58/issxuIryquO/mj0HwQc+APD3/YMtv/AEUtbtYng1fL8FaNCTloLOKFsDuihT+oNbdbH2a0CiiigZxHxV8o+FrT7Rs8n+0oPM8zG3bk5znjFc+usaXoHiLxRqXhr7N9gh02LAtNpha5JwgG3jPPOK9OvdOs9Sg8nUbSC7izu8ueMSLn1wagTQdJisxaRaVZJbhxIIVt0CBx0bGMZHrQI8s8HXcmlW2t6Lc2+pWou9Ma6QahCYy0yxkTFMnkE4P4Vj6YdQ0zT/CWmz5m0++1O1vrWQD/AFTBiskf5sCPx9ePcLqwsbh1uL62t5GhRgssyKxRWGG5PQEdfaq4tdEe1sIBDYNBuWSxj2Js3AFg0Y6ZAyQR2pgeQ6hdabaW+uvfadp2oar/AG3N5kdzKY7jZlfL8rad+Ov3as3ZJ+IHiEyr4VU7rbePERyQfKHEf9f+A161LpGmzagl9Lp9q96n3bhoVMi49GxkVDc+G9Dvbp7m80bT7mdzlpZbVGZuMckjNK4HlniyaK18YeIJ4/D1rrNsmmwjexQC1UpgSKMEkdPu44FdNo2kG21rwaz3lvcm20yZS4nXLZVcbVPzMMEjI6Y5xXapplgkkjpZW6vLGIpGESgumMBTxyMdulJDpWnW7W5t7G1ia2UpblIVUxKeoXA4B74oGed+JtMvtV+LMkGm2ekXco0dWZNXiaSML5uMqACd3I/DNQDQ9P8ADviLw3pfiq4t7iwg0+fEl4F8jzmfcR83HAOBn0FeoCytRfG9FtELvZ5Zn2Dftznbu64z2qK8s9N1TNrf21reeWA5hnjWTaDnBwemdp/I0wPJdG2/ZfDBh3fZv+Ejm+zenldse1SWkmn6Brds0D+H9ejn1M7ZEGdQjd3Iz3yF/AZxivWG0ywdbdWsrci1bdbgxL+6PqvHB+lV4tK0WLVmuILGwTUMb2kSFBLg8bicZ5wRn2NK4jx/UBpJ8I6yJvI/4Sj+2W8vIH2rd5y4x/FjbnpxV3VTqOn+OvFuu6bmWKzMMV5bj/lpDJEQW+qlQa9YbR9NfUBfvp1o14OlyYFMg/4FjNSrp9mktxKlpAsl0AJ3EYBmAGAGOPm4OOaYzC+HWP8AhXejYxj7OOn1NdNUNtaw2cCQWsMcMMYwkcahVUewFTUgCiiigAooooAKKKKACiiigAooooAKKKKACiiigAoopCwHUgUALRTfMT+8v50eYn95fzoAdRTfMT+8v50eYn95fzoAdSAUnmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50ALilpvmJ/eX86PMT+8v50AKBilpvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AZ1zoFjcXTXSpJa3L/entZWhZvTdtID/8CBFR/wBkalH/AKnxBdt7XEMLgf8AfKKfzNavmJ/eX86PMT+8v50AZX2HXOn9sW+PX7Dz/wCh0HR7+X/j51+8weqQRxRqfx2Fh+DVq+Yn95fzo8xP7y/nQBTsNHstOkaW3hPnOMPPK7SyuPQuxLEegzgVd70nmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AOopvmJ/eX86PMT+8v50AZmpWV7/aVtqWmCGSeGN4ZIJ3KLIjFTwwBIYFRjgjBI75DPtfiH/oD2P/AIMW/wDjVa3mJ/eX86PMT+8v50AZP2zxD/0B7H/wYt/8ao+2eIf+gPY/+DFv/jVa3mJ/eX86PMT+8v50AZP2zxD/ANAax/8ABk3/AMaprXPiR1Kx6Xp8TEYDvfswX32iIZ+mRn1FbHmJ/eX86PMT+8v50AVdKsBpmlW1krmXyUCmRhgue7Y7ZOT+NXKb5if3l/OjzE/vL+dADqKb5if3l/OjzE/vL+dADqKb5if3l/OjzE/vL+dAEV9G82n3EUQy7xMqj1JBxXFWXhPV7GbRZP3c0Wmlhbw+Zgwq9tKHDnP/AD0ZFG3OF/Gu68xP7y/nQXQj76/nQB51FH4isrILcTz2t5dXSw2sM1yW3B4yrkAzSk7CQ/LfwdBmun1SyvP7U08pDqF3ZRRFCtre+UyvuXDyZdC4wDxk9+Dmt3emfvL+dL5if3l/OgDhYLPxXHqF5cNb3QjE0ciwLdZEgE2WCF52HKdsRjtinGx8TyXmmT+VeLtmd5YnuQUjU3DMA5WYZxGQPuyDoABiu48xP7y/nR5if3l/OgDl/DNhr9tdX7avPOxcEJ5hDRs244ZT5rkDGOAiD2rFj0TxItjctFDfw3Dx2iTGW9ErzlDJ5vlsJlKrl1IG9O/TpXoXmJ/eX86PMT+8v50AcRHp3ib+2NKEount4o40uJvO2blw27couCAw46Ix/wBuobDwxqtrZ2jxR3lvc2dlBCmL7O91mJfOHwyleQG4AbAAPA73zE/vL+dHmJ/eX86AFpab5if3l/OjzE/vL+dADqKb5if3l/OjzE/vL+dADqKQMG+6c/SloAKKKKACiiigAooooAKKKKACiiigAooooAKiltopmBlQMR0qWigCv9htv+eK/maPsNt/zxX8zU+RS5oAr/Ybb/niv5mj7Dbf88V/M1YzSZGcd6AIPsNt/wA8V/M0fYbb/niv5mrGaTIoAg+w23/PFfzNH2G2/wCeK/masZxSZHrQBB9htv8Aniv5mj7Dbf8APFfzNT7hRketAEH2G2/54r+Zo+w23/PFfzNWKM0AV/sNt/zxX8zR9htv+eK/masUZFAFf7Dbf88V/M0fYbb/AJ4r+ZqfcPWlzQBX+w23/PFfzNH2G2/54r+ZqfcMZzxQCD0oAg+w23/PFfzNH2G2/wCeK/masZozQBX+w23/ADxX8zR9htv+eK/masZozQBX+w23/PFfzNH2G2/54r+ZqfIpc0AV/sNt/wA8V/M0fYbb/niv5mrFFAFf7Dbf88V/M0fYbb/niv5mrFFAFf7Dbf8APFfzNH2G2/54r+ZqxRQBX+w23/PFfzNH2G2/54r+ZqxRQBX+w23/ADxX8zR9htv+eK/masUUAV/sNt/zxX8zR9htv+eK/masUUAV/sNt/wA8V/M0fYbb/niv5mrFFAFf7Dbf88V/M0fYbb/niv5mrFFAFf7Dbf8APFfzNH2G2/54r+ZqxRQBX+w23/PFfzNH2G2/54r+ZqxRQBX+w23/ADxX8zR9htv+eK/mazdU8YaDo159k1LUo4bjaGMYVmIB6Z2g4/GqsXxB8LSzJGurxBnYKN6Ooz9SMCrUJtXSMnWpp2clf1Nz7Dbf88V/M0fYbb/niv5mp8g0tQalf7Dbf88V/M0fYbb/AJ4r+ZqxRQBX+w23/PFfzNH2G2/54r+ZqxRQBX+w23/PFfzNH2G2/wCeK/masUUAV/sNt/zxX8zR9htv+eK/masUUAV/sNt/zxX8zR9htv8Aniv5mrFFAFf7Dbf88V/M0fYbb/niv5mrFFAFb7Fbf88V/Wl+w23/ADxX8zVXVdU/sxINtu9xJPL5UcaMBztZskk9MKazpvE13bwPNNo0ojjUuxW4QnAGTgetclXGYejPkqTSZShJq6Rt/Ybb/niv5mj7Dbf88V/M1LG4kRWXowBHFPrrJK/2G2/54r+Zo+w23/PFfzNWKKAK/wBhtv8Aniv5mj7Dbf8APFfzNWKKAK/2G2/54r+Zo+w23/PFfzNWKKAK/wBhtv8Aniv5mj7Dbf8APFfzNWKKAK/2G2/54r+Zo+w23/PFfzNWKTIoAr/Yrb/nkv5mkFrZlygRCwAJGeQD/wDqrA8Z+MrXwpYDpPfTDEFuOST0yfbP59q4EWHjTQlXxpM7TzzHddWZ5Ii7ZXpjHp93APrWcqiTstT2MJlc8RS9pOShfSN/tPsvLz7nr32K2/55L+ZpfsNt/wA8V/M1neG/Ell4m0pLyxfnpLET80Teh/xrZyKtNNXR5dSnOlN06is10K/2G2/54r+Zo+w23/PFfzNWKKZmV/sNt/zxX8zR9htv+eK/masUUAV/sNt/zxX8zR9htv8Aniv5mrFFAEcUKQqRGoUE5wKkoooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKAPHb/T/Dmo/GrXovFr2yWi20TRm4uTCvmeXF0O4ZOCeK0fAD+Xq/iiy0eaSfw9B/x6szl0ViDkIx6jr+AHrVbUrYWfxb1rUNW8K6hrWnzQRpEYdO+0KH2R8jdx2YcVoeCtKvk13xDqcGlXGj6PeR7bewmj8ti4H3vLHTv/31gdKYi18GjnwAuT/y9Sf0rM+J8FhdeNvC0OrsgsJGkE5kk2LtyvJbIx9c1F8P9dvPCvhcadqPhbxHLN5zybrfTiy4OPUj0qXxyJ9V13wtq58O6neWUYeS5tDZGSRQSPldOQDx0Jo6gdF4Y8P+BrTVftXhVrOW8jQ5NvftMVU8HI3muP8Aite3uqeI47DSGydDtTqM7D+E5H6gYP4113hzVtKGoNFpvgzUtFZ42Z530lYFIHOCV5J9BXMeG/CfifWp9Y1yTU5dBl1Sd45La505ZHaLsDvIwMHHH92gDofE/i2X/hUra9pUnlz3EMYV16xszBWx7jLflWba/DaNtA03UdCv57HXWSOeW+aZ380kbmDDOMZ9vrWbpPhbWLrwH4h8G3FvMklpc77C4liZI51DZwpPHJUnrxv9q04vEniyTRdP0fSPDd9a6tEscM9zeQgW6qowWD/xev8ALNAEOu3sOn/HHQrjVrm3tkTSj5sskgSME+cOrepxiluNRsdT+PWiT6be295CunOjPbyrIoYCY4JB69KsazoM2o/GLRpNQ05r6wTTTHPNJbb4S480/NxtByQcfSibw99g+NWkXGk6R9m09bBhJLbWuyJXIlHJUYzgr19qAPRiRg81l6Pq/wDast4vkCL7LOYs7927B69OKtX+nW2p2xt72LzIiQSu4jn6g1z2g+E4rW+ubi+s9rR3O+1bzScKDkHg/wA64q066rQUF7ut/wCraeXc7aMKDozdR+8rW/q6v59jqpJFijZ5GCqoJLMcAAd68S8Oa/eL8SYvE9z8mma5eS2KE54UbdmR252/k1ejfEW5v4fBN5DpNrcXV1dDyFW3iZ2VW+8flHHy55ridX+G/iCHwElrHrpuorBftEGnRaeoYSckgODuJ+ZvrxXacRJ8bXuEvvDUllvFwsk7RbBlgwMRBA9c1X8eePRrXgHT7XTubjVIzJdIvJiSP749cFlPPoD61qa7Hquuaj8P9QfTLwSRzFr1TbOPIO6LcX4+UZVjz2pdQ+GlvoemeJr/AE3zLue9t3S1to4eYQxyVXBJYngDgcD3oAwfF4J+BPhkDOftEQB/7Zy1fvfiBNN8KY7ZSx1ydjpkkZ++GAwzY91x+Le1L4k0fU5/g54bsoNOupLqG5iaWBYWLxgJJklQMjqK6Of4c2MXi6+8SxOWaSGRks1i+7MVwXBzyTycY6mgDkNI1i70T4By3OnyNDcPdNEsgPK7n5IPrjPNWfEvhi28H+DrLxJoU1zBq8TRNNcmZibjf97eCcYz7fXNS6P4R1TVPgnJo7Wstrf/AGhpY4bhDGSQ2cYbGMjOD0p+tXGu+MfDNn4Zh8N6jZXRaMXdzdRbIECdSr/xev8ALNAGb8S9Q1GPxpoGpaSrfbY9P+0oq89CzMPcbQcires69beJfFngPU7Q/LNMQ6d0cOmVP0/rW3q2kXa/FjwxLFaXE1na2bxyXAiJRflcYZugzkdfWucvPAl7oPxW0qfS7S4m0mS8W4UxRlktssN6tj7o4Bye2PQ0AdBofHx88SZ/58Y//QYawPihqF/qXiwRaO2R4dt1vZSD0cuv54BU/nXSadaXln8ZfEeqS2F0bNrBfLmWBispCRZVTjDH5TwPSsXwz4O8S6vbatqtxqsmiS6xNItzaz6cJGaPnglyCB8xGAOgH4AHp2j6lFrGjWmowfcuYVkA9Mjp+ByKu1w3wug1LS9JvtC1S2uIxp10y280kLIksZJ5QkYIyCeM/eFdzSGFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUHpRVe/vItO025vbjPlW0TSvjrtUEn+VAHknjzQdYuPF19e6BYnVInKfathKmCQRqAvctlQCcA4yM9RXJNputCaGHVdIubC0uJPKkuTBKfLG1iSFMYJ4BPHpXv2hWUtjotvHc4+1OpluSp4Mznc5+m4nHtioPFdiL7wtfp5XnSRwtLEmM7nUEge4OMEdwSO9d8MwrwpeyT0PGq5NhKtf28k73vvpcmtNf0u7uFt47tEuT0t5wYpf8Av2+Gx+FaWRXL2+m6qdDt47i50/xJbGJS0dzb+WZgRwwbLA8f3l57sKLJQWkTw/cTWN5CMy6TfksgHYYySi9g0ZKezYxXAeydTkZoqjpmpR6lbGRUaGWNzHPBJ96GQdVP55B6EEEcGr1ABRRRQAUUm4etZ154i0XT5PLv9XsbZ/7s1yiH8iaL2LhTnUdoK78jSoqnZavpupDOnaha3Y9YJlf+Rq3uHrRuKUZQdpKzFooooJCg9KKKAOL8VyW1/qh07UNdh0VLdIrm3Z5FjaVyXDHcWU7cDaQpB+brgisWXStIuEEc/jyxWIkeZ5V7JuZc5I+e4ZcEcHKmmfEnz7rxZawQ29tOtvZb8XD7QDI5HH/fquU+xXf/AEDdK/7/AH/165qmFo1Zqc43aLUpJWR7N4cvjqOlecZorlFmkijuIQAsyqxAYY47duMjI4IrWrmfh6zt4F09ZFVGiaWLahyoCSuox+AFdNXSQFFFFABRRRQAUUUUAFFFBPFACZFcv4z8ZW3hSwH3Zr6YYgt89T03H0Gfz7UvjLxjbeFbEYAnv5gRBbjv23H2z+fasTwZ4Ourm+/4SfxYTPqUx3wQuP8AUjsSPXpgdB/LOUnfliexhMJThT+t4v4Oi6zfZeXdh4N8HXVzff8ACTeLSZ9SmO+GFx/qQehI9cdB0H8vQGUEEMMjuK8t+OfjvU/Bvh+xttCkNvealI4NwFBMSIBuwT0YlhzjoD3r52j8feL4roTp4n1cShs5N5Iwz7qTj8KqMVFWRx4vF1cXU9pU+SWyXZH0d4i8PX3grVm8TeEkJtut5Yr93HfA/u/y+nTt/DfiSy8TaUl5Yvz0liJ+aJvQ/wCNcx8IfGd1448Di71fa19bytbzsECiXgENjpyDg9OQaz/Efh6+8E6q3ibwkhNr1vLFfu7e5A/u/wAvp0zadN3Wx6dOpDM4KhXdqq0jL+b+7Lz7P7z1DIorH8N+I7LxNpS3li/PSWIn5om9DWxkVqmmro8SpTnSm6dRWa6BRRRTMwooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiig9KAMyXxFokF6bSfWNPjuQ2wwPdIHDem0nOeelXkniklkiSVGkjx5iBgSmeRkds157e2+oS6L4x8q8sorP7XN5sVxbku37pM4k34XI4HyHB9anl1WXS7PXr7TkZZVhsRGGwTGHULk5IBIDE8kDjnFAjv84pP8muKGrazbW9xb3smpI73MMVo5Wze6kLAlkwreWv3c7mxwehqOy1zVruK2sJ7uW0eTVZrOS6ljhMyqkZcKdoMW8njgY44GaAO2M8P2jyDKnnMhkEZb5ioIBOOuMkc1JxXGS2V9c+MLGGDXZVlXTJ83kUMRaT98gAIKleOM4AzjtV2DXZZfhzbazczNDPNaRsXhjVzvfAG1ThckkdeBnmgZ0px3pc1wD61riWuqWv2q7guILuyjilu47dpoxNIqsGEWYyMZxxkZqxcarqtrqE2jHU5H/wCJlb2wvnij8xI5Ii+MBdhOV2glf4h1oA7KKeGbeIZUk8t9jhWB2sOx9D04oW4ga5a2WaMzoodogwLBSeCR6cdfaue8Gbo7fWRNdi7ZNUlDTkKC+FTk4AGfXAHSua0zWIj4ktfEJS7U6nePbSM9pKsYt2AWA7yuz7yIeD/y1NAHpmRSZFcEL/XJIYLldcmQXWtTWHlC3hKxRiWRQV+TO8BOpyPUGppNT1gqNPXVHSWPXRYm7EMfmPCYPN6FdobnGQvbp2oA7bj86UVwq6jrVrBe3cmryTrp+rxWXktBEqzRs8SksQoO7EvBUqOOlT2us6k91a3j3+VuNWlsW07y0wiKzqDnG/eAoYknGD0FAHZE4GTwB70yC4hurdJ7aWOaKRQySRsGVge4I4IritL1bV0OiXV5qj3SanPPC8LQxqsYVJGUqVUHP7sZyT1qrP4k1SXw7Z3FteX7XyaLHfT/AGeG2EeWUkPJ5mDglT8qDI59RQB6HSVzviLVLyDwfDe2l0LOeaS1UzlAwjEkiBjhsjGGNZVxqerxXNxpcOsPI0ep29uLtoYjIEkTLIQF2ZHY7fzoA7fg0yaeG2haa4lSKNRlnkYKo+pNcfqV5q1pdaha/wBuyQ/2Zp4vFlkhh3XLM0nDjbjaAgU7dpy3as3xBqN/qmj6201+1lFZx2oFn5aYk8xVdtxYbuS20YIwV70Aei8UfSuPvdfvra18QlrsRyWmpQQ2+5VyiOIeOnOdzcnnn2q3p15f319e3cmqNCtvfS2y6eI49rKnABJG/cwG4YbGD0oA6XilrivCmr67qVxp91eC4a1vrZpHE32ZURuCPKCMZCBkg7gT0zik8T69qFjd30mmz3xGniHzESK3+zoWIOHLnzGyD/B0zQB22O9GRXMeN4Hms9KEd3LbH+1bYboghPMgAPzKeR1Hb1zVKXWNTW7kuhqWVh1ePTxYeWmHjZlQsTjdvwS/BAwOlAHZSzRQQvLPIsccalnd2wqgDJJJ6DFKjrIgeNgysMhlOQRXBxeIdUZ9fh/tIN/ZFpcNbyrCubthn5/u4/dkBDt4LdeMZ0rK91DVNUuVfVzYx2SW2IxFGVnLoGLvuGcEnaNpXlaAOsyKTIrC126uhquk6da3rWK3jyeZPGiM52JkKu8MMnr0PArmrTxBql7odqI9Rvrm9Ed3Iz2MNsBIkc7IrsZcLtwBwvJ60Aeh5ozXAza/rEum2mqPPcRWn9lQXk/9ni3Yo7KWcyJL82zGMBOeD3ru43EkaOhyrAMD6igB9FFFABRRRQAUUUUAFFFFABRRRQAVj+Jx5uji16i7uYLdl/vI0qhx/wB8bq2KyNWG/VtDj64vGcj1Agl/qVNAGsO1LRmigDn7eWTw0ptLq3kk0xWJt7iBC/kITkRuo5AXOAwBG0DOMZNqaDTvEdnHcWd2jvExNveWsgLQv3wRkfVTkHoQRWris+70LTb2c3E9ogucY+0xZjlA9pFww/OgDFFzcxxf24IgLuzZrbU4YgcTxoT86jk5UHeo5OGZepyOoilSaJJYmDo4DKynIIIyDUNnZW+n2ogtI/LiBJxkkkk5JJPJJPUnJNUPDY8iwns1/wBXaXUsMQ/upuyq/RQwUewFAGxVbUNQttM0+e9vpRFbwIXd27AVZPQ1458c/EEiLZaBA21JB9onA/iGSEH0yCfwFRUlyxuelleBlj8XDDrRPf06mFr3jnxJ4+1j+yfDMdxDZsdqxQHa8i/3nfsPxA9c1f0/4EalcQh9U1iC1duSkURmI+pJXn869C+HnhKHwt4bhV4x9vuFEl1J3yf4c+g6frXWPIiRs7sAqjJJPAFYxpcy5p7nu4rP5YWTw2WJQgtL2u5eev8Aw/5Hg2rfBzX9DjN9o+oxXhhBfKEwSDHORk4/WtH4ffFq4W6h0rxTMZo3ISK9b7yEnADnuM9z+NVfiH8RLjxLe/8ACPeFi72ruEeSLO66b+6P9j+f0rP8TfCyfw54Di1iaYvexyA3US42Ro2AAPUg4yfc+lZbSvT6H0MV9awsKWctc9R2hpaS83bb+r+X0IGB6HNLXEfCnxBJr/gmD7S5e4snNtIx6sAAVP5ED8K7euyMuZXPzjFYeeFrzoT3i7BSZpa5nxxqs+l6Pbi33D7ZdLbSOnmblQqzHbsRmydu0EKSC2e1NtJXZzHIeKNCvvFHim6v7HRBqVrEq2sU5uVjB2Z3AZIzhmYZ9Qay/wDhAdW/6FJP/Bgn/wAVXYW3xA0+yt47Y6a9tHCgRI1PlqqgYAHmhOPwqw3xJ0oD5YWJ9Bd2x/QSk1KqQaumh2Yvw8gm0rS7nR7+1+w3EE7TR2xkD/unwQwIJBG7ePYiuwzXmuu+Okltf7RsLCRLnTw0scrLMQRjLRkpEy7WAwcsADg5G0EekjoKIzjL4XcLNC0UUVYgooooAKKKKACquoNdpp07adFHLdCMmJJW2qzY4BP1q1QelA4uzTPHvASWmp+OL248VySPrscn7mC5XCrjrj3Hp26jtj1PVIbm40m7g065W1u5IXSCdl3CJyMBiO+DXNeN/A48QRrqGmMLbWLcBoplO3zMdFJ9fQ/geKh8E+N21WRtH15fs2s25KMrrt87Hf2b1H41jD3Hys+hx6/tGn9co/ZSUo/y26r+7+XU4m48E+PtG0+zW+udL8TQWM21Fvrhl82KRlZ45PM4OHjj25z94+wHEWOtWsnjo67ZQeHLy+vWNl/Yf2dktQu1ApWZgE3E5HoefUV6RL4j8U/EjWr7wra6AdD06yuPLv7+admkXawKGIgAb8qGH3hwMnBrDsvgT4njvIoLjxFbQ2cUg/0q1Z1nZB0+XaAG7Z3ED0NbHzxd0vwj8SL/AE+A2Goaf4ft5rkXsn2e5L7sEBIl2ZHlBVB27sHdyccD2nAKkN83Y15n4a8ZazoPibTvAfiDw15coiCWl5YSF4WgQYDHdzwAATnOe3TNnxf4vvNT1H/hF/B+6W8lOye4Q8RDuAe2O57fWplJRV2deEwdTF1OSGiWrb2S7swLlv7J+KCxfD8maWU4urYf6kHPzDP93/0E9PSvY037V3gBsDIB71z3hDwfa+FNPCRATXkoBuLkjlj6D0Uf/XrpKinFxV2deaYuniJxjT1UFbme8vN/p1sFFFFankBRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFB6UUHpQBmS+HdEnvDdT6Pp8lyzbzM9qhct67sZzwOfapp7HTjLLeXVramQwmOWeSNcmLqVLH+H2PFY2l3d7qGoXd1Pqxt44L+S2Wx8uPYUTgZJG7cw+bhsYPSsFdd1C6Uqbi+nsdQ066lRryK3RWCrlTGIzvUcnh+elAHWQ6V4d+ztYW9hpnkzIJjbJDHtkXs5UDke/vVgaHpS2DWK6ZZizJy1sIF8sn1K4xXLR3smnyLeW6CWW38MCZE/vFeQP0quuv8AiC00a7uppJjG1ik0dxeC2/duzBSyLExymGLfN024zQI7K1tdLtrgQWUFrFLbxBRHCiq0UbEkDA6KSp9iRUv2G0Ww+w/ZofsmzZ5Hljy9vpt6Y9q53w9DLD421+Ka/e/Zbaz/AHsiorDPnHB2KB3z0zgiptKur7UdRu7mbVjbpBfyWy2Plx7Cq8DJI37mHzcNjB6UDNKx0vQ0sc6bY6cLWUrIPs8KBHKnKtwMHB5B7VKbPS9TtXka2tLuC8VWdtiyJOAPlJPRhjpXG+FJb+x0nw7G2oPPa39vKpt5I4wsW1CylSFDdsHcTn2o0a8vH0PRLC21T+y4otCS68xY0YuwAGDvBG1QMnGDz1FAjtrXTrGytTbWdnb28DE7ooolRDkYPAGOac1javZize2ha2UKqwmMFABjA29OMDH0rldJv9Y17U4N2pS6fGNKtLuSCGGM7pJC+7JZScYTGBj+dRRa/qDeIrBoLi+lsbzUJbU+fFbrCQqyf6sKfNyCnVuCATxxQM65dPtAiJ9lg2pIZVXyxhXyTvHocknPuaY0GmpdJG8dqs8spuEUqod3CgFwOpYKQM9cVxml3uvXcHh15tfn/wCJwJBLttoP3W1GceX8nBwuDu3D0FSx+INVCQxSXYaSNNTjkl8tB5rQMFRyMcHuQMDNAHYtYWRjkQ2sBSSQSupjGGcYIY+pBUHPtTV0vT01E36WFst6w2m4WJfMI9N2M1xr67rOkWYmnvW1J5tCl1ALLEiiOVAhwNij5fn6HJ461reGrvWJdQkTUvtMls9uksct39mD7iedohY/IRyCee2TQBtyW+m2q2wlitYVjk224ZVUK7ZGF9zkjA65qKbw/o90kCXOlWMyW6bIRJbowjX+6uRwPYVQ8Xc2ulD/AKi1p2/6aCq/gy3khOtGS7muAdUnAWRUG3nqNqg5OfpxwBQBq61o0WsaVHYEpHCJoZCpj3KVjkV9mPQ7cfj0qe30rTrW3S3tbC2ghjfzEjjhVVV/7wAGN3vWFpF/eXdvJq95rBijWa4R7DyoykaxlgBnAcsAoY88+lYM3iTW7a1vDFPftv0Sa/t5b6K2DblKYZBFn5cPnDjPA96AO8u9LsL+SJ7+xtrpoTuiaaFXKH1GRwaZd6Lpd/cJPfabZ3UyLtWSaBHYD0BIzisHVdavl1C8ttMu4Q6aXHPGJGQASNIV3ZPGSOmeM4rPutf1O1tfsSSaobx7+GBxcR2gniSRGYbSp8kklMDd03dDxkA6640TSry6F1d6ZZz3C4Amkt1ZxjpyRmnNpGnPqAv3sLVr0YxcmFfMGBgfNjNcut94jk063iZrhJheyRv5clp9rliC5XAJMW4E4YcHAzWlFql1c+Bpb2wuVN2sciLLeBI8SKxU7sfICCOo+U/SgDSTT9H0y6a8jtLGznuHCGYRIjSMx4Xd1JJxxS3eiaTf3Qub7TLK5nUYEs1ursB6ZIzXF6hd3t3arp9xdX8d7FqViwN5Fbl4g8nDAxZRhlSQCM8DPWr0mrarb3E+ktqTsy6vFZC/eKPzEjeAS9Auzdn5Qdv8Q4oEdfc2lte27W97BFcQv96OWMMrfUHiof7J077ct79gtftaDatx5K+YBjGA2M9OK5OLU9Xu7yy05NVeMNqdxaveRwxl540iLg4KlQc8ZAx8tE0V5YeMtSnOpzyzQaAj7njiAdg0vYL6jdx3PPGBQM6z+ytN8mOL7BbeXGjIieSuFVvvADHAPf1pJ9G0y7mhmudOtJpYFCxSSQKzRgdApIyB9K4y417WtGsVlkv31B7jRJL4ebDGoilUx8jaFyuJCcEnp1q1Hf8AiNLHUF3yk+VA1tNfPaLJuZ9rgCNimCvKbu5wc0COi13Sm1i0SBfsJVX3Fb2zFzG3BA+XcuDz1zVew8J6VbaPa2F5ZWt+LYsyvPArYZmLMQCCFySTgdKxzqeqvZyWltcX5vYr1I5kuVtFuRGYy2IyP3LN0PPbNaVprMy+D7++Rp7q6sUn3Lcoiu0kYJ2kRnaemMrwaBl+40PRCsUt3pmnkWiDy5JbdP3Kr0wSPlAxx6Vetrq3vLaOezninhkGUkicMrD2I4Nef63d6g3h3VbKfV3vo59Be9MwjjBjYcbRtXGxwT1BPBwa72whaCwgied52VADJIFDN9doA/SgCzRRRQAUUUUAFFFFABRRRQAUUUUAFcv4muNVtte0iTRrKO+dY7h5Ld5NhZRsHyseAct+VdRWTeceKtL/AOve4H6x0AZQ8dRwcanomq2W3h5JIAIgfZiRn6gU4fEbwtkBtSKt3X7PIcfkpFdPkYPNc74g8Y6foZMGftd43Atojkg/7R7fz9q0p051ZcsFdmFfEUsPD2lWVkJ/wsPwxtz/AGi2PX7LN/8AEVGfiN4Yb/U35lfsqwOpP/fQArBGreMrU/21cabG9k/3rRUAZE7Nx8w+pz9K6rQPFemeIIh9lmCXAGWgkIDD/Ee4rephKlOPNo15a29Tkw+ZUK0/Z6xl0Ula67r+rlA+Nbi6+TR/DeqXMjfcaaMRRP8ASQbgPxxVvwc17Jp95JqkccV019MXji6JyMLnJyQAASK6DNZXh/8A1N8fXUJ//QyK5D0jWPSvn/4tFU+Klu9zxEIoDz/d3HP9a+gD0ryT44eG5LuxtNetYy7Wv7m42jJEZOVP4En/AL6rGurwPpOGa8KWYxU3bmTj83t/kerGRI4y7sFVRkk8ACvD/iJ8Q7jxLef8I74W3yWsj+W8kYO66b+6P9j+f0rF1T4h654m8O6d4bs438xkWGdozl7o9APoRgn1Nen/AA5+HUPha1W/1FVm1aZeT1EAP8K+/qfw+sOTq+7HbqejRwNHIovFY20qmvJH0+0/6/HY+HXw6h8LWq3+oqs2rTL8zdRbg/wr7+p/ydj4hvGnw81vzsbTbEDPqSAP1xXTdBxXjXxj8ZQ3UK+GtLkEx3hrtozkZH3Y/rnBP0HvVy5adOyPLwP1rNs0hUm7u6bfRJO/y7IufAUMNJ1cn/VmePb6Z2nP9K9brkPhp4dfw34MtoLhNt1cE3E4x0ZsYH4AAV19VSVoJHLnWIhicxq1YbN/krfoFYPii0hvotNhuVLIb+P7rlSOG5BHIrermPGhm+z6StvcSW7PqUY8yMKWHyOf4gR29KVacYU5Tnsk2zyY3bsi2fCemfwPqCn21K4P6F6P+EUseM3Gon/t+lH8mqgE1ZPu69dP/wBdYID/ACjFLu1nvrLD3FrH/hXzv9q5U9XH/wAlR0+yq9/xI/EXhfTIfDd9Iv2x2WFiPNv55B+TOQa62vP/ABQupx+F9RkfXLyQLbsTGY4ApwOnEYOPxr0AV62AxWGxMW8OrJeVjGpGUfiFooor0TMKKKKACiiigAooooAD0rjPG3gca/GuoaY32XWLYBoplO3fjopPr6H8DxXZ0HpUyipKzOjDYmrhaqq0nZr+rPyOG8EeNjqkjaNryfZdZtztZWXb52Op/wB71H413G4YrjvG3gceII11DTGFtrFvhoplO3zMdFJ9fQ/geK49/G3ibW7OPwva2Tw60zGG5uPukKO/+yTzk9Mcj2z53DSR7TwFPMP3+Eaivtpv4fNf3fy2Nrxd4uu9T1L/AIRfwhmW9lOye5jPEQ7gHt7nt9a6Twh4PtfCmnhIgJryUA3FyRyx9B6KP/r0eEPB9r4U08JEBNeSgG4uSOWPoPRR/wDXrpKcYtvmlucmMxdONP6phNKa3fWT7vy7IKKKK1PICiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACg9KKD0oAz1sNJutQa/S1spr2NtjXKxI0iMBjBbGQR6Ultoek2d01xaaXZQTvndLFborHPXkDNcfbXl5p95fXVtqeVbxCLZrHYhVlkZFY5xu3cluuOOlTtqetQeG9V106pLM8NxcwxWxhiEaKs5jU9ASVAzy2PWgDq4dG0u3Nv8AZ9Ns4ja7vI2QKPK3fe24Hy57460lvomk2YmW00yzgE6lZRHbqvmA9Q2Bz+Ncwmq6xa211DfyaiiySW6WcrLaNcuznBQBGMYHAwzAfePXFZs11qOrW1rDe3l5by2fiJLZXdIPNAMYYFtoaPcCxAxx680CO40zT9IsvO/sa0srf5vLm+yxouWXs20dRuPB6ZqVtJ059RF+9hatejGLkwKZOBx82M1x1vNqGm3F5ewX7iF/EC2zWhiQoyySIjHON2fmyMHHHStzxJf3EN1ZWVjPfpcTiSQR2McBZlTGSTOdoALDgcmgZsR2NpCsIitYUFuCIQsYHlZGDt9M+1VJtC0M2oS40uw+zxO0oWS3TYjd3wRgHjrXM6ZqWta/Jo8S6q9h9o0uS4maCGJi0iyKoOGDAdeQPwxVUa7qWvaOhfUf7NU6D9ukMcaETOSytncDhRtzhcH5utAHeQx2zt9qt0iLTRqPOQDLoMleR1HJx9TVM6Volrqcd21jp8V9NITHMYUWWR8EnDYyWxuP51kzX8+mfDrTp7SRYZGgtIfPZQVhDlEMhHTChifwqtrNnefbtDtRrk00v9qnFwY4vMhH2aUlSAoQnGcZXoe9AHVR2NpEIBFawoLfPkhYwPKyMHbxxkZ6U3+zrH/nzt/4/wDlkv8AHy/b+I8n171xcuu60ZLTTI5rqeRru8he5tY7cTSCIjaMSYjyd3OBn5eBU8mpeIZNP09nkmif7LLJcixe0abcrYV2Eh2bCASdhzk4zQB14srUSRyC2iDxRmJG2DKocfKD6cDiq8Og6RbwywwaVZRRz/61Et0VZO/IA55rnPDrm+8bXuoRX08kM+l2cqo0aKHDeZgkbcj169WPbADNf1XU4NS8QG11n7HFpVhHdQ2/lRsJGw5IbcpODtA4IPPFAHYy28E6os8McgjdXQMoIVh0Iz0I7GobWPT/ALVdXFklt50j7LmWELuZ1GAHI6kA9D0rj9T8R6jHftc2Mt/5UN5bW0sTR24t0LmPchLHzi2JM5XjOO2anfU9WvdWt7KHUntVl1a5t2kjijZhEkRYKNykdR1waAOnGkaauoG+XT7UXjZBuPJXzCCP72M/rTbXQdJsZJJLHS7K2eRCjtDbohZT1BwORwOtVPC1/c32mTC+m8+e1vJ7VpdoUyCORlDEDgEgDpW3QBnQ+HtHt4pYrfSbGKOZdsiJbIquM5wQBzz60sehaTDYyWcWl2aWspzJbrboI3+q4wT9a0KKAM5vD+jPZJaSaTYtbI25YGtkKKfULjANWBp9oLH7ELWEWu3b5HljZj024xirNFAFC20TS7OLyrTTbO3j8wS7IrdFG8HIbAHUetSzaZY3EdwlxZW8qXJBnV4gwlIAA3Z+9wAOfQVaooAqw6bZW6QJBZwRLbZ8hUjCiLIIO3A4zk9PWibTrS5uFnuLO3lmRGRZJIwzKrDBUE9iOo71aooArmwtNyN9lh3RxmJCUGVQ4yo9uBxVaLw/o8FtNbQaTYxQT/62JLZAsn+8AMH8a0aKAM7/AIR/R/sP2L+ybH7IW3m3+zJ5Zb124xn3q3bWlvZ26wWcEdvCv3Y4lCqPoBxU1FAFGDRNLtoJ4LbTbOGG54njjgVVl4x8wA5/GrirtAAGABjHpTqKACiiigAooooAKKKKACiiigAooooAKyL/AJ8T6V7xXA/RK165jxTqyaHq2jX1xbzSwF5oneJQfLym7J9sIT9AaAJPF1rr1xp2PD86x4B8xAdsjj/Zbt+n1rlvA1zoOn3X2bUYGtdZDEGS8Ocn0Un7p+vJ9TXX2njPw7e2/nRatbxpjhrhjDn/AL7xmq+q2PhzxRbgTXlpJIBhJ4J03L9Dnkexrvo4mKpOjPRPqt/n3R42KwFSVdYqi7yXSWq+X8r8zoWZFjLOwCjkk8Ae9eW+KpdJ1XWY4/C1vNLqgkBaezO1Mjvx3H94Y+tXh4Q1WXbpt54iQ6PGQy4k+Zv9nB/qSBXUaefDXhu28i2u7C1U/eeS4QM59yTzWlOVLCPnjLmflovn/kYVqeJzKPs50/ZxW7dm7/3e3+L7ix4cg1iDSkTXp4prgHjYOQPQnufw/OneHebO7Prf3P8A6NYVUvfHHh2wQF9Sjl3fd+zgyBj6blyoP1Ip3g27N/4f+1mGSBZ7y6dY5RhgDcPjIrzpy55OXc9ylTVKCgm3bvqzfNQ3FtFdW8kFzGssMilHRxkMD1BFTUVJom07o8M8V/CnVtC1L+1fBryywo29IonImgPX5f7w/X2qjB8XvGOi/wCi6rbQTSLwftduySfoR/KvoAimPEsnEiKw7ZGawdGzvF2PqKfECqU1Tx9GNW2zej++zPn+4+IHjrxiDaaXA8aScOunQsuR05ckkfXIrrvAHwl/su6i1bxMI5bpCHhtQdyxt/eY929uQPevU1XaMKAoHQCnYojRV7ydzPE59J0XQwdJUove27+eggWnUUVufNgelc14yPy6N/2E4/8A0CSulrA8VWUV/DpkMzSKPt8ZBjcqwOG5BFYYim6tGVNbtNfeVF2kmNopx8MN/wAstc1ONf7v7lv1aMn9aP8AhGZf+g/qf/fFv/8AGa+I/wBXMX/NH73/AJHb9YiYvi3/AJFDVf8Ar2f+VdxXHeI/DMS+Gr97nUb+6CwsdskiKp+oRVyPrXYg19HlGAqYGnKNRp3fQ5qtRTegtFFFe2YhRRRQBn61runeHdP+26xc/ZrfeE37Gbk9BhQT2qLQ/E+j+JIpJNFvluREcOArKy/VWAP6VzvxVmS38MWc0zbY4tSgdzgnABJJ4rnLnxNC2r+JPEugCR7Z7CKzt5/LZBNcs2FwCASRn9KAPSLLxDpeoafdX1ldrLbWjukzqrfIUGWGMZOPbr2qJPFWiyabY38d8rWt/OttbSBGO+RiQFxjIOQeuMd6808PR33heTU9H1XS20tNS0l3iV7lJvNmijIdsr0LA5I9qyLDTr7SbLwiI2aTStS1G0uiW/5YThirD6MDn8KYj1u68ceG7PWxpFzq0Md7uClCG2qT2L42g/U1BqnxD8L6NqU1hqWqeTdQkCSP7PK20kAjkKR0NedXupXOlprGhxRRPq11rE04srmwM4vI3K7CpI24784p11rLaN8QPEIl8VL4eZ2t96rpv2oTYiGccfKFJ/HPtQB6HqHxC8L6Xdra3+qeTMyLIFNvKflYZByFwODVpNR0KPXrVYXh/tDVIfMhkjjJM8ajOd4GMY55NeeeIb3WF8X+Jbvw7FaXMT6VC04nRixiKdUAxyAScH9elbehWmmw6t4NNlqUc4i02dYsq26bIUkjAKjHzZBII460ilJrY6TW/HHh3w7fiy1nUPs9wUEgTyJH+UkgHKqR2p9/408PaZpltqF5qkKWt2MwOoZ/MHfAUE8d+OO9cnrNhqeo/F+WHR9X/smb+xVLzfZlm3L5vK7WOB1Bz14qCeysPh74k0CW/eb+yraxmg+1NGzhZmcsSQucZyQPrimSdyvinRXh0+WO/SSPUpPKtWRWYSP6cDj8cVVTx14bfXBpCarG18ZPKEYRsF+m3djbn8a8802GWKDwxK8DwR3PiKWeBHXaRG3TjtUlhq6aRr0On+FNUnvRJqJMujXOnFWjDOd8nmkAjA5GegPNAHoE3jjw3Brn9kTatCt7vCGMhsBv7pfG0H2zV2PxDpc2oX1jHdqbrT1D3MW1soCM56c8ema8lv7mGPwtq/hJ7eY+ILjVmkih8liZAZVYSBumNo9asavp18fGni/W9HLG700wbocZE0DxESLj1AAP4etAHrenaja6rp8N9YS+bbTrujfaV3D6EAirNcz8O+Ph7ow6f6OOPTk101IYUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFAFFdF0xb/7cum2gvMk/aBAvmZPU7sZqdLO3jgeGOCNYnLF0CDaxY5bI75JOanooAzo/D+jw2ctpFpVjHbTEGWFbZAkmOm5cYP40q6DpKWL2K6XZLZu29rcW6CNm4GSuME8DmtCigCubC0KlTawFWlExHljmQEEP/vZAOevApl9pVhqaImpWNteLGcos8KyBT7ZBq3RQBWg060tmjNtaQQmKPyozHGq7E67RgcDIHFV5tA0i4ggguNJsZYbcYhR7dGWIeigjA/D0rRooAhNpAbQ2rQRm3KbDEUGwrjGNvTHtVe20bTbNI1s9OtLcRSGRBFAqhXIwWGB1wSM1eooApT6Ppt3A0F1p9rPC0hlaOSFWUuerEEYzyeajm8P6PcxQxXOk2M0cAxEklsjCMewI4/CtGigCt9gtRdR3ItYftESeXHL5Y3In90HqB7VnN4YsZ/EFzql/b2920ywiJZrdWMBTdyCc8ncPTGK2qKAM+fQtKub77Zc6ZZzXPH7+S3Rn4xj5iM8YH5VYFhaLKsq2sIkWRpA4jGQ7DDNn1I4J9KsUUAVU02yjlSRLO3V0dpFYRAFXb7zA9icnJ71aoooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKo6ppx1G0VY5TBcROJYJgM+W46HHcEEgjuCRnmr1FAHL3B0tpt3inQYYrgdbtrUTxN/tCUKSg/39v49aZHpPgvUyfsr2Up7i2vCMfgrcV1WPTiq9zp9ne8XlpBcD0liVv5igDDHgTw0vz/ZHAPf7ZN/8XUUmneCtMOy5fT0bGNlxdbyfbazHP0rV/wCEX0Ddn+w9Nz6/ZI/8KvW1la2S7bO1ht19Iowo/SgDnoIo590PhbSY9NSUYk1FrQQbR38tCAzt6EgL3y3Q9DZWkVhZQ2tsmyKFAiLnOAP5/WpqWgAooooAKKKKACiiigAooooAD0rl/G1i97a6X++jhhiv1aWSRGdVBjkRSQrKfvsvOeOvQE11FMliSaJ4pUWSNwVZHGQwPUEd6mUVKLi9mC0dzjf+EW1iMYjvPOXtjVbyEfgAzYpf+Ec1w8FsD1Gv3n+Fbo8OWsX/AB53F9ZjskN2+xfYISVUewFL/Ybn7+samw9PNVf1Cg1yfUaXeX/gUv8AMvnf9I4/xB4Xv18P3f2zUI90kbRRQyT3NyXkYYVVLygBiSAOK9CiDiFBI25wo3HGMmqNroVjaXS3ISWe4XhJrmZ5mTPXaXJ25/2cVo1vSowpfDf5tv8AMltvcWiiithBRRRQAmKMe1LRQBHK6wwvLI21EUsxx0A5NUodc02ZdOaG7VxqQP2TAP73CFz24woJ5x6deKt3kTXFjPChAaSNlBPQEjFcla+CLiym06eC7jZrNiY4pFykAaCRHC/3t0jqxzjhcdqAOxzzRxXnUXhLUrCxFuwjjubu6VI2s0DJHG0ZSZjsijVflJYcfeC8k10+qaE9xqlhcRWFhewWsRjWC8cqsJ3KQ6fIwJAGO3QcigDe45oyMiuFg8Ia1DqF3ef8S/zHmjmRVYIsrJNv+bZCpXK8ZPmH3NOPhDVpLvTbl/sSzW8zyuwl3iMtcNKdgaIk8HGQYye5IoA7jjvUS3MTXclqrZmjjWR1weFYsFOeh5RvyrnPDPhi70S6v5LiYO1wCBIkinzPmJDsoiU7uerM596x08CaiNKntxHp8DOtqrLDJlboxb9zSb4mGW3g4KvyO/WgD0Dgn1qvBqFpcziK2mWVjCs6lOVZGJCsGHBBwe9cgng3UhrGlzyG1kt7NERzI6NLtAYMm7yAzDn+8i4420W3gSSOztVeCwS4s7aGGCSLPyOkxdnB2jaWGM+5IyRyQR3H0oxRS0DEx0paKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAqGa48lgPJlkz3Rc1NRQBU+2/wDTrcf9+6Ptv/Trcf8AfureKMUAVPtv/Trcf9+6Ptv/AE63H/fureKMUAVPtv8A063H/fuj7b/063H/AH7q3ijFAFT7b/063H/fuj7b/wBOtx/37q3ijFAFT7b/ANOtx/37o+2/9Otx/wB+6t4oxQBU+2/9Otx/37o+2/8ATrcf9+6t4oxQBU+2/wDTrcf9+6Ptv/Trcf8AfureKMUAVPtv/Trcf9+6Ptv/AE63H/fureKMUAVPtv8A063H/fuj7b/063H/AH7q3ijFAFT7b/063H/fuj7b/wBOtx/37q3ijFAFT7b/ANOtx/37o+2/9Otx/wB+6t4oxQBU+2/9Otx/37o+2/8ATrcf9+6t4oxQBU+2/wDTrcf9+6Ptv/Trcf8AfureKMUAVPtv/Trcf9+6Ptv/AE63H/fureKMUAVPtv8A063H/fuj7b/063H/AH7q3ijFAFT7b/063H/fuj7b/wBOtx/37q3ijFAFT7b/ANOtx/37o+2/9Otx/wB+6t4oxQBU+2/9Otx/37o+2/8ATrcf9+6t4oxQBU+2/wDTrcf9+6Ptv/Trcf8AfureKMUAVPtv/Trcf9+6Ptv/AE63H/fureKMUAVPtv8A063H/fuj7b/063H/AH7q3ijFAFT7b/063H/fuj7b/wBOtx/37q3iigCp9t/6dbj/AL90fbf+nW4/791ao/GgCr9t/wCnW4/790fbf+nW4/791a60uKAKn23/AKdbj/v3R9t/6dbj/v3VvFGKAKn23/p1uP8Av3R9t/6dbj/v3VvFGKAKn23/AKdbj/v3R9t/6dbj/v3VvFGKAKn23/p1uP8Av3R9t/6dbj/v3VvFGKAKn23/AKdbj/v3R9t/6dbj/v3VvFGKAKn23/p1uP8Av3R9t/6dbj/v3VvFFAFT7b/063H/AH7o+2/9Otx/37q1ketFAFX7b/063H/fuj7b/wBOtx/37q1ketLigCp9t/6dbj/v3R9t/wCnW4/791bxRigCp9t/6dbj/v3R9t/6dbj/AL91bxRigCp9t/6dbj/v3R9t/wCnW4/791bxRigCp9t/6dbj/v3R9t/6dbj/AL91bxRigCp9s/6drj/v3R9t/wCnW4/791bxRQBU+2/9O1x/37o+2/8ATtcf9+6tEjHX6VzNj470W/8AEsmiw3GZl4SX+CVh1VT6j9e1JtLc2p0KtVSdOLairu3RG59t/wCnW4/790fbf+nW4/791ayPWlxTMSp9t/6dbj/v3R9t/wCnW4/791bxRigCp9t/6dbj/v3R9t/6dbj/AL91bxRigCp9t/6dbj/v3S/bf+nW4/791axRigCOGXzVyY3TnGHGDUlJS0AFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRXN6t8QfDGh6nNp+qan5F1DjzI/s8rbcgEcqpHQitDSPEmka9YyXek30dzDGSHKggrj1UgEflQBqUVn6NrmneIdP+3aPcfaLfeU37GTkdRhgDVXXvF+h+GZIU1u++ytOCYx5LvuA6/dU+tAG1RXO6P498N6/qK2Ok6l9ouWUsE8iReAMnllArQ1fxDpWgtbDVrtbY3UnlQ5Vjub8AcdRyeKANKimSSxwxNJM6xxoCzOxwFA6kn0rnrT4h+FL7UlsLbWYWuGbaoZWVWPoGICk/Q0AdJRWdN4g0yDxBBoktzt1G4jMsUPlsdyjdzuxtH3W4J7UTa/psHiCDRJbnbqNxEZYofLY7kG7ndjaPut1PagDRoooyKACiq2oaha6Vp819fy+VbQLvkfaW2j1wATXO2vxN8H3l1HbQaynmSNtXzIJEGfdmUAfiaAOrorMv8AxFpemalZWF7deXc37bbZPLZvMOQOoBA6jqRTtQ1/TNL1GxsL+58q5v3KWyeWzeYQQMZAIHUdcUAaNFczqfxE8L6PqU1hqOp+TcwECSP7PK23IB6hSO4rT0vxJpGtaa9/pd9HcW0YJdlBBXAycqRkflQBp0VyC/FXwW7hRrQBJwM20wH5lK2tT8TaPpGjx6pf3qx2MpUJMitIGJGRjaCe1AGrRWXd+JdIsdZtNKu7xYr29G63jKN8/XHzYwOnQmnX/iHS9M1Oy0++uvKur5tlvH5bNvPHGQCB1HXFAGlRWNrni7QvDjRrrOox2zyfdj2s7keu1QTj3xVzStZ07XLFbzSbuO6gY43Ieh9COoPsaALtFIzKqlmIAAySe1Z+ieINL8RWb3WjXa3UKSGNmCsuGABxhgD3FAGjRWdBr+mXOv3OiQ3O7UbWMSTQ+Ww2qQpB3YwfvL0Per8kscMTSzOscaKWZ2OAoHUk9qAHUVzdp8Q/Cl9qQsLbWYWuGbaoZWVWPoGICk/Q1paz4h0rw9arc6zex2sTHapbJLH2ABJ/CgDSorK0TxPo3iOF5NFv47oIfnUAqy/VWAI/KpNK1/TNbku49MufOezl8mceWy7H54+YDPQ9KANGis3S/EGl61Jdppt15zWUhiuPkZdjDPHzAZ6HkVmf8LE8J/2p/Z/9twfaN+zo2zd/v42/rQB0tFZuq+IdL0T7L/ad0IRdyCKAhGfex6D5QcfjWlQAUUUUAFFFFABRRRQAUHpRRQB554m+It5o3iG50yw02CZbXYryTTFcsyh8AAHjDCsofFzVIv3k+j2hiXl/LuG3Y74yuM1p674Eg8d38urR3TacVYwRPEGP2gIdpdwGXPIIXBHyjOSCAvOar8Lrjw7Hb6mupjUo4Jh5ltNBKUcEEKCvn/NltoxwOck4zXpU5YP2PvR971Z4VWnmbxN6c1yX7Lb8z2cGlzWBa6tqhtY7hbK21O1dQUm0+cKzA9D5cmAP++yavWWt2N9ObdJGiugNxtrhDFLgd9rckf7QyPevNPdNGijNFABRRRQAUUUmQKAFoozRQAUUUUAFB6UUmQRwaAPJviL4v8VaZ4uOm6Bdw21tHbRysQq+YWYt3dHGPl9BXKDxx4+z8mrSZ/2zbkf+iK9G1zwfp3i3x5dtNPdwNa2MCSS2soHzl5CFIIIyF5xjow9RTV+D+kg/PrWsuv8AdMkA/URA/rXqUK2DjTSqRbfyPAxeGzOdZyozSj0u3+hqfDnXNT8QeE0vNbaF7tZ5ImaFdoO1sD8fpj6V1tcv4BsbfS/Db6fbhg1pe3MUodtzbhKxBP1Qo30IrqK82XK5Nx2PbpqUYJT1dtQoooqTQKKKKACiiigAooooAKTIx14oyMdeK8z8U+KL7xNqreF/B5LF+Lq7Q4UL3Absvqe/QVMpKKO3B4Opi6nLHRLVt7Jd2HinxRfeJtUbwt4PJYvxdXaHChe4DDovqe/QVZvvhPYDwylvpshj1WD94t4TjzH64bHQZ6Y6dfXO5pGk6L8PvDjyXFxDbxIN91eTkJvb/PQD+ZrIj+N3w+luhAviBck4DNbTKuf94pgD36VCp82sz0KmZvDuNLAe7CLvfrJ935eQeCfGk8t4fD3ihWt9WtzsV5Bjzvr/ALX8677cPWuO8V+E7LxppMV/pk8QvUTfa3kLgrIOoBYdR7jpVLwT40nlvD4e8UK1vq1udivIMed9f9r+dEW4vlkLEYenjKTxWFVmvjh281/d/I7+ik3D1pa1PDCiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigDyY61/Yfxw8QXH9m6hqO+1iTytPg811+SI7iMjA4xn3qbwHIL/wAVeL9SWNrEyjb/AGfKpSVevzMvY/1J9q07vwt4qs/iFqfiLw/Jo7JexJEEvmlJUBUB4QeqetXPDvg/UrTWNX1zXrm1l1PUo/K8u0DCKNcADluT91e3GKYip8Gj/wAW/X/r6k/pWf8AEm7+wePvCV19nnuvJeRvJt498j8rwq9zU/hnw14+8K6QNO0+Tw7JCJGk3TtOWyfoAKteI/C3ifV9R0DVreTSV1DTFZplkaQQs5IPy4BOOO+DQB0Gh+Jv7duJYv7E1jTvLUNv1C08pW56A5OTXnXjmzm8ceMdVtLRm8nw/p7Ou0/fm4Yr9T0/4DXfaV/wm323/idjQDa7G/48zMH3Y+X73GM9a5/QvhPp7W9xceMYItQ1O4uHleWC4lVQDzjjbnkk8jvQBS8Q+IpNZ+A/25JCJ5EiguCpwdwkUN+ePyNdRD4S0fW/AulaZe24NvHBE6eV8hDbeoI6ZyayNK+HEtto/iDQLyWH+xtQm82yETs0kBzkbgRzjanfnFRnwd4yvtMs9D1HWrGHS7UqPtFoJBcyovAB6KOPT9aAM7xPejRPjRolwLW9vxDpe3yrWLzZn/1wzjIz6k02LWP7b+Omi3J06/07bYOnlX8HlSHAlO4DJ4+bH4V1Fz4Su3+JWla/byQLYWNibYxsx8wnEgGBjGPnHOe1SX3ha9ufihp3iSOWAWdrZtA8ZZvMLHzOQMYx847+tAHRX+oWum2pnvZfKjBxu2lufoBXOaB4rhuL65gv70u0tzstF8ojKk4A4H866sj1rM0jR/7KlvX8/wA37VOZsbNuzPbqc1xVYV3Vg4P3ev8AV9f0O2jPDqjNVF72lv6s7efcofEH/kn2s/8AXsf5ivN7vxVompfCO08N2jNe6w0MUUdrHA5ZXDDoSMdOOCeuK9V8U6XPrfhe/wBNtHjSa6hMaGQkKD74Brl9T+H15e+B9Hsbe4gg1vSNjW90rHYGBGRuxnHAOcdRXacRia5bXNl4l+HNtfnN1CqJLzn5h5YI9+e9anj8g/ETwTj/AJ+n/wDQo61vEPhLUPEOn6TeNcwWev6Y4lSZMvEz8bhggHBIB6cdKgtPCeuap4ps9b8X3Vgx08H7Naaer+XuP8ZZ+c57ewoA5u01v+w/jB4lm/svUtR8xI12afb+ayfKvJGRgVJ4FZb2/wDGupKv2IzlgdPcFZI+GO517Hn881rSeFvFmn+OdW13QJNGZNQCrsvWlJCgDso9R61b8PeDdRsrjXNU1m6t5dU1ZChW3BEMYwcYJGT26jigDhPDviYWfwkvNMbQNVvA8U4+0x2u63G7PJkzxjr07VL4gg+zfADSI1uo7rNwr74ySBuMh28+mcfhW/o3hPx3ovhl9CtLjw+LaQOplczNIofrjgDPPpVnVfhvdP8ADO08M6ZdQtPDOJnmuCVVj8xPQHu3HHagDn/idpVzrXjzRLDT5Nl09gzQnOMsu9gPYkrjPaqX/CUnxR4q8FvdDZqFpcmG8jIxhwy/NjtnH55Feh6j4Vvrz4h6Lr0csC2unwNFKjO28khxwMYx8w6ntWbq/wAOJJ/iNYeJNKkghiWZZryJ2ILMDyy4BGSOxxyPc0AUdBYv8VPF99Jbm8uLOACCMYLkAfdXPGTjH4/WrvgW+0yTxdrVvZaPeaVesBNdwzSgpuJ4wB0PzE/jVzUfCetWHiy48QeEbuySa9QJdW2oB/LbAGGBXnPH86teEPCVxod3f6pq92t5q2ouGneNSqIBnCrnnHP6DigBvxL1s6L4IuzCT9pvP9FhC9SX4OP+A5rl/AVrN4J8cy+Gbt2Meo2UdzEWPWVV+cD8n/BRXR+LvBtz4s8RaSbxoDolnueeAyOskrH0wMY4Xvnk1nal8Lray1DTNQ8FwW9jdWdyJZBcXEpWRO453fTt1NADNE/5L74j/wCvCP8A9BhrS+K88kHw5v8AynKs7RoSpwcF1yP6VUu/C3iq0+IOpeI/D8mjlL2FIgl80pIAVAeFHXKetakmh614j8OajpXjI6aguFURNpokwpHO47+uCB0oAWHwno+teBdK0y9twbaKCJ08r5CG29QR0zk1z19Atx8ddHtbnM0VnppaISnd8w3/ADf73Tn2qY+D/GV9ptnomo61Yw6XalR9osw4uZUXgA8BRx6frWp4i8HXtxrOna54auobXU9Pi8hVugWilj5+Vsc/xHn3oAyJkWz/AGgLUWwEX2zTS04XjzD8/X1+4v5Vj+CfEn9hax4mjGjavqPm6k53ada+cEwzcMcjBrr9A8JamniqbxL4ou7afUGi8mGGzVhFCntu5JPv6mpfBnhe98O3mty30lvIuoXhniEJJKqST82QOee1AHA+H7xz4K8f3UKyW7yTOdsi7XTdu4I7Hkitz+zrM/s/bTBGR9h8/wC7/wAtM53fXPetfw/4Gns7XxLaaxJDJBrM7uot2JKK27rkDB+b3rN/4Qjxd/YP/CMf2vpv9i52fafLf7V5Wc7cfd/X8aAMLXJpJ/A3gKSZ2dzdRAlupxgCvZc1w3inwLeX2iaFYeHXtYv7IlV0+1swDBRx90E9RWnpg8c/2lB/bP8Awj32LP737J53mYx/Du460AdPRRRSGFFFFABRRRQAVna9eyaf4fvrq3wZ44W8kHvIRhB+LECtGsjxCPOj0+073F/Bj/tm3nH9IjQBe0+zj0/Tbaygz5VtEsSZ64UAD+VR6xYHVNEvrAMEN1byQhjyBuUjP61dooA5rStD0W+0i2utO09NJnK4LWIEEkLqSGQlcbtrAgg5GR0NJqA8mAWvipUurHcDFqca7GhbsXx/q2/6aLgZzwlX7jSrq3upbvRbhIXmbdNbTLuhlb+9xyjcYyMj1UmmNq88KNHrGj3UasCrPbp9rib2AQbz+KCgB+mXlxDdtpWqvvuY1MkFwRj7VEDjdjoHXIDAccgjAOBr1y9lpc954bEdv5ltLaXDyaXJcIVeNQTsDAjIXaSmDzsPPNbml3y6lpsF0iGMyL80bdY2BwyH3DAj8KALlJkUp6VznjXxVD4R8OS6hIBJM37u3iP8bkcZ9u5pNpK7NaNGpXqRpU1eTdkXNf8AFGj+GrTztYvUt8j5E5Z3+ijk/XpXn158d9LilIsdHurhAeGkkWPP4DNch4Y8Iax8TNYn1fWrqVLPfiS4PLMf7kY6AD16D3r1rT/hl4T02ARpo8NwR1e5zIzH154/IVgpVJ6x0R9XUwmT5X+6xd6tTqo6JeXT+uiOd0z446FdTLHqNndWO4j5+JFX645/SvRdO1Oy1ayS7025juYH+68bZH09j7V5z4+8E+B9N8Pzahdwf2ZIARC1o2DI+OFCHg/p9R1rynwh4wv/AAhq63VoWe0cgT2xPyyL3/4EB0P9Kn2koO0zeOS4PNMNLEZcpQa6S2fkn/wT6mzRVTTb+DVdNt76zcPBcRiRGHcGrddR8TKLi3GSs0Fc94v1y80fShHotp9u1e6ylnb84yBlnbHOxRycdeFHJFdDWBDtPxCvDNy66ZB9nz2Bll83H4iLP0WgR5jpfi3xt4eja2n0QybpDJNcPp8paaQ/eYvI8QPpwMAAAYAGNN/id4mKYh0Ql/8Ar0Rv0F1mvWc0UAeNaZ4m8bL4jOuT+H3+ylQuoQxWc0LTRDpIoYMpdBk8Pkgbeflx7BbXEV1bRXFs6yQzIHjdTkMpGQR+BqXPvzWF4OwNBdYf+PZb26W3x08sTuFx/s46dtuKAN6iiigAooooAKKKKACkJGOaWquoWMeo6fPZztIsc0ZRjG5VgCMcGgcbNpPY888U+KL7xNqreFvB5LFjturtDhVXuAey+p79BXV+H/D2m+C9BcIyKEUy3V1Jhd2BksfQDniuD0eW4+FfiKSx1WPztJv3BS9VPmB9Tj07r+I9/U5o7LWdLeGVYruyvIirLnckqMMEe4INY09W3Lc+hzS9CjChh/4L1Ul9t936duh4l8WLz/haOi+H4PBN9Hd280tw/kuDGZZUMaBfmHysPMJw2Mg5zwK8mh+GXiebxlceF47SH+1beDz3iNwgGzAIIbOM/MOPevfvF/w28D6JoFxqYsrnToopoZXNhcNGVIbbvA5xtDsxwM/LXidnqdnI9pPfw2VnavcmV762uJvtwVlCt++w2SAOhXGSfWtj549b+E+tW/gTwRLpni/VLeAxambWBeTsdlVjFwM8Fsk9Bu64Fdv408FQ+J7MTW5FvqkAzDcLxnHIVvbP5Vz/AIb+Eng+60LS76+0y7une3SVI9Rundoi58wggbRnLYPHYe9eg6jqNppWny3t/KsNvEuWc/yHuewqZJNWZ0YWtWoVozoP3un+XnfscX4K8azS3jeHfFANtq1uditJx53p/wAC/nXf5BryOzsLv4oeKRq88JsdItDsikUbZJcHOAR3z1PQdu9etImxFUZwowKim20ejnFGjSqxcFyzavKK1UX5P9Og+iiitTxQooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiig0Ac7P4ujgN+40nUZbbT5THc3MYiKptAZjtMgcgAg8Ka07LVre/vLi3tw5NuI2ZiMBg67hjv09a4TUNPhlj8SQXNprjXlzdyNbJbR3PkyZRApIH7kjcDnd2HPFW9UtNVa2122S2mW7ura0ceXCxjkVNolQMuBnG4bNwJzx60CO+yPWgkV5xHYSQaRdiCyS4tJ7uAtbnQ54YYAAd0gtt5eTJCggYGeeRRY6fMNKgTUNPnn0mLVpXltI7GRFaIx/IRbnc3lhznZz16cEUAd2dShXW49MKt5z27XAbA2hQwXHrnLVdzXFR6Bpmqa9YB9Gf+yk06dY4bm3ZVjYzL/C33TjJHcD0qaBL5fhXbJPZSXV4LGNJbeZHLHoG3KMM2BklRycY70DOuyKM9u9eZRaRNcWGq2iae5spr2wKxQaZLaRsvmr5hWJySMKPmPtn3q5f6MbS+vLaHSpToaalbTS2sFuWjeMxMH2xgfMA+wsqg9DwaAO2sNRi1BroQq4+yzmB9wHLAA5GO3NW8iuZ8E2yW1hqQgspbG3fUJXgimhaI7CFwQpAIHHA9KxY/C8cfw/lmt9LK6s6sznysTSATByD3JwowPyoA7TUtSh0u2SedXZHnihAQDIMjhFPJ6Zbmlv9Ri0/7N5yu32idYE2AHDN0z7cVweuLLrEmuXEelajLaSf2YojazlR5lSd2k2qwBOAeeP6Ul1psTW9w1tot3/YravbSJZrZupKBP3rCHAYKT1GOcHg5oEehyyvHJEqQSSq7bWZSuIxgnJyRkduMnmpsiuC02wmS/sXtLC4t9P/ALckmt4XgaPyofsrKSUIBRTJuwCB196r6JoE2nWfhuXT9Pe1vZIbhLuXySrZMTFfMP8Av7cZ/CmB6LmkyK858M21pbeKtCjg0y4sbxdLmW9ae3aMyygxZO4j94c7iWBI+brTvGVtdXGqXpg0xTcRrCbW4TTZp5ZMEElJlO2HBzwRzg9c0gO3sNTh1CW8SEMDaXBt5N2BlgqtkY7fMKu5FcJfWtwU1e2nsruaFtYjuriFIHYT2xSMHaQMPyvKjJwCMc0lzZaU1zZSf2DdHQUW5DWn9nyECcmPa/kYyFIDgHbwTnjrQB2H9oxf2yNN2v532fz93G3bu24z1zVwkVwFl4ca8ktF13TmuDFozIonQybH3kqMnPzhce9VZbGeXTLdtc0y9v5n0K3jsttu8jQ3W1t5OAfLfJQ7zjp14oA7621GK51G7s0VxJabN5IGDuGRirmRXNaElza+Ir+O/jmE01vbsJvLYxuVTa/z4253dicmuf1Xw2tzZ67dnTJHv31eLyZVibzDCTCr7T127S4OOOtAHomQap3mpRWV5ZQSq7NezGGMqBgEIz889MKa5G/0xtNbWLaw0hW06Wa1YQfZHkhXOfMdYkxvxhSVXr3rLtdK1iazgg0xWsmXXJGgn/s6SGOCI2hBdYmOVXcWxk43H3xQB6fkUgYHvXmd1pk0kGlR3OleTaW0E0E8MumTXqC43LmTajKzbgCRJz1PQmpdU0ySO3sTcxXGp3EOmpGi3ujyXCu4JPBRv3Mh4BYn054oGekZzVKfUooNWtLB1cy3SSOjADACbc5/76FZHieCa60XT/tFpJNbLcxPqFrGpkLx4OV2jJcB9pIGcgHrWY2iaZqms6KkOiuumRLdsYLi0ZI1Y+Xj92w+UHkgEDp0oA6o6lCutR6aQ3nPbtcBsDaFDKp565ywq7mvP9NtNRtWsgtvdRStpl3aQSGJz5cnmgxhjj5BtUYJwOOtUW0sto18mjaRd2n/ABIZoLyN7Z42uLk7dowR+8fh/nGc7upoEem5FULzVo7PUrGx8iaea8LbPK24RVxuZixHA3Dpk+gNc3qfh/TdPbS9ujeZpQkZry3t7Uyh38vCO8agl8c9jyQT61V0zQpXvvD81zpx3Qx3pie4h3NbqZA1urE52lVPA7c0wO+yKTI9a8307TJVtoFtdMu4L9NMnj1WZ4HT7RKUAA3EYlJfJBBOBWhN4Usk8P6JBDpCqZbi1+2osPLhQSTJxzyTkn8aQHc5FGa87k8NRwQ61NZ6U0dxbanCdPaOEhoo/wB0W8rA4XJkyBx1z0rurPULW/a4FpL5htpjBL8pG1wBkc9eo5HFAy1RRRQAUUUUAFFFFABWTqY8zXdGj/55zSz/AJRMn/tStauX8S6MmteIdJiN1cWkkUNw8U9tJsZWzGMZ9CM0AdRmiuUGleMbLm2160vx2S7t/KCj6qCT9c04SeOU5kXQn9ohKT+rCgDqaSuRXVvFb3bWqw6R9oQbmj35YD12+ZmpS3jp/uDQFHo4mB/QkU2mtxKSex1NZOgYH9oqMbVv5cAdOTk/qSfqTWWdB8U3/wDyEPEgtY2+/DZwjp/syYVh+tW/B9hHpmm3drC8kipfTDfM253O7lie5JzSGdAeleEfG2+mvvGGn6RH9yGBSq+ryMf6Ba93rwL4xxSaf8RbPUNhKSQRyKfUoxyP0H51hXvyH1PCqi8yV91F29T2vQ9Ig0PRLTTrZQI7aIIMdyOp/E5NQ+I/Emn+F9Hk1DU5dsY4RAfmlbsqjuf5dTxUOr+LdJ0XwyutXc4NtJGrwhT80xYZCqPU/p3xXiMaa/8AF7xcXcmG1i4OOY7WMnoPVjj6kjsBw51FFJR3MMtyuWNnPFYt8tOLbk31fVLzCNNf+L3i4vITDaxdeCY7WMnoPVjj6nHYDjvvHvgbTNP+FkltpluqHTMXCSH7znIDlj3yCfyH4dzoHh6x8M6RFp+lwiOJOWY/ekbuzHuT/wDW6VifE/UYtP8Ah3qZkYbrhBBGM/eLHH8sn8Kn2aUW5bnbLOKmKx9CjhFy0oySjFetrv1VzC+B+pyXfhG5sZG3fYrkiP2RhnH57j+Nem15V8CLN4vD2pXbghZ7kIvvtX/7KvVaul8CPLz9QWZ1uTa/42V/xCuf18iDX9AulX94s08bEHBaM28jFfoWRD9VFdBXO+Jv+Qrof/Xef/0llrU8Q4mH4xahNBHMnhq2AdQwzqbZweef3NSf8Lf1L/oWrX/waN/8Yrz2w/5Btr/1xX/0EVPX1scqwzinZ/efnE+IMdGbSa37HoNt8Sb7W01DT20iOwf+zrmeO4hvTKQyJxwY19fWvQtJgittFsoIECRRwIqKOgAUYFeHeHP+Qzdf9gi9/wDQBXuemHOk2f8A1wT/ANBFfP46jChXcIbaH2WUYqpisIqtXd3LVFFFcR6oUUUUAFFFFABQaKKAM7WNGs9d0yWx1KESwyD15U+oPYivOdO1LUfhnrQ0nW3e50O4fNvc7c+Vn/PK/iM9/VzWdrGjWeu6ZLY6lCJYZB68qfUHsRUSjfVbnp4LGxpJ0K65qUt11T7rs1+PU8/0H4YzXfiybXvFHiK48QWKTmfSLeS5Z0jVjncw6dMDC/Ke/pXQ2vwr8F2WpC+t9BgWVZPNVWkkaNW9RGWKA/hxXMabqeo/DLW10rW3e50O4fNvc4/1Wf5e6/iM9/SbvWLCy0htSuLmNbRY/M83OQQRxjHXPbHWiM01qTi8DOhOPs/ehL4Wuvl690eeJ4LvvA/ipdW0vxNLYeEYw091p88rSnzDn5U3A8MSD13Z9eKghg1H4q60Li6Elp4ctZPkj6GUg/qT3PYHAohg1H4q60Li6Elp4ctZPkj6GUg/qT3PYHAr1C1tIbG1itrOJYoIgFRFGAoqNaj8jvbjlMbLWu/ugv8A5L8gtbSGxtYraziWKCIBURRgKKsUUVseA227sKKKKBBRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFACEiqR1KJdZj0zZJ5z27XAbA27VZVI9c5Ydq4ebTNUsr+4a2srh7fQJ2u7JI1J+0rM4d0T1KoZEx/tCrOneE4pdS0qHXNOW6T+y5nuDLHuQXEkqO2SeN2S2O4xxQI7cSuboxmFwgXd52V2k5xt65z36Y96gvtSisJLNJVdjeXAt49gzhirNk89MKa4CHT9Ym0Nd1tdmc6DaRy5Rld9spMsYJ/jKZGOvIrSvNJ0nUIdNg0vQ5YbL+1I3uIZLF4Y2URP83lso4yQCcAHvmgZ3Hc4qOCVpoFkkheBmGTFJtLL7HaSPyJrH8L2R0+HUrVYGt7dL+T7PGUKqsZCkbR/dyT0rjjpbLoWkC8sJJZ4dNKC3utIlu4wxbOBtIMchx948YNAHoWoalBpscDzq7ie4jt12AHDO20E89Mmp5pWiKFIXm3OFOwqNgP8AEckcD259jXO+ILGbVPDmlQXFkxL3do1xbqC+xd6lwfYc59qzV0mWz1Ke2sbGSKyi123lgjiiIjRDChdlAGAu/dnHGaBHc59aoWOrwahoUeqxJIIJIjKEYDdtx6Zrg9LtILbxP4cSfTZ4NWF5d/bLqS3ZRMTFKc+YRiTPBGCcAdqn0bw61jpmgyWumPBdzW9wl44iKs2Y2IEh/wB7GM/hQB3dheR6jp1rewqyx3MKyoHAyAygjPvzRd39tZPbJdS+W11MIIhtJ3PgsBx04UnJ44rz37FcNZ6NYQQTQjWrCHTr9JYmieMwgF2wwBOYzKuRxnbya6PxhpkFx/Yc0mnLdQ2eoK0qrbeaUiMbqcKATjds4A7A9qAOn/i5qOdzHBI6RPMwUkRRkBnOOgJIGfqQPeuFGnSf24S2nXH9rf2u0rXv2diptMk7fNxjb5eF2ZzntVAaXdDSdeVtLvAl1p1wukRNEzGCIlsxEY+RmJUgHkjavVaAO803Q7DT5zc20UonZPL3TXDzFFznYu9jtXPYccVpVxi2lqnia7l1vSbi6uJJ4GsLlLR5BFGFXgOBiPa4cnJGQe9ddb3CXCM0QkAVyh8yJkOQcH7wGR79DQMlxQRS0UAJigClooATHpRilooATHqKMfnS0UAJijFLRQAmPb6UYpaKAEo5paKAEA4oxS0UAJijFLRQAmKbHCkW7ykVNzFjtGMk9Sfen0UAFFFFABRRRQAUUUUAFZN7x4q0r/rhcf8AtOtasi+/5GfSv+uVx/JKALt/qNnplo1zf3CQRL1Zz19h6n2FcTP4l1vxXM1p4Tt2trUErJey/Lj8f4fwyfpXS+IPDFl4ihVbwMssefKmQ/Mn9CK5SK717wEEt72H+0tHU4SWMYaMf0+h4969PCwpOF461Oie3y7v1Pn8xqYhVFGo3Gj1lHV/Pql5pMsP8NBDaLPZ6rcLqiMX+0E4DH045H1yT/KlsvGWo6FdJp/jK1ZM8JeIuQwHcgcH8Ofatafx9oMeli8W7EhbpAo/eZ9CO31PFYDW3iDx8ym6X+y9HDBlTGWk9+cZ+vA+tbwdSqn9cXu93o16f5bHHVVChJf2bL33b3VrFr+90Xre56BbXcF5bpPazJNE4yrocgis/wAP/wDHven1v7j/ANGEf0p+iaFZ6BZfZtPQgMdzuzZZz6n/AOtTPDpzY3J9b+6/9HuK8ifKpPk2Pp6TqOCdRWl1tsax6VxPxN8HP4r8M5tI86hZEywDu4/iT8cDHuK7ag9KylFSVmd2FxNTC1416XxRdz5Nhkn1G9sNJ1vUZLS0tn8kNOCRbKWyePz/AE6Dp9LeFNM0fSNBgtvDzRSWg+YyxuGMjd2Yjqf/ANVY/i/4ZaR4rZrkZsdQI/4+YVzv/wB9eN36H3rzib4LeKrCcnTL60kToHSZomx7jH9TXNGMqb2ufb4vGYHOqEYuv7FrVxa0v3vp+fyPadY8QaVoNo0+rX0NsgGQHb5m+i9T+ArwfxT4i1L4oeKLbTNGt3Foj4t4j1P96Ruw4/IfjWtp/wADdburgSa1qdtAhPzGMtK5/PA/WvVPC/g3SfCVoYtKg/eOB5txIcySY9T6ew4qmp1NHojhpVcsya9WhP21bppaK8/6b+Ra8NaFD4c8PWel2wytumGb+8x5ZvxJNa1FFdCVlZHyFSpKpNzm7t6sK53xLzquif8AXa4P/ktJXRVzviT/AJC2if8AXS4/9J5KZB4XYf8AINtf+uK/+gip6r6ef+Jba/8AXFf5CrFfoMPgR+M1f4kvVmn4aG7XLkeuk3v/AKAK9x0o50eyP/TBP/QRXh/hjjXrjOP+QTed/wDYWvb9I/5Atj/17x/+givkc0/3p/L8j9H4e/5F8fV/mXKKKK8w98KKKKACjNc14312/wDD2iQ3OlJbPcTXUduouVYp8+Rn5SDVfQvE2pjWNR0nxVFZQ3NjbrdefZl/KeI9ThuRigDrcijIriPDHji51zQdYubm2jt7yxQzwxbTh4WTfEx5ycgc4NZumfE2fVNB0q4jht0v5tVgsbyFgxVUkyQ6c9wOMk9+tAHpOaDXASeMvENzf3tzpdlpbaTZ3rWhjuLnyri4KHDFGYhB1Bwar6h421z/AISvVNNsL3w1Yw2TRiM6tLJE8odN3GGwcfTuKAO21jRrPXNMlsdRhEsUg/FT6g9iK81s/hprE2rDSNVvpH8P2knnRYf/AFm7sB2PXPYZyOtbmp+JvFUfiLUdP0qPRjHptmlzObrzBuyuWCkHHrjP41e0/wAX3ep6v4cSG2ijs9Ws5LiUOCXRlHRTnGMkdRUSpqTuz0cJmeJwkJQpPR99bPuuzOptbWGxtYra0iWKCIBURRgKKsZrgfFHjHWNM8YnSNOuNCtIlshcmbVpHjDEsQVBBxnjOMVHa+Oda1y20W30Gws4tR1C3kuJTes/kxqjFeNvJyQcVZ57bbuz0KiuBtfHl/dwaJm0ghmu9TfT7xCCwUr1KHI/XNGh+Mta1zxB5cP9hw2i3TwtaS3DC9CKSC+3p+GKBHe5FLmvObnx7rsVvd65Dp1i3h6zvfsrqXf7SwDhC4/hxk9OtW/+FgSQeOdX0C7ihRLePNlNtPzv5e/Y3OCTzjGOmOtAHd5FFY/hTVZ9c8K2GpXaxpNcx73WIHaDk9Mk+lbFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAJijFLRQAmOKMe1LRQAgFGKWigBMUmOOmKdRQBmW2gWFrqP26OOVrj5irS3EkgTccttVmKrnvtArSxS0UAVDplq2qrqLRs10kZiR2kYhFPJwpOATgZIGTVrFLRQAmP8+lGKWigBMe3FGKWigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAK5bxjHqUdxpF7pF1FbywXRjYzrmIiRCFD4BIBfYOPWupqG4toru2kt7mJZYZVKvG4yrAjkEelAHMjWfFtr8l34ahu8fent7oIp+ifMx/SlbxdMEKXfhjWCSMMsVq0gP4kAGtFdP1bTht0y8ju7cfdtr8tuX2Ewycf7yufen/wBpatDxcaBJIf8Apzuo3H/kQx/yoA46B9Dg1Q38fgrxAJOojNhlEPqF3YBre/4S68lGLPwzqhbstxA0Q/PaRWp/bF9/0Leqf9/LX/49SHUNYm/49dD8o+t9dog/8h+ZVzqTqW53cxpUKVFNU4pX7aGRPrHi6eF2j0Sy0qONS7T3t0JECgZJ+XBXj1FaHg2C7g8L27ahI0lxPJLcuzLtP7yRnHHGOGHHapBo1zfyI+vXSXEaEMtnAhSHIOQWySZCD64X/ZzzWyB0qDYWiiigAooooAKKKKACiiigArnp4v7R8cPBIxCafpyyRqOm+dpE3fULCQP9810J6Vz2oGbSPEp1f7NcXNpc2qW1wbaMyPCY2dkbYPmYHzHB2gkEDjk4AONh+DdzBCkUfiRQiAKM2A6Af9dKefg/d4/5GRf/AAA/+2V2f/CaaAvE2oC3P925ieEj8HUU4+NPDYGf7bsj7CYE12LHYlfbZ5jynAt3dJHO+G/hqdD1v7feasL9PIeDyfsvlgh8Z53n0rovCLufDcMMrtIbSaezV26usMzxKT7kIDUbeMNMcYsFvL+Rh8qWtnIwY+m/bsH1ZgPerPhuxuNP0VIrxVW4lmmuZUVshGlleUqD3wXI/CuepUnVlzTd2dtGhToQ9nSVka1FFFZmwUGiigDm/G+g3/iDRIbbSXtkuIbqO4U3LME+TJx8oJrAufBnibU4NXutRvdOTUtThjsyLfzBFDAGy+MgkkjsfU816HRQBwMPw9vNJ1OSXSdVuLq2udPls511K4Lso2/u9m1egPr0HSqjfDK5A8MXUU9ul9pckIvMM2yZEbdkcZLDoM4r0O8ma3sZ5kALRxswB6ZAzXJad41mvptDtzbxpPdFxqC5/wBQwid1A543bCRn+EH60wMfVfhvql9c3dhFcaadHu717zzJY3Nzbs5G4IB8pHGMk0++8Da2nijUtQ0+y8NXttdmLyxq0TyPEEQLxhcDPfnsK6C18d6Vc28s+yVYoiyuyvFKoKxmTG6N2GSFOBntg4yK1J9ZMN3bWsdhdT3E8fmskfljyUyAS5ZgOrdFyfakBx2vfDSTxJrOpahqL2yyz2cSWrxu/wC6mUYJIx90njucV0Nlo1/Hf6HcXVtpqfYbWSCUwtJlCQAPLGFXadozkcdqWDxnp8+ozWSpIZYZkhO2WKQZd9g+4524PUNg+1EnjPT4720tWimD3UrxIWaNQCspiP3nBb5h0UMQOSBQIr3fg9NR8fPrOpW1jd2B08Wywzx+YwkEm7dtK4xjPOc0mveHNUbWrDV/C0tjDdWkDWpgvEYRNGcEY2cjBFXtF8Xabrtzcw2TkG3XexZkbcuSN2FYleR0YKfas8+OoIhPdXlpPbWfk27W4nMaPMZTJhtxfYFwgPzEEc5oGZ9p4D1C0h0PN3BNNaam+oXjncoYt1CDB/XFMuvBviDVtct5tUfQ0gt7tbgXtpbsl2wVtwTPQD8T681ux+NtNmurCCJXka/jDw7ZYcknOBsL7+xG4Lt98VVs/GskrWk1zpVxDa3FnDcMVKOYDJIUBY7uVPBGAT1JAoAx7rwDr0sN3ocOoWK+H7u8+1OzIxuVBcMUH8PUdatal8PpdWu/E0l1LAv9pvBLYyKSWgkiQjLcccnt2rvKKAMfwrpM+h+FtP027eN5raII7RklSc9s81sUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRUM1sk7AuXBH91sUATUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUVV+wR/35f++6PsEf9+X/AL7oAtUVV+wR/wB+X/vuj7BH/fl/77oAtUVV+wR/35f++6PsEf8Afl/77oAtUVV+wR/35f8Avuj7BH/fl/77oAtUmKrfYI/78v8A33R9gj/vy/8AfdAFrFJiq32CP+/L/wB90fYI/wC/L/33QBZxRVb7BH/fl/77o+wR/wB+X/vugC1RVX7BH/fl/wC+6PsEf9+X/vugC1RVX7BH/fl/77o+wR/35f8AvugC1RVX7BH/AH5f++6PsEf9+X/vugCxLGs0LxSDKOpVh6g1QbQdNZYlNnHiLBXGQTiNohuPVvkYrznrU/2CP+/L/wB90fYI/wC/L/33QBkyeELLy4oLcutv9ojnnWeWSdpfL5RQzudoyB65HFaV5pFrf3UNxOsqzQghHhuJIjgkEg7GG4ZA4PFSfYI/78v/AH3R9gj/AL8v/fdAGavhHR1EoFvN+8x/y9S/u8PvGz5v3eG5+XFOTwppMa26LBMI7c5RPtcpVjvL/ON2H+Y5+bNaH2CP+/L/AN90fYI/78v/AH3QBHZaRaad5v2RZVWU8xvPI6L/ALqMSqjnoAKpReEdHt4ZIobeZVk8sEi6l3IEzsCNuygG44CkYBxWj9gj/vy/990fYI/78v8A33QBT/4RvTvt0V4Y5zNCVKk3cpDFQQpZd2GIz1YE0sXhrS4bfyI7c+XsWPBlc4VXLqBk8AMT/LpxVv7BH/fl/wC+6PsEf9+X/vugCzilqr9gj/vy/wDfdH2CP+/L/wB90AWqKq/YI/78v/fdH2CL+/L/AN90AWqKjhhWFNqliM5+Y5qSgAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKTIoyKAFooyKTcPWgBaKMikyKAFopMj1oyD3oAWijIpMigBaKM0ZFABRRmjIoAKKTIzjvRkUALRRmkyPWgBaKMikyKAFopMg0uaACikyKMigBaKMg9DRmgAoozRmgAoozSZFAC0UZFJuHrQAtFJketLmgAoozSbgOpoAWijIozQAUUZoyKACiiigAooooAKM0VyfimLWL/xDpel6Pqv9nRyW1zczjyyfO2NAqruBDL/rCcg0AdZRmuIPhTXiPl1PY/8Az0/tG8b/AMdMmK0/B7alHHqtjrOpf2lNY3/kpP5IjyphikAxk9DIeSSaAOkooooAKKKKACiiigAooooAKKKKACiig9KAEyKXNec/F+HWrvR9MtPDq3EtzJdl3ht2YMyBDknBHyglfxIryqfw/wDEOC2eY6bqaBBncruSvvjeT+lK5xVsTOnU5FTbXdH01kUtUNJ1C2v7CF7e8guiEXe8MocZxzyPfNX6Z2hRRRQAUUUdKADpSbhTZJUiiaSRwiKpZmPAAHevOL/UtZ8f30tr4VuGsdKszk32CPtEo5UD2z/j6ColLlOzC4SWIbbajFbyey/4L6I9J3ClrkPCfiyW+uZNF1+P7JrVrw6HAEw/vr6+vH1Ht124U4yUldGWIw9TD1PZ1F/k10a8mLRRSE8GqMBc0m4GsXxN4ms/DOlm5usySP8ALDAv35W9B/jXECXxpo7Dxben7RDN/wAfOlqOYYexA9R+nU9SBEppOx6OGy+piIc7kop6Rv8AafZf57Xsup6lmis/RtXs9c0yK/0+YSxSdcdVPdT6EVoZq9HscE4ShJxmrNBRRSE8GgkMijcK4XxH4ivdY1VvDPhFs3TD/S70cpbL0IB/ve/9ah0HXb7wrq0XhzxbL5kbcWOpMPlkXsrHsR79PpzWftFex6iyys6XPdc1r8v2uXvb9N7a7HoNFJkUtaHlhRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUGgDy+x1Kx0v47eIpdTvbezjayjVXuJVjUnZCcZJHPWl8OzWerfGzxI9vLDe2c+nou+NhJHINsIIyOD3H51YtfDi3/xn1251fRvtOnvax+TLc2u+FnCRD5SwwTwRx6Gn+HNDfS/jJrktrpbWemNZosDx2/lwlsREhSAFzkN075piOVudTvfAsWveDbZZJXvZFOlMOTsl+UjP04HuDV3x/wCHYfDXwo0fS48Fl1CNp3H/AC0kMcm4/wCewFdD4r0y8ufij4Xu7eynmtoN3mzJEWSPnjcQMD8aX4vWF5qHhWyj06zuLyRNQjkaO3iaRgoSTJwOe4oAxfGWhWPw9bStb8KrLYubxYZ4hM7rMpBOGDE9lI/GpPEOi2Gv/G+2sNWt/tFs2m7mjLsuSN2OVIPapfEr6l8RJ9M0uz0DVNOtIbpZ7m51KDyQoAIwBk7uCfxxUniDwqviH4vwf2ppk9zpZsMNMFdYw43YG9e/TjNACeF0TQPixqHh7RJXbSfsnmtbmUutvJx0JJI6nj/a9qoeDvD1r8RNO1PXPEklxPdyXbxWzCZlFsoVSCoBxnnuMcVp/D/Sbrwh4m1bQrnTZWtpW8211Nbc7XXH3GfkdOgJ6hvUVU8NSa18O7XUdEk8O6hqSPctNZXFnH5kbZUABz/CPlGfqaAMmLxjrCfBO4mN3J9sivv7PW63fPs2hs59cHGa0tT8PaB4XksH0vxCmi67EEmmmuZnf7SpzncvTBI7Ckh+HWrH4QzaW6r/AGpLdfbvIZhwcBdmemdo+maXxCdX8d6XZaLb+GL3T7sun2y9vYAscYXrsf8AiGeaAE8dw6VqHxQ8Opr7wjTZbJjM8kxjTHzkfPkYGQMc11nhXw/4LsdQmu/CRtZLhY/Lle3vWn2qxzgguQPu/pXNeNdOaD4g6Ddy6De6xplpZmOaOCzNwG++ACCMd1PNdL4V1LTZdQlttM8I6hoW6Pe8s2mLbJJg8DKnk8n9aAPNPhP4om0HUI7HUdyaVqkpjikb7sc6gfzBAP8AwE9jXY/CTj/hJB/1Em/rWT4S8Dz6z8KrzStUtJrG9F681s1xGUZGCJg884OCPzrW+D2lalpWmarHq9nc2sz3QI8+Mrv+Xkgnr9RQBT+KEFhc+NvC0OsMi2MjSCcySeWu3K5y2Rj65qDTU0vSPippdl4CuhLYzwsb+GC4M0KjBwc5ODwO9bPjrR59V8e+FmOnSXllHI4uT5BkjUEj7/BA6HrXaWGj6dpYYaZp9rZhzlhbwrHn64AoA8f8MaT4P1HWvET+L5LSOVNRcQfaL0wErubOBuXPStb4jabo+lfCqGLw2IxYPfJIhimMqsSGyQxJz09ao6FDBpGsa8fEHgjUtV+0X7yQSppImAXc3ILY657VreOo5de+GUUeh+H9QtBHeKFsWsjHIigHJ2LnC80AUPGWh6b4Ej0bVfCSyWWoyXaxmFJ3b7QhUkghicjIUcf3q1PEUZ8UfFW28N6jLL/ZMNp9okto5Combn7xBzjpVHU/Bsfg3xfo2ueH9GlvLHIjurWON53hP/PVc5IOOfYj3rW8QWWpaN8QbTxbY6bc6lZPbC3uILZMzJnoQh5Pbj25xQBT0ayj0T4l3vhK33y6HeWJl+xzOXWMnqBnnnn865u8GuaBJffDmxzKuo3Cmznc/dgfO7P1xg/RvWuq0qLUr7xvf+NL3Sb2ys4LMw29rJETcTkf9Mxkjv8AmKwW8Ha7r+j6j4vu0uLbxB9pFxY2xUho0jP3NpAOT2GP4R6mgC/8TNGtfD/w10bTbEYig1CJd2OXPlyZY+5PNSeLdIsdc+NujadqsHn2sumktHuZc484jlSCOQPypfHT6p4p+G+kSppF+t99ujNxa/ZnDoQjhjtxnbyCD05qfxUb3Tvi9petxaPqeoWdvp/lubG1MpDEyjHYfxDv3oAZpMA8I/F2Lw9pUsi6Vf2ZmFrJIXWJwHOVyc/wH86wPDGk+D9R1vxE/i+S0jlTUXEH2m9MBK7mzgblz0rqdFstT8R/EweKLrS7nS7C0tfIgS8XZLKxzzt7D5j+nvXPaFDBpOsa8fEHgjUtV+0X7yQSppImAXc3ILY657UAen+HdM0bS9Gji8NiMWDkyIYpjKrZ6kMSc/nS63q50eO2cQ+aJ51h+9t25zz0pPDt5b3ujo1ppVzpMKMUS1ubcQMoHoo4ArK8R+FI7uSK40+z33ElwrXDeaRlMHPBbH5VyYqVWNJukrv+vJnXhI0Z1Uqzsv681Y6jOR/k15to0kfhL4ta5p8zCKy1O3N/FxwCuWb+cnT0FegafplrpcBhsovKjLbyu4tz+J9q4D4v+Hb/AFG0sNR0WC4mu4WeCRbdCzmNxyTjsOR/wKumDk172/8AXoc0uVN8u39epj6DbyX/AMPfGfie6UibVVm2bucIoPH5sR+FVPFAY/Afw1sJ3G7QAg/7MuK7/UNDk034TXGjWcLzTR6aYgkalmd9vOAOSSSa4/X9G1Of4NeHLKHTruS7hu42kgWBi6DbLyVxkdR1qiSjrvimTXPhHdWOp5j1fTbmKC6jbhmw2A36YPuPcVf8dQWFzrvgmHWDGtg8O2dpJPLXbhOrZGPzpfix4Gurq5XXPD9rNNJPiO8t7aMszdw+0cnoM/QH1qz42sLltX8I3Mmh3mp2tpDm6ggtDMcfJ8pXGM8dDQB0Hh7Q/Aun30l94XNnLeQRMWNtftMVUjnI3kfnXGaDp2j+JfDN54n8a38kV5cXbRW9007qLUgZUKAccHPX0rtPDuo6TPqD2mneDNR0QzxsHnl0tbZCPQsDXN6EdW8FaPe+Hr3wxfas6zs9lPBB5sEmRgFz/Bz/ADoA6jw1rCWHgGa8vNah1ePT0fddxZ+cKoIUk9W5A9+O9cR8MtS1DT/GGdYO1PE0L3cRz1kDtj6ZAb81p1x4X1zSfhpYeGYbSeS81e+Et2YYy626ZXhivA5CZOccNVjxP4L8SaTp+l6lbavJrUmiyxi0tINOWNlTIGAUJJ+6vB96ALXjbS7PWvjB4e0/UofPtZrR/Mj3ld2PMI5HPUCnaTbw+FvjJDoPh15F0y6sjLcWvml1hcBueSSD8qf990/xToH/AAlHxH8Ove6VdT6VLZn7QTFIqx8OwVmGNpyRwcUvg7RZvBfj7UNMGmSzadegSWuoJAz+WOvlu4HHpyf4Qe9AHplFFFIYUUUHpQAhIxXkfxm8RWXl2uk6epn1e2nWZ5YX2Napjld/UFuPl9ME9q6j4oeKb/wp4Wjn0mINdXlwLZJOCYcozFwDgEgJwDxk556V8+/bpAxaW1u2d2LO74dmY8liQxySc5PfNYVqjirLc6aFJSfNLYtHxD4gZNhudWK/3TqT4/LfXtXwi1/Tr3wvDpSRra6paLuuoD96XJ/1wP8AEDwCeoPB7V4V/aH/AE7XP/fs1La6reWd7De6bDeW93btuimQKCp/FuQe4PXpXNTqyi9djqq0Yzj7u/8AXkfWeRRXP+CNfn8UeDrDV7u2W2nnDiWNWyAyOyEj2JXOOcZxk9a6CvQPM2CiikJFAC5FGa4rxh8S9G8Ju1s5a9vwM/ZoT9303N0H8/avObn42eJbycjTdPs4U7KsbSMB7nOP0rKVWEXY9zB5Dj8ZD2kIWj3bt/wfwPesilzXhmnfHPWLeYJrWl206A4byd0Tr+BJB+nFep+F/GGkeLLMzaXcZkTHmwPxJH9R6e44pxqxlojPHZLjsDHnrQ93utV/wPmdBRRmitDxwqC8vbews5Lq7k8uGMZZiCfoABySTwAOSeBUks0cELyzSLHGilmdjgKAMkk/SsOxhk128i1S+jZLOI7rC2dcFj/z3cf3v7q/wg5PzHCgE2lWlzc3raxqaNHPIhjtrYn/AI9oiQcHHV2IBbqBhQOmTf1K9TTNKu7+ZWaO1heZwvUqqljj8qsiory1ivrGe0uV3Q3EbRSL6qwwR+RoA5O/0uc3tjea7HY/6RMIHazhMclozj5GWfO4nftTIwDv6dq3dCu7iaG4tL9xJdWMxgkkxjzRtVkfA7lWXOMDdux0qjEk+t+ELrTrlx/aUCtbSO3UToMpL7Z+SQezCjTL1bjXbO/jG2LWtLSYD+60ZBH4lZ/ySgDo6KKKADpTJJUiiaSRwiKpZmY4AA7mnnpXmt9f3PxF1+fQtOla00WyYfbZPuyTnP3QDyBx6e59KmUuX1OzCYV4iTbdoR1k+y/Vvouo68u7z4j6lJpulvJbeHbd8XV0ow10wP3V9v8A6xPYVf1T4heBvATR6LdalDayQKALaCJ5DGMZ+baDg8555Oav6/qbeB/DVqdB8OXWqRpKsX2SxUlo05LOcAk4x+JPXnNfOPivwxa6zqesalY32oT6xNfSSDTXsJNzxEeY0pkOAoC5+UjPy0oxtq9y8VilVSpUly047L9X3b/DZHvl1HoPxN0ddU8L6nG19aH9xdxZV4m6hXU4YA+49x73fCXiuW/uZNF1+P7JrVrw6HgTAfxL6+uB9RxXkPw/v7H4fajqr+FRq/izzoo42t7exkiO/OQCpUkbR5mTz1Ar2bxT4Uh8SWcV1bu1nqluA9rcgYZD12t7Z/I/qpRafNE0w+Ip1Kf1bEv3fsy6xf6xfVfNHTbgR1rF8TeJrLwzpZurs75HO2GBfvSt6D/GuV074lpa6DfDXoGOp6YfLlWBdyTNnAIYcLyOcn6Z6VZ8KaBcaxex+LPEzx3F3MoaygUho7aM8jHbOP8AHr0XPzaRNllzwzlUxmkY9vtPdJeVtW+3mR6Nod5LNJ4w8WwS3l+F3WthAm826dgq929vx69OpsNUub6RfO02S1hkU7WnbaxbrtKEA9M9M9KjurIajrk8EpREitomSSN1aQFmkByjKdowow3c7h2rM1HU9I0SO1W5vYr86ZcPPcNNch7i3XypBvCLyx+YJtA6NnrVxiorQ8/E4mpiZ80umiS2S7IytW0i98D6pJr/AIaiaXTZTm/05egHd0Hb+n0Jrs9G1ez1zTIr/T5hLFJ1x1U91PoRWJo/xI8HeIZ/s+l69aSzs2xYJSYncnsFcAk/QVha5YT+ANRfxFoO3+zJmAvdPLYGSfvJ6HnoOn0JqHeGq2PRhJZilSqO1VaRf8391+fZ/Jno5Ixwa4XxH4ivdY1VvDPhFs3TDF3ejlLZehGf73/6utVdb8Zza9cWmg+FHaG51GISPdTL5flRkZ+XPU4zyM+2a6vw54csvDGlraWC5Y/NNMw+eZ/Un+XpRfn0jsKFCOAiq2Ijeb+GL/8ASpeXZdeuhkwQ6P4B0hNNtpVS9uoJ5o3lGWuZIo97En2HOPSqHh3VdI+J3w901dUKtc3cDF0JAkSWIqruMdMMyn6MK8R+Lviq+8QeNo4tGv2uLJl8yzET/PD50aQyxN/dyyEFT0LH1qO0m1/4X/Er+wLWeO5Ns/kWzvhYovtAjZnPvsUDJ4G3PQVpyq1jzniKzq+3cnz3vfrc9x0LXL3wpqsfhvxZJvhY40/UW6OvZGPYjp/nNd/kVk6xo+neJ9FNteATQSqHjkXqpxw6muW8M65e6B4iXwh4gk+1OBmxu0+YsnZXA6cA8n09OazTcHZ7HoVKcMfCVakrVFrJdGv5l+q+aPQKKKK1PHCiiigAooooAKKKKACiiigAooooAKKKKACiiigDIPinw+s5hOu6b5obaYzdx7g2cYxnrmtGC4huAxt5UlCOUYoQdrA4I46EHtWI3/JSF/7BLcf9thWFpst/YTS3cOoOYZvEMtu1oY02FWlKk527t2eeuO2KAO4guILuES200c0ZJAeNgykg4IyPQgj8Klrhk1XXb3TrCWG5uG3td+d9j+zCc7JiqHbNhdgAwcc5xWpqGuyjwRb6nYT4NyIF+0yxgeUJHVWkZeny7icdOPSgDpaTg1y99LqNrdWGmprsjfbLto3umih82ICIv5YwmzcSBgleh6Gs+w1PWdY1KwsV1d7ZcXwkuLeGIm48mZERhuUgfeOcDB5x2oA7nv1qFLy2ktBdR3ETW5XeJg4KFeuc9Me9cfoWraxKfD91e6kblNWklhmgMKIibY3ZWQqN2f3fOSRzxisvQNR1DTPDejtb6obiK7srk+Q0ce2Dy0ZlZSBu4ICncTkntQB6PFLHNEskLq8bqGVlOQwPQg9xT+tcBcatrc1pqt5Bqzwf2bpEF6sKwxMsshjd23ZUnadgGAR7YqTV/EmoLcSXWmz3xjt5LZJYxHb/AGZDJsJVixErEhxyvAz7GmI7ae5gtY/MuZo4ULBd0jBRkkADnuSQPqak6/8A6q4GGe80y78Q3FtfSl3161iKOkZAVzAp/hz91ivXoB3yTctdZ1J7q1vHv8rcatLYtp3lpiNFZ1znG/cAoY5OMHpSGdlS1xGj6rq4l0K5vdTe6j1S4mhkgaGNUQKsjKVKqDn92M5J61qaq+pXXi220yy1SXT4GsJZ3MUUbsWDoo++p4+agDox1pk9xDawPNcypDEgyzyMFVR6knpXDaVr+qJpuj6rqWptLDqVpNLNGYE2wFYy4KBQGOApyCTn2rO1XVtRl0bVrS9e+kgl0j7Un21LdXJ3gZUQn7pB6Nz70AemZ560vauEuPEuqnR765bzrW9+3Q232MxxFrON2AVgWwrMwPVjtBOOxzL9u8Sm0MBa5RxfhFJksxeSQ+XuKgZMW8N9Pl5xnmgR2ox24+lLkHoawLLVZZ/B1zeJPM9zbxzqzzxorrJGWHITKEgjtwa51/EWr6ZpguBqX9qPPobX+XijAhkBQZG0L8nzngn+E80DPQaTIFcFNqniKCxnQz3MQeSzW3ubpbVpV8yYI+FiLKVweCRnk8nFaerT39jJa6bb6pqt1dvHLMWt4bTeUBUAsZAqADd0AyaAOq4zR7CuI0nWtS19LXzdU/soDSYb1pIo4z5zuW3Md6kbF28gYPzdaJNa1+bXrwWYneKzvorcwgWyQGM7dxYu3mhjuJXHHAHNAjtJriGDb580cXmOI03sBuY9FGepPpT+tcFoct5plm/l300nn+JJbdxIkf3fNfd0UYLcE/pgcVqaJqFzcWQ1nUdaxExnMlgY4wkYQngHG/coGTknP0oGdFBf29zc3FvBJvktXEcwCn5WKhgM9DwQePWrGRXBWTaikmhQLqMmmPrX2q+uiiRs5Y7WRRvVgCqsB9FqGPxFr1/DYQW0lx5jWcszTWaW+ZmWQoGImYDZhQxC8/MORQI9DJox/wDWrkbCfWtW1xYZtRfTli021uZbe2SF1MrtJvG4q2V+THB+hqvp+sapcyaVPLqxI1aW4iktlijxaBVchkO3OVKAHcWBLdqBna9eP0pa4TSdc1vWNC1W6t75Dd2SKLeGKIAXCp83m/MucSgEDHAHTmpP+EiudTtzd2V3eC31C88jTorKKEyOiRkuwaX5Rlg3UnhQB1oA7b6Yo4zXD6brmq6pFpdlNfSWck9zeRS3Qji81vJfaq4w0YYg5JAI+Q4qPUtX19NQubTTbme5axso5kkhW1WOdju+aXzGBCfKB+76cnPQUCO5nuIbaFprmWOGJQCzyMFVfqTUnavP5Z77T9R8VahDezRzqLQiJljZVLKv+zzgZUc9D3PNbdhdXuoaxezSax9litL82y2Ijj2uoAxuJG7c2cgg9OxoGdLj/OaK5nxNqN3BeJa6bPqCzrbSTsllHbkYBA3O0xxgE9F5qjpmr6lr/kl9VGlbNLtbw+XFGwleVSWY7wfkGAMAg89aAOvhuIbgyCCaOUxPskCMDsbAO046HBBx70sM8Nxua3mSUK7IxRgdrKcFeO4IwRXISaxqVzrB09dQNosury2wnSNCyRpbq4Rdylcls8kE/pV7wIT/AGDcb5xct/aN3mYAASHz3+bA4568UAdNRRRQAUUUUAeZfHJZD4V0oQsqv/aYwWUsP9TL2BFeK51AdrVx67mX9Oa9p+Ov/Io6b/2EP/aE1b2ieBvC8/h/T5ZtBsZJJLWNmZoQSSUGTXNUpc8zrpVfZ0z543X/APzytv8Av63/AMTQP7QJ62sffI3N/hX0r/wgHhT/AKF7T/8AvwK5j4i+D/D2meAdRvNP0aztriMxFJYogpXMqA/zrN4dpXuaxxSbtY1fhKGHwx0wOQW8y5yVGB/x8SV2lcb8J/8Akmem/wDXW5/9KJK7KuyOyOGXxMD0NcT8TPGDeE/DmbNsX92TFAcfc/vP+HGPc12x6V4H8ZZpdQ+IVnp4bCJBGi+gZ2JJ/l+VZ1pOMND28gwdPGY+MKvwq8n8v+CWPht8Nh4hQa/4l8yS2kctFCxOZznl2PXGc/X6dfabPT7TTrZYNPtoreJeiRIFH6U6xtYbCxgtLddkUEaxoo7ADArm/HPjmz8HaYWbbNfSqfItgev+0fRaIxjTjdixeMxec4vkhd3fux6Jf8NuzN+KOseHdM0N4tZsYNQvJkIt4WHzg9N24cqB+teHaTd6v4dntfEFgksEQmKRy4ISQjGUPqMcYrrPCXhLVPiTr8uta/LJ9hEmZZjwZSP+WaegHT2+temfEXQbNvhjfWlvAkMVjEJYFQYCbD2/DI/GsHGVS89j6rD4jDZO4ZdJ+0lNpT191X0sl8/8/Lo/DmtweItAtNUteEuEyVP8LA4I/Ag1q15X8CL15fDeo2bZKwXIdfYMvI/Nc/jXqh6V005c0Uz4rNMIsHjalCOyeno9V+DMPV0/tTWLTSWwbZV+1XY/vBWAjjPszZJ9RGR0NbdcH478Uy+C9f0++t7Fb06hbyQSxtP5WPLZWRt21unmPxjuPSsH/hdlz/0LUP8A4MT/APGabklueFVx2Goz5Kk7M9bzRmvJH+N0yLl/DsKj31HH/tKoh8dWZsLoFqT6DVP/ALVRzRM1mWEaup/n/kekXml3a6k9/o9zBbzTII7iOeEukmPutgMCGGcZ7jAPQEV7jSJ9P0XSV07ddT6P5exCQpnQRmNlyeASrEjJxuC5I61wn/C7Ln/oW4f/AAZH/wCM0f8AC7Lgcnw3F/4MT/8AGqOaPcX9qYP/AJ+I9SsL6HUbKO6ti3lvkYZdrKQcEEHoQQQR6irNYXg1zceErC9ZQh1BWvygOdnnsZtue+N+M98Vu1R6IHkGuL8VeFLv7eviPwsRb6xAMug+7dL3Vh612lB6VMoqSszow2JqYapzw+a6Ndn5HFwfEO1l8H3usrYXU93py/6Vp0KgzKcgHAOMgcnPoD3rgPFXg/xj8SRaa41hBa2rljDpV7cnfEpVQsudpClscoRx9WOO/wDFPhS7+3DxF4XIg1eEfvIx926X+6w9cD8fwFanhXxTbeJrBnQGC8hO24tn+9G3Q/hxwaUZO/LI68Th6cqf1nDfB1XWL8/Ls/k9Tj/DGoa38Pf7N8NeJ7G81MahKkdrqNiRLFGxVQYihwY0UDOec/MQBzjT8ReIb7XtWfwx4Rb990vb4fdt16EA+tHiLxDfa9qz+GPCL/vul7fj7tuvQgH1rpvDvhyy8M6Wllp6d90srfelbuxP+cUm3N2WxrTpwwMFWrK838MX0/vS/Rdd3oQ6R4S0vR9BbSordZYZQfPaQZMxPUt/niuJ1S11LwIlxYxX11H4dvztju4Rum05yeo9R/8Ar69fU6gurSC9tZLa7iWaCVSro4yCD2puC6dDCjj5qcvb+/GfxJ/muzXT7tjidO8E6kfIu4PHOo3CO6StOIYt9xGCSqNIBkp8zYGeNxrmPGnwQn17xNdapo+pi1juz5ksc8sjESH7xB54PXHbtgAVuI958MtS2SGW68MXMnytyzWbk/nt/wA9evb3muadY6K2qXN1GtmI94lByGB6Y9c0RknuTiMHKnKLpe9GXwtdfK3Rrqj56svgdrPhPWrPX9Z1vSE0/TrqO5d1eTewRw2ACmMnGOteo6dp178QdTTWNdiaDRIWzZWDcGU/33H+fT1yabp158QdTj1jXYnt9EgbNlYNwZT/AH3H+fT1z6EiCNVVFCquAAOwqbc+r2Ouco5dHkhrWe7/AJfJf3u76bI53xV4Pt/EVinlN9kv7YZtLqPgxkdBx2ql4U8V3FxeSaB4lj+y61b8fMAFuF/vKfXH+NdkehrnPFnhKDxLZoyubXULf5rW7Q4aM9ccds/403Fp80TDD4mnUp/VsV8PR9Yv9U+q+a1PNB4R0Dwp8Yr7WLjV9Mks7tmeSzkv4YpbZ35ZXjkO14znPZh8uOnMvxI0vQviJ4i0iztdf0q3tYpd9zc/2nB+83YBVI1O5pCFUZbAAAA6muo8O31hqeqS6R4x0ixXxBDgPLNbIftSgYDBiOuB09Ons/xVdaLoksOn6JoWn3OuXJH2eKO0T90eznjjHXr2p88bXM3gK/t/YW13v0t/Nft5mh4p8UDQY4NH0KAXWrTqI7a2QZEQxgM3oAP5elTeEfCQ0NZL/UZftmsXZ3XFy3OM87F9AP1o8I+EhoayX+oyfbNYu/muLlznGedi+gH64+gHT0oxbfNI1xGIp0abw2Gen2pfzf5RXRdd2LRRRWh5YUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAQ+RD9o+0GJPOC7PN2jdtznGeuM9qg8jThN9l8q1EhY3Ih2ruJDD95j1yfvetcc/ijUrXUDBcXIaPSLmT+1HMYBaB5AIScDjCPvJH9ym2Catq+uaVPLqctlc3Gkz3G+OGMsqNMhRMMpGACoPc46igDq59J0K7kWxurDTp3jHmrbyQoxQEn5gpHGWzz3OatzizjgS1uRAsM37lIpMBXyPuAHg8A8e1cOni7VZNHW7EyK8mjWtwf3YKxySSlHl6ZwB82OnFXtes7sHSLb+25riU6tFtnaOLzYcxSZ6KFOR0yvfvQB0Y0DR1sTZLpVito7bjbi3TyyfXbjGferEVlawGEw2sMZhjMcRSMDy0OMqvoOBwPQVmeH7u7ltdQjvZzeS2V5JAspVVaQBVYZCgDPzY4ArK0/VboeFRr2oa4/7+xe4a2W3jPkNjOEAAYlD8pDEjPXFAHTpYWcawLHawoLckwhYwBGSCCV44yCenrUFtoOkWckj2ml2MDSoUkaK3RS6nqCQOR7Vxk+va7axara/abyKaKKzkhkvYrZpUMs+xuIsoVwOARnr7V02i3F4muarpd5eyXq2qwyRzSoitiQNlTsCg4KenegDQitdNnjuEigtZEdfs86qqkEAY8th6AEjB9aZPoOkXF0txcaVYyzqAFle3RmUDpyRniuPtry80+8vbq21PKt4hFs1jsQqwkdFY5xu3cluuOOlWNE1vXr/VoLhlna1lvZoJo5PsywxopcAJhvNLgqMhhzk8Dg0COqay0uS/fzLeze8dVd90amRlVsqT3IBAwexFItnpK6y1wltZDU/L3NII187YeM5+9g4x6cVg6xBdz+NGNlqEti0Wks5aKNHLEScA7wRjPpg+9Z0/irVDpcdzHPHE02jWVznywVikml2vJ74Bzg8cUDOye3060W282K1gWKTFvuVVCO2RhfQnJHHXNSS/ZILmO4n8mOZv3Mcj4DNuP3AT1yR09q4PVZdRlvLvS5NYkuvsup6cIZnij8yEu2TkKoUkcHkVbnurtr4WF9dNdmx122jjnkRVdlaJX5CgLwXIyAKBHYJp9lHHDHFaQKluCsSrGoEYIwQvHGRVaDw7otssqW+kWEKyrtkWO2Rd6+hAHI471iaNq+p3fiCPR57gmbTWnN+5jUeapI8gdONysG4xymKsXF1e3viPULdNY/syCwSFlQRxsJd+SWcuD8vG0bSDnPNAzbm02yuXle4s7eVpoxFKZIg3mIDkKcjkZJ4qufD+itZCzOk2Jtd27yDapsJ9duMZrnk1nUjfC7+3ZQ6ydP/s/y02iMMV3Zxv3YG/rjHaoEvddXwPNrZ1qV7iRWCRtbxeWh80KpGEz0z1JzntQB102mwHR5dOtUjtYnhaJFjQBYwQRkKMetQaVoOnaRZiG1tLZHaNY55I4FQzYGMtjrnnrnrWTef2paanp+k/27cAXnnytePDD5ihFTEY+TbyWJ5XOFPNZY1vXLvTbW5SecRLayyTGw+zeYSkhUSMkxHyFVz8uDk0AdTaaXoUJntrCx0+MpIjzQwwoMOPmQsAOo4IJ+tWL7S9O1PYNTsbW8EZyguIVk2HvjcDjoK5Z/EV8Rf38N2WsbK5tJGUxqN1s8SFzyMjG8v1yNuM1U/t3Xb2ezjtpbwJqEdxeQ/ZI7fzBEHCxL++Kgjadxxlju6gDNAHYzaFpNzFBFcaXZSx24xAklujCIeigjjp2p8mjaZNepeTadaSXUYASd4FLrjphsZFM0S4u7rRLOfUESO6eFWlWNgyhsc4Kkgj6E1oUAVBpditw8wsbYSySLK8nlLuZ1+6xOMkjPB7VWufDej3b3Dz6Za+ZdIUnlSIJJIp6guuG57885rUooAx9U8OWmsanY3F9FBPBaJKv2aaESK5fbg88DG30PXtVq50TTL23hgvNNtLiGD/UxywKyx8Y+UEYHTtV6igCCOzt4ZDJDbxRuUWMsiAEoudq8dhk4HbNQDRdMFxPONNsxNcqVnkEC7pQeoY4yc+9XqKAKNxp2IJG01ba0vPJEMdwbcPsUdBgFcgdhnGagt/DunRaDa6RcWkN5a2yKqpcxrIGIH3iCMZ5Jz7mtWigDPfQ9KksBZPplm1orbxbm3QxhvXbjGeTz70k2gaRcLCs+lWUgt+IQ9ujeWM5+XI459K0aKAKculWE9w089jbSzPGImkeFSxTOdpJHIyAcdM0kmj6dLqC38mn2r3iY23DQqZFx6NjNXaKAKd9pGnansOpWFreGP7n2iFZNv0yOKjn0LSrpYFudMs5VtgFhWS3VhEB0Cgj5eg6VoUUAUp9H066hlhudPtZopZPMkjkhVld8AbiCOTgDk1CugafFd2U9vbJb/YWkaGOFQiAuMMSBwT/jWnRQAUUUUAFFFFAHmPx1/wCRQ07/ALCH/tCau88Pf8izpf8A15xf+gCuD+Ov/Ioad/2EP/aE1d54e/5FnS/+vOL/ANAFQvjZo/4aNKuQ+Kf/ACTPVf8Atj/6OSuvrkPin/yTPVf+2P8A6OSnLZkw+JDPhP8A8kz03/rrc/8ApRJXZVxvwn/5Jnpv/XW5/wDSiSuypx2QS+JgeleD/GyxmsfGNhq0QIWaEBWxwHRv8CK94rm/G3hSLxd4clsX2x3CHzLeU/wOPX2PQ1FWLlGyPXyTHRwOOjVqfC9H6MyfEHxM0vSfCNrqluy3F1fRBre2B53EclvQA8e/avNfCXhLVPiRr8mta/LILHzMyzHgykdET0GOM9B9a5FtO/sPxJHZ+KLW4SKBwJ4kOHZOvyk8YNfQGh+PfBjabDDYapaWUMSBVgmPklB6YbGfwrni/aS997dD6zE4d5Lhv+E+DnKpf30r2XRK39de1uos7O3060itLKFIbeFQqRoMBQK4/wCLetRaX4BuoN+J74i3jX1Gct/47n86frnxW8L6TbsYL5dQnx8sVr82fq33R+deVpHr3xd8YrLIrRWkZ2lgD5dtH6A92P6n2rSpUVuWO54mUZTW9ssZjE4U4PmblpdrXrrud98DtOe18I3N7IpX7ZcnZnuqDGfz3V6bVTTdOg0nTbexsoxHBboERR2Aq3WsI8sUjw8wxbxmLqYj+Z/h0/A8l+Nv/HxoH0uf/aVeZAO00UMUbSSSyrEiLjLMxwBz6k16d8bf+Pnw/wDS5/8AaVeXSb/LYwkrIPmRgcFWHIP51nP4j83znl+vrn20ueyfDPwYlhpdxceIdBii1MXTeXLcqsr+XtUgg5O0ZLDAxnFd7PYWlzAYbm1hmixjZJGGXH0NRaNqKavotlqMQ2pd26Tgem5QcfrV6t0fa0acaVNQhsjwP4geFrjRtfvr3TtEa00RfJUSRFfL3NgEhc5X5mAwABxnHeuSb7p+leu/GjUPL0bTNMQkG6uTM+OhSMdP++nQ/hXkL/6tvoawnbmPh85pU6eLtDd6v5n0Z4H4+H3h3/sF23/opa3qwvBH/JP/AA9/2C7b/wBFLW7W594tgooooGB6GuL8VeBptUvhqnh+7Omam48ueRCQssZ4OcfxAdD/APWrtKKmUVJWZ0YbE1cNU9pSdn+D8mupkeHfDtn4a0tLOwT3llb70rd2P+eK16KbJIkUbSSuqIgLMzHAUDqSaaSSsjKpUnVm5zd292OoqhY67pGpzGLTdUsruRRkpBcI7Ae4BqyLy1a8a0W4iNyqeY0IcbwvTcV6496ZAl1aQ3trJbXUSzQyqVdHGQQe1cJZ/DHy9ZVL2/kudBtpDNa2LMeHPUN7D9fbnPbjVdPMNzKL62MdqxW4cSriEjqGOflx70261rS7G2iuL3UrS2gm5jlmnVFfjPBJwamUFLc7MPjq+GjKNKVk/wCrrs/NalpEEaqqKFVcAAdhT6o3muaTpwiOoanZ2omG6Mzzqm8eoyeetQv4m0GO2juJNb05IJSVjla7QK5GMgHODjI/OqOM1KD0qkdY0wWMd4dQtRaysEjn85djsegDZwTx0q7kGgDnPFfhKDxJZoyObXUbf5rW7X70bdQDjquaj8J+EF0ISXuoSm91i65uLpjnH+yue38/yA6eip5Fzcx2LG4hYf6upe7/AFpft1ttcSlooqjjCiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooArSafaS/aPNtIH+1KEn3Rg+aoGAG9Rgkc08WsC3CTrBGJUTy1cINwX+6D6cDj2qaigCpHpdjFHsjsrdE8oQbViUDyxnCYx93k8dOajttE0uyjRLPTLO3VH8xVigVQr4xuGB1wSM9av0UARRW8UBcwxpGZHLvtUDcx7n1PFVU0PS4pp5o9Ms0luAVmdbdQZQeoY4+YH3q/RQBnQaBpFrG6W2k2MKSFd6x26KG2nK5wOcHkehq4ltDHPJMkSLLKAHkCjc+OmT3xmpaKAKK6Lpi3/ANuXTbQXmSftAgXzMnqd2M0Jo2mpqJv00+0W8b71ysKiQ/8AAsZq9RQBC1tC0xmaGNpSmwuVGdvpn09qq3OkQPYyQ2dvaQO0At1ZrZXVYx0QrxlRz8ucVoUUAc/ofhW20kXDTx2crzypJst7NYYYyn3diZOCDk5yTk1qT6VYXUc8dzY206XDBpllhVhKQAAWBHJAAHPoKuUUAZml6Q1hdX13cTLPc3sgZnSPYqoq7UQDJ4Az35JJ4ziprvR9Ov54pr/T7W6lh/1ck0Kuyc54JHHNXaKAKf8AZVh/aX9oCxtvtuMG58lfMxjGN2M9OOtP/s+0+yG1+yw/Zz1h8sbOuenTrzVmigCte6dZ6lD5Oo2cF3CDuEc8YkUH1weO9QXOg6TeeSLzS7K48lQsXm26N5YHZcjgfStCigCt9gtSsym1h23AxMDGP3oxtw3rxxz2qO70fTr+3jt77T7W5gix5cU0CuqcY4BGB+FXaKAK8djbQzLNFbxJIsYiDqgBCDoufT2qxRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAeY/HX/AJFDTv8AsIf+0Jq7zw8f+KZ0v/r0i/8AQBXB/HNmHhXSisRl/wCJmBsBAyPJlz1rxcX08ShRBqCqAAAJsgDp2euedTkmdMKXtIbn1tXIfFP/AJJnqn/bH/0clfPH9pTdo9S/77b/AOKpr3c8ybXt76ReDh5Rg4ORwX9RUuurbFxwzTTv+Z9DfCc/8Wz03/rrc/8ApRJXZVxfwkJb4Y6YXXa3mXOVznH+kSeldpXTHZHLL4mFFFFMkxvEHhXSPE9qIdYs0m2j5JB8rp9GHI/lXn958BdPkmLWGs3NumchJYhLj8QVr1miolTjLdHp4TNsdg48tCo0u26+53R5fpvwL0W2kV9Sv7q+C/wACJT9cZP616Lp2mWek2aWum2sVtAnRI1wPrVuiiMIx2Rni8xxeN/3io5fl9y0Ciig9Ks4DyX42/8AHz4f+lz/AO0q8xr2P4leGtR8U61o1npDWwlghuJZDcyMihSYgOVVjnOe3auV/wCFP+Kf+euj/wDgVL/8arGcW3ofI5tl+KxGJc6Ubqy6r/M7P4Q6h9q8Di1Ykvp9zJbnJ7E71/DDgfhXeHpXi1r8LfG9iZDYaraWfmEF/s2qXMQcjuQsYqx/wr34i/8AQyf+Vy7/APiK0Tdtj28PWxEKUYzpSul3j/8AJGT8VdR+3ePpIFY7NPt44ME8b2+diPqGQfhXGS8Qvn+6a7x/hH4ulkklmu9Mmlkbc8s19M7sfcmMmo5fg/4qaFwJtHBKkA/apf8A41WTjJu583jMvxuIxEqvs9H5rb7z1XwSf+KB8Pf9gy2/9FLW7WH4MUx+CNEhfh4bGGJx6MiBWH4EEVuVufbIKKKM0DCikyKMj1oAWs/X/wDkWtT/AOvSX/0A1oZFMkRJYmjlVXR1KsrDIYHqCKAPG9E/sYL4EOkfYxqonP2v7Nt8wJtO/wAwjn86Zp/iGT/hPo/FDWuopbXt61q1y1uRbG1ICR/PnqGXJr1i18P6NYs7WWk2NsZF2OYbZE3L3BwOR7VK+lac+nrp72NqbNcAWxhUxjByPlxjg80xHit//aOl/wDCZ6pZ7prG61C6sLyAf8s92THL+DMQfrjvxrXcllFrOmvq8NhOo8MQ/YotSYLC0m4ZGW4B25969VXS9PEFxALG2EV0xaePyV2zMepYYwxPvTLrRtLv7WK3vdOtLmCH/VxTQK6pxjgEYHFAHjVxOtzD4OkjstJsYdt6IodXkZ7QKCOSW5weSuT1x2rU1sJ53g77LpWiavL5l4XstKZVtZWwvAJyM7cE57ivULvRNJ1BYhf6ZZ3IhXbEJ4EcIOOBkcDgdPSi30PSbQwG10yzg+zszQ+XbovlFhhiuB8pPfHWgDy/StPGoeA3uY/slnFda+k6WfnKi2gDhWj+fADcE7R17DmvXxzVE6NpbeYDptofOlE0n+jr88g6OeOWHr1q8KQxaKTIpcigAopNwpc0AFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUHpRRQBheLPC1r4t0X+z7ySSEpIJoZo8bopACA2DweGIIPY9uteXXfwZ8RwyEWV9pt3EOjSM8LH/AIDtYf8Aj1e3UVnKnGe6NIVZw+Fngo+Evi4vjyNPA/vG7OP/AECtHT/gvrk0w/tXUrGzizz9l3TOR/wIKAffn6GvaaKhUKa6GjxNV9TO0PRbXw/ottpenqVt7Zdq7jljkklie5JJJ9zWjRRW5zhRRRQAUUUUAFFFFABRRRQBj6lb3lvq9rqljbNeLHC8E1ujqrlWKsGUsQvBXkEjg9eME/tq/wD+hY1X/v7a/wDx+tiigDH/ALav/wDoWNV/7+2v/wAfo/tq/wD+hY1X/v7a/wDx+tiigDH/ALav/wDoWNV/7+2v/wAfpG1jU3QrD4a1BXIwpmmtlUHtuKykgepAJ9jWzRQBR0awfTNHtbSR1kkiQCR1GAzdWI9sk1eoooAK5PV9A1K81C+uLe4nSOSW1ZbdDFsmCOpYtuUsMAHoRn3rrKKAPOLu512O7tNEMm2S5gZGs4DbBCpilyWUfOp3BfmGE55OauXEGt6Kkd7eXDNFY28qpdSmIFQUgYKwGMgvHJGMAt8w+td3ijFAHKahp97fWelzappf9rhRI9xZ/u/ldxleHKqdnK5696gmh8WRNNFpsckESWhW3TzIZI4yIAFG5vnaQS5GW+Uryea7LFFAHLXFh4mhN4bfVry4WJEEAMdsDNknefuABgMbc4XIGcjNZ1zH42lkto1jaS3e3lWZZhbHJLSbfM9W2+XkKNu7Pau6ooA468t/GK2M8djMImjCCF44oWdgxBbCsVUFACoBIBBz1p+rp4uFjo/9lSTGZFze4hgHmt8vyuGfCA/NkoW9q66igDkJYPFkSzOtxdSrLK5KQi2DwoJiEEe4BSTHg/PnGPWmHRbs6DoUWp6P/agtYmW5sy0RO8qAGwzBDg5798iuyooA42aHxZE00WmxPBEloVt0MkMkcZEACjc37xpBLkZb5SvJ5qPVdI8Ty6bfW4vbjUFkEkcaSLbplQFKNkKvzbtw54x2HWu2ooA5G3l8WRCJZLa4mWWRQHka3DwoJvmMu0gEmPP3M9OgNZsGn+MLu5hm1aOZhb3D+WubblWideQONmSowSWwT6V6BRQI87h0fxPHBd25tJvJcrM0O63EbECIgR4IYNlWBDELXRaGniL/AISDUX1mR/sLM32WLyYgiLu+XDq5cnb13KOehroqKBhRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFAH/2Q==)

<https://discover.univarsolutions.com/blog/cleaning-products-when-to-avoid-mixing/>

H) Getting Rid of Skunk Odor! H2O2 mixed with NaHCO3 and Dawn Dishwashing liquid….

It’s a redox reaction when reacted with skunk thiols (R-SH)

Mix:

* one liter of 3% to 6% hydrogen peroxide (available in pharmacies),
* add one quarter cup of baking soda
* and 1 teaspoon liquid dishwashing detergent.
* Wash the cat or dog (or child) with this mixture and rinse with lots of water.  Presto!

The smell is virtually eliminated.

This latter point is an important one.

People who have struggled with using tomato juice to remove “skunk odor” may be successful in reducing the smell, because they only mask the odor. There is no chemical effect using tomato juice. Folks probably managed to physically rinse away some of the odiferous compounds, but the scent may easily come back.

This is because the skunk mixture also contains compounds called thioacetates which are not particularly smelly but over time react with moisture to form thiols. And thiols are stinky.

Thiols (R-SH) are a class of compound related to the structure of alcohols (R-OH), with sulfur

substituting for the oxygen.

As the concentration of thiols increases, the skunk aroma returns.  But under the mildly alkaline (pH greater than 7) conditions described in the hydrogen peroxide recipe, these thioacetates are immediately converted to thiols which in turn are oxidized and washed away. They do not accumulate later. Therefore, the lingering smell is greatly reduced.

<https://www.mcgill.ca/oss/article/environment-history-science-science-everywhere/solution-skunk-pollution>



**Checkout!** Mercaptan Control with Hydrogen Peroxide:

<https://www.h2o2.com/industrial/applications.aspx?pid=110&name=Mercaptan-Control#:~:text=Mercaptans&text=Hydrogen%20peroxide%20has%20been%20shown,sometimes%20required%20for%20vigorous%20oxidation>.

**PRACTICE BASIC ISOTOPIC SIGNATURE!**  Complete each practice problem. The following may be of help to you. All answers are given at the end. Check your work.

**USE THIS!**

(#p + #n) = mass number  # of nucleons ⮱ upper left number

X

Atomic number = # p = nuclear charge  # e- ⮳lower left number

1) Example: Given the isotopic notation of Cr you can tell that the atom has:

Cr

a mass # of 52 OR the # p + # n = 52

24 + 28 = 52

an atomic number of 24 OR 24 protons OR a nuclear charge of +24

and since it has 24 protons and is an atom, it has 24 electrons

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

2) According to the isotopic notation: Ge, the number of **nucleons** (not neutrons), is equal to

3) Given: the following : Na

a) \_\_\_\_\_ What is the mass number of this atom? How do you know?

b) \_\_\_\_\_ What is the atomic number of this atom? How do you know?

4) Given the following : Zr

a) \_\_\_\_\_ What is the mass number of this atom ?

b) \_\_\_\_\_ What is the atomic number of this atom ?

c) \_\_\_\_\_ How many **neutrons** (not nucleons) comprise this atom's nucleus? How do you know?

**USE THIS!**

(#p + #n) = mass number  # of nucleons ⮱ upper left number

X

Atomic number = # p = nuclear charge  # e- ⮳lower left number

5) An atom has an atomic number of 13 and a mass number of 27. Hint: Use the information to first write out

the isotopic notation, as was given in problems 1-4

a) \_\_\_\_\_ How many protons comprise the nucleus of this atom ?

b) \_\_\_\_\_ How many **nucleons**  (not neutrons) comprise the nucleus of this atom ?

c) \_\_\_\_\_ How many neutrons comprise the nucleus of this atom ?

d) \_\_\_\_\_ To what is the nuclear charge equal ? (include a + sign) How do you know?

e) \_\_\_\_\_ How many electrons surround the nucleus of this atom ?

f) \_\_\_\_\_ What is the overall charge of this atom (the charge of the **atom**)?

6) An atom has 76 electrons and a mass number of 190 Hint: Use the information to first write out the

isotopic notation, then answer the questions.

a) \_\_\_\_\_ How many protons comprise the nucleus of this atom?

b) \_\_\_\_\_ How many nucleons (not neutrons) comprise the nucleus of this atom ?

c) \_\_\_\_\_ How many neutrons comprise the nucleus of this atom ?

d) \_\_\_\_\_ To what is the nuclear charge equal ?

e) \_\_\_\_\_ What is the atomic number of this atom ?

f) \_\_\_\_\_ What must be the overall charge of this atom? How do you know? \_\_\_\_\_\_\_

g) \_\_\_\_\_\_\_\_ This is an atom of which element? Just give the letter symbol (use the periodic table)

h) What is the relationship between the terms atomic number and number of protons in any atom?

**USE THIS!**

(#p + #n) = mass number  # of nucleons ⮱ upper left number

X

Atomic number = # p = nuclear charge  # e- ⮳lower left number

7) An atom has a nuclear charge of +12 and 14 neutrons.

a) \_\_\_\_\_ How many protons comprise the nucleus of this atom?

b) \_\_\_\_\_ How many nucleons comprise the nucleus of this atom?

c) \_\_\_\_\_ How many electrons surround the nucleus?

d) \_\_\_\_\_ What is the mass number of this atom?

e) \_\_\_\_\_ What is the atomic number of this atom?

f) \_\_\_\_\_ What must be the overall charge of this atom (atomic charge)?

g) \_\_\_\_\_\_\_\_\_\_\_\_\_ What is the isotopic notation of this element?

h) \_\_\_\_\_ What is the nuclear charge of this atom?

8) An atom has a mass number of 30 and 16 neutrons in the nucleus.

a) \_\_\_\_\_ How many protons comprise the nucleus of this atom?

b) \_\_\_\_\_ How many nucleons comprise the nucleus of this atom?

c) \_\_\_\_\_ How many electrons surround the nucleus?

d) \_\_\_\_\_What is the nuclear charge of this atom?

e) \_\_\_\_\_What is the atomic number of this atom?

f) \_\_\_\_\_ What is the overall charge of this atom?

g) \_\_\_\_\_\_\_\_\_ What is the isotopic notation of this atom?

9) The nucleus of an atom has 58 nucleons and there are 28 electrons surrounding the nucleus.

a) \_\_\_\_\_ How many protons comprise the nucleus of this atom?

b) \_\_\_\_\_ How many neutrons comprise the nucleus of this atom?

c) \_\_\_\_\_ What is the mass number of this atom?

d) \_\_\_\_\_ What is the nuclear charge of this atom? How do you know ?

e) \_\_\_\_\_ What is the atomic number of this atom ?

\_\_\_\_\_10. Study a copy of the periodic table thoroughly. Based upon this study, the elements are organized:

a) according to increasing mass c) according to increasing atomic number

b) alphabetically d) by the dates of discovery

\_\_\_\_\_11. Which of the following is the least in mass?

a) a proton b) an electron c) a neutron d) an atom of H-2

\_\_\_\_\_12. Which of these subatomic particles is described as having a charge of +1 ?

a) proton b) neutron c) electron

\_\_\_\_\_13. Which subatomic particle is described as the fundamental unit of negative charge?

a) proton b) neutron c) electron

14. The following is an answer from a student on a test. The underlined part has something wrong. She would

get 0 of 1 point. What should it read?

"If an atom had 30 protons and 35 neutrons it would have a mass number **of 35**."

15. The following is an answer from a student on a test. The underlined part has something wrong.

He would get 0 out of 1 point. What should it read, when corrected?

"Given 20 protons and 20 electrons, it is clear that **the ion must have** an overall charge of 0."

16. The following is an answer from a student on a test. The underlined part has something wrong. She would

get 0 out of 1 point. What should be written?

"An atom has a mass number of 31 and a proton number of 16. The number of electrons **must be 31**."

17) Why are electrons not included in the mass number of an isotope, in our course?

18) Define the term: isotopes

19) Which choice is an example of the isotopes of an element?

a) and c) and

b) and d) and

20) Use a periodic table to help you with this:

Given the ion: F-1 How many protons are in the nucleus? \_\_\_\_

How many electrons surround the nucleus? \_\_\_\_\_\_

21)  is an isotope of the element sodium, while 1+ is a second isotope of sodium, but also a cation.

Compare and contrast the two species in terms of: atomic number, overall charge, number of electrons,

and number of neutrons.

|  |  |  |
| --- | --- | --- |
|  | an atom of Na-23 | a +1 cation of Na-22 |
| atomic number |  |  |
| overall charge |  |  |
| number of electrons |  |  |
| number of neutrons |  |  |

Answers to Questions 1-21

1. 24 and 52. The atomic number is in the lower left corner and the mass number is in the upper left

2. 73 The term "nucleons" may be considered to be a synonym for mass number

3. a) 23 b) 11 4. a) 91 b) 40 c) 51

5. a) 13 b) 27 c) 14 d) +13 e) 13 f) 0

6. a) 76 b) 190 c) 114 d) +76 e) 76 f) 0 g) Os (osmium) h) They are synonyms

7. a) 12 b) 26 c) 12 d) 26 e) 12 f) 0 g) Mg h) +12

8. a) 14 b) 30 c) 14 d) +14 e) 14 f) 0 g) Si

9. a) 28 b) 30 c) 58 d) +28 e) 28

10. c The PT is organized by ascending atomic number (number of protons). While it may SEEM to be organized by what is

called the atomic mass … it is not … there are some glaring exceptions … check out elements 52Te and 53I

11. b 12. a 13. c

14) The mass number is the sum of the number of protons and neutrons. Therefore, the mass number should be 65 (no unit!)

15) 20 protons and 20 electrons make a neutral ATOM, not ion. IONS are charged. The term ion should not have been used.

16) The number of electrons of an atom equals the number of protons, **not** the mass number.

17) Electrons have so little mass, that no atom has enough electrons to alter the mass. They are, for our course, effectively 0 atomic

mass units.

18) Isotopes are atoms with the same atomic number (of the same element), but with a different number of neutrons (or different

mass number due to a difference in the number of neutrons)

19) d same symbol, same atomic number, different mass number (due to a different number of protons)

20) 9 protons, 10 electrons (the -1 indicates one more electron than in the atom)

|  |  |  |
| --- | --- | --- |
|  | an atom of Na-23 | a +1 cation of Na-22 |
| atomic number | 11 | 11 |
| overall charge | 0 | +1 or 1+ or just + |
| number of electrons | 11 | 10 |
| number of neutrons | 12 | 11 |

21)

PRE-QUIZ 1: BASIC ATOMIC STRUCTURE

*Since this is a pre-quiz you may, of course, use your notes. Do try however, to "wean " yourself away from them. Learn the material.*

DIRECTIONS: For questions in this section, one or more of the responses given are correct. Using your notes and understanding of the periodic table, decide which of the responses is (are) correct. Then choose :

a) when only choice I is correct

b) when only choice II is correct

c) when only choices I and II are both correct

d) when only choices II and III are both correct

e) when I, II, and III are each correct

\_\_\_\_\_1) Which of the following applies to an atom of Mg-25 ? (Hint .. look up Mg on the periodic table to find determine the

atomic number. Then, re-write the symbol like the atoms in

question 2, and then answer)

I) 24 protons II) 13 neutrons III) 12 electrons

\_\_\_\_\_2) Which of the following is true for these two different atoms of phosphorous? P and P

I) The have different mass numbers

II) They have the same number of protons

III) They have a different number of neutrons

\_\_\_\_\_3) The symbol : X most probably represents an isotope of

I) gold II) silver III) tin

\_\_\_\_\_4) It requires approximately 1,836 \_\_\_\_\_\_\_\_\_\_\_ to equal the mass of 1 proton.

I) neutrons II) electrons III) nucleons

\_\_\_\_\_5) The term "nucleons" refers to

I) electrons II) protons III) neutrons

\_\_\_\_\_6) Ultimately, the nuclear charge of an atom is

I) the number of neutrons

II) the atomic number

III) equivalent in magnitude to the charge of the electron cloud

\_\_\_\_\_7) Which of the following applies to an atom of Al-28?

I) 13 protons II) 28 neutrons III) 15 electrons

\_\_\_\_\_8) Assume each following symbol represents an atom. Which has/have a **zero** number of neutrons?

I)  II)  III) 

DIRECTIONS : For questions 9 – 12 use the following choices:

ASSERTION REASON

a) True True statement and correctly explains (or predicts) the assertion

b) True True statement but does NOT correctly explain the assertion

c) True False

d) False True

e) False False

These are just a bunch of True and False statements: ***For example:***

Assertion Reason

Tom is a science teacher . because Tom wears glasses and is a p.i.t.a.!

*ANSWER: Both statements are true. But wearing of glasses or being a pain in the ass, has NOTHING*

*TO DO with the fact that Tom is a science teacher.* *So*, *the BEST answer is “b”.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | ASSERTION |  | REASON |
| 9.\_\_\_\_ | Based on the Periodic Table, you know that each atom of potassium (K) has 19 protons in its nucleus | Because | According to the Periodic Table, potassium is atomic number 19 and the atomic number is a synonym for the number of protons. |
| 10.\_\_\_ | The mass of an atom is generally attributed to the number of protons and neutrons. | Because | The magnitude of an electron's negative charge is equal to the magnitude of a proton's positive charge. |
| 11.\_\_\_ | Atoms are the smallest unit of matter | Because | Atoms are made of subatomic particles |
| 12.\_\_\_ | The *nuclear* charge of an atom is related to the number of protons in the nucleus | Because | For our work, the term atom is neutral in overall charge. |

13 Correct this statement so that the underlined portion is correct.

An atom, with 12 protons, 14 neutrons and 12 electrons, has a mass number of 38.

14) The terms atomic mass and mass number both deal with the protons and the neutrons of atoms of an

in some way. But how do the two terms differ from each other?

Identify 2 ways the terms (or representative values) are different from each other:

15) How many protons and how many electrons does the ion Fe+3 have? (are you using your periodic table?)

16) How many electrons are in an ion of Cl-1

Answers to Pre-Quiz:

1. d 2. e 3. b 4. b 5. d 6. d 7. a 8) a

9. a The reason is an excellent explanation as why you, as a student, may assert that K has 19 protons in each atom.

10. b Both statements are pretty accurate ...but the reason does not explain, predict or account for the truth value of the

assertion

11. d Please !! Atoms are not the smallest matter and they're mostly empty space . An atom can’t be the smallest unit

of matter if it is made of smaller pieces of matter … An atom IS the smallest unit of an element that can react

chemically ... but not the smallest unit of matter.

12. a In order to be called an atom, the assertion must be true. The Reason clearly recognizes this.

13 An atom, with 12 protons, 14 neutrons and 12 electrons has a mass number of 26.

The mass number is just #p + #n

14) The atomic mass is an average mass based on frequency and isotopic mass ... while the mass number is just a

counted value of the nucleons

OR The atomic mass has a unit of mass (atomic mass unit), the mass number has no unit

OR The atomic mass value is representative of all the naturally occurring forms of the atoms of an element,

while the mass number represents only one isotopic form of the element

15) 26 protons and 23 electrons

16) 18 electrons

PRACTICE: The answers are at the end of the packet.  **Remember answers always come from the reactant side!**

0 +1 -1 +1 -1 0

1) Given: F2(g) + 2KCl(aq) 🡪 2KF(aq) + Cl2(g)

a) Assign oxidation numbers to each species (I did it for you ….)

b) What species is oxidized? (be sure to record the oxidation number of your answer, even when it is 0)

c) What species is reduced? (be sure to record the oxidation number of your answer, even when it is 0)

d) What species is the oxidizing agent? (be sure to record the oxidation number of your answer, even when it is 0)

e) What species is the reducing agent? (be sure to record the oxidation number of your answer, even when it is 0)

f) How are the species of a redox reaction related to the “agents”?

0 +2 -1 +3 -1 0

2) Given: 2 Al(s) + 3 NiCl2(aq) à 2 AlCl3(aq) + 3 Ni(s)

a) Assign oxidation numbers to each species (I did it for you )

b) What species is oxidized? (be sure to record the oxidation number of your answer, even when it is 0)

c) What species is reduced? (be sure to record the oxidation number of your answer, even when it is 0)

d) What species is the oxidizing agent? (be sure to record the oxidation number of your answer, even when it is 0)

e) What species is the reducing agent? (be sure to record the oxidation number of your answer, even when it is 0)

0 +1 -1 +3 -1 0

3) Given: 2 Al(s) + 6 HCl(aq) à 2 AlCl3(aq) + 3 H2(g)

a) What species is oxidized? How do you know? ...The oxidation state

b) What species is reduced?

0 +4 -2 0 +2 -2

4) Given: Mg(s) + SiO2(s) à Si(s) + 2 MgO(s)

a) What species is the oxidizing agent? How do you know?

b) What species is the reducing agent?

0 0 +6 -2

\_\_\_5) Given: 2 N2(g) + 3 O2(g)  🡪 2 N2O3(g) Which species is the oxidizing agent?

a) N20 b) O20 c) N-3 d) O-2

0 +4

6) Given: 2 Fe2O3(s) + 3 C(s) → 4 Fe(s) + 3 CO2(g)

From a chemical (or redox) point of view, what happens to the three moles of carbon as they react with

the rust? The atoms of C0 are Defense:

\_\_\_7) Based upon the formula alone, in which compound is oxygen probably in a positive oxidation state?

a) NaOH b) Ag2O c) NaClO d) OF2

8) What is meant, in chemical terms, by the phrase: “Fluorine gas (F2(g)) is a strong oxidizing agent.”?

For question 9 a –c, use your knowledge of chemistry and the following passage, which is an adaptation from McQuarrie & Rock Descriptive Chemistry 1985 p. 153) Numbers for the lines of print have been provided.

**1** Copper is slightly less abundant than nickel and is found in many different ores. An

ore is a general term referring to the **rocks** that are really mixtures of a number of

**3** valuable minerals (a.k.a. elements or compounds).

Copper generally occurs as various sulfides, although in some ores copper is present in

the form of sulfates, carbonates and other oxygen containing compounds. Deposits of

**6** the free metal are very rare, being found only in Michigan. Most copper-containing

ores have a copper content of less than 1 percent, but some richer ores have up to

4 percent copper.

**9** Copper ores contain other metals and metalloids such as selenium, and tellurium,

which are important by-products when the copper ore is reduced to copper metal.

Some important copper minerals (a.k.a. compounds of copper) are ***chalcocite,*** (Cu2S),

***chalcopyrite*** (CuFeS2), and ***malachite*** (CuCO3•Cu(OH)2), which is a crystalline

mixture of two compounds.

9)

a) In lines 5-6 you read: *“Deposits of the free metal are very rare…”* What does the author mean by the

term “free metal”? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What is the oxidation state associated with

the atoms of the free metal copper? \_\_\_\_\_

b) In line 9 a reference is made to copper ore being reduced to copper metal. Chemically speaking,

what must happen to the metallic ions of an ore, in order to be reduced to the metal? \_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) What elements, other than metals and nonmetals may be obtained from refining copper ores?

+1 -1 +2 +5 -2 +2 -1 +1 +5 -2

\_\_\_10) Given the chemical equation: KI + Pb(NO3)2 🡪 PbI2 + KNO3 you can state that

a) no changes in oxidation states occur

b) lead changes in oxidation state from Pb+2 to Pb0

c) iodide changes in oxidation state from I0 to I-1

d) potassium changes in oxidation state from K+1 to K0

+1 -1 0 +1 -1 0

\_\_\_11) Given the chemical equation: 2 KCl + F2 🡪 2 KF + Cl2

The oxidation number of the fluorine atoms in F2 changes from:

a) -1 to -2 c) -1 to 0

b) -1 to +1 d) 0 to -1

ANSWERS

1) Given: F2(g) + 2KCl(aq) 🡪 2KF(aq) + Cl2(g)

a) Assign oxidation numbers to each species

b) What species is oxidized? Cl1-

c) What species is reduced? F20

d) What species is the oxidizing agent? F20

e) What species is the reducing agent? Cl1-

f) Answers will vary … think about how you identify an oxidized species …vs. an oxidizing agent … We’ll share answers in class….

2) Given: 2 Al(s) + 3 NiCl2(aq) à 2 AlCl3(aq) + 3 Ni(s)

a) Assign oxidation numbers to each species

b) What species is oxidized? Al0

c) What species is reduced? Ni2+

d) What species is the oxidizing agent? Ni2+

e) What species is the reducing agent? Al0

3) Given: 2 Al(s) + 6 HCl(aq) à 2 AlCl3(aq) + 3 H2(g)

a) What species is oxidized? Al0

b) What species is reduced? H1+

4) Given: Mg(s) + SiO2(s) à Si(s) + 2 MgO(s)

a) What species is the oxidizing agent? Si4+

b) What species is the reducing agent? Mg0

5) b) O20

6) From a chemical (or redox) point of view, what happens to the three moles of carbon as they react with

the rust? They are oxidized. Defense: The oxidation number of the C changes from 0 to +4

7) d) OF2

8) It is easily / readily reduced

9) a) +1

b) **The pure element**  **Zero (0)**

c) **They gain electrons**

d) metalloids such as Se and Te

10) a) no changes in oxidation states occur

11) d) 0 to -1