WINSMART ACADEMY

MOTTO: PERSONALISED TUTORING FOR LEADERS OF TOMORROW

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PHY202 - MODERN PHYSICS 1 EXAM SUMMARY

The _____ atom is the atomic system that can be solved exactly.
hydrogen

The _____ is the atomic system that can be solved exactly.
hydrogen atom

The hydrogen atom is the _____ that can be solved exactly.
atomic system

The hydrogen atom is the atomic system that can be solved exactly.
True

Much of what is learnt about hydrogen atom with its single electron can be extended to many electron atoms.
True

Experiments in _____ provide precise tests of theory for overall understanding of atomic structure.
hydrogen atom

Experiments in hydrogen atom provide precise tests of _____for overall understanding of atomic structure.
theory

Experiments in hydrogen atom provide precise tests of theory for overall understanding of_____.
atomic structure

The _____ that are used to describe the allowed states of hydrogen atom can be extended to complex atoms and for better understanding of periodic table.
quantum numbers

The quantum numbers that are used to describe the allowed states of ____can be extended to complex atoms and for better understanding of periodic table.
hydrogen atom

The quantum numbers that are used to describe the allowed states of hydrogen atom can be extended to complex atoms and for better understanding of____.
periodic table

The quantum numbers that are used to describe the allowed states of hydrogen atom can be extended to _____ and for better understanding of periodic table.
complex atoms

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The _____ numbers that are used to describe the allowed states of hydrogen atom can be extended to complex atoms and for better understanding of periodic table.
quantum

The quantum numbers that are used to describe the allowed states of hydrogen atom can be extended to complex atoms and for better understanding of periodic table.
True

The basic ideas of _____if well understood can be extended to molecular structures and the electronic structure of solids.
atomic structure

The basic ideas of atomic structure if well understood can be extended to _____and the electronic structure of solids.
molecular structures

The basic ideas of atomic structure if well understood can be extended to _____structures and the electronic structure of solids.
molecular

The basic ideas of _____ structure if well understood can be extended to molecular structures and the electronic structure of solids.
atomic

The basic ideas of atomic structure if well understood can be extended to molecular structures and the _____ of solids.
electronic structure

The basic ideas of atomic structure if well understood can be extended to molecular structures and the _____ structure of solids.
electronic

The basic ideas of atomic structure if well understood can be extended to molecular structures and the electronic structure of_____.
solids

The basic ideas of atomic structure_____
if well understood can be extended to molecular structures and the electronic structure of solids

The full mathematical solution of the _____ equation in modern physics applied to the hydrogen atom gives a complete and beautiful description of the atomic properties.
Schrodinger

The full mathematical solution of the ____in modern physics applied to the hydrogen atom gives a complete and beautiful description of the atomic properties.
Schrodinger equation

The full mathematical solution of the Schrodinger equation in modern physics applied to the _____ gives a complete and beautiful description of the atomic properties.
hydrogen atom

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The full mathematical solution of the Schrodinger equation in modern physics applied to the hydrogen atom gives a complete and beautiful description of the_____.
atomic properties

Modern Physics I is a course that intends to introduce you to the field of_____.
modern physics

_____ model of the hydrogen atom was widely accepted as the correct model.
Bohr's

Bohr's model of the hydrogen atom was widely accepted as the correct model.
True

_____ Exclusion Principle deals with the filling of electrons in the orbitals of atoms
Pauli

_____ deals with the filling of electrons in the orbitals of atoms
Pauli Exclusion Principle

Pauli _____ Principle deals with the filling of electrons in the orbitals of atoms
Exclusion

Pauli Exclusion Principle deals with the _____ of electrons in the orbitals of atoms
filling

Pauli Exclusion Principle deals with the filling of _____ in the orbitals of atoms
electrons

Pauli Exclusion Principle deals with the filling of electrons in the _____ of atoms
orbitals

Pauli Exclusion Principle deals with the filling of electrons in the orbitals of_____
atoms

Pauli Exclusion Principle deals with the _____ in the orbitals of atoms
filling of electrons

_____ is a smallest part of an element that can take part in a chemical reaction and retains all chemical properties of that element.
An atom

An atom is a _____ part of an element that can take part in a chemical reaction and retains all chemical properties of that element.
smallest

An atom is a smallest part of an element that can take part in a _____and retains all chemical properties of that element.
chemical reaction

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An atom is a smallest part of an element that can take part in a chemical reaction and retains all _____of that element.
chemical properties

An atom is ____ in shape.
spherical

An _____ is spherical in shape.
atom

An atom is spherical in shape.
True

____ has a nucleus that is positively charged and located at the centre of the atom.
An atom

An atom has a ____ that is positively charged and located at the centre of the atom.
nucleus

An atom has a nucleus that is _____charged and located at the centre of the atom.
positively

The ____ is made up of protons and neutrons.
nucleus

The nucleus is made up of _____ and neutrons.
protons

The nucleus is made up of protons and_____.
neutrons

The nucleus is made up of_____ and_____.
protons and neutrons

The nucleus is made up of protons and neutrons.
True

The ____ electrons move round the nucleus in energy shells.
negative

The _____ move round the nucleus in energy shells.
negative electrons

The negative electrons move round the _____ in energy shells.
nucleus

The negative electrons move round the nucleus in_____.
energy shells

The negative electrons move round the nucleus in ____ shells.
energy

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The negative electrons move round the nucleus in energy_____.
shells

The ____ are held together by strong Columbic forces.
electrons

The electrons are held together by strong ____ forces.
Columbic

The electrons are held together by strong____.
Columbic forces

The electrons are held together by strong Columbic forces.
True

The positively charged nucleus and the negatively charged _____combined to give an atom a neutral charge.
electrons

The positively charged nucleus and the negatively charged electrons combined to give ____a neutral charge.
an atom

The positively charged nucleus and the negatively charged electrons combined to give an atom a _____charge.
neutral

The positively charged nucleus and the negatively charged electrons combined to give an atom a_____.
neutral charge

Atoms have a radius of____.
10^{-10} m

The radius of the nucleus of an atom is_____.
10^{-16} m

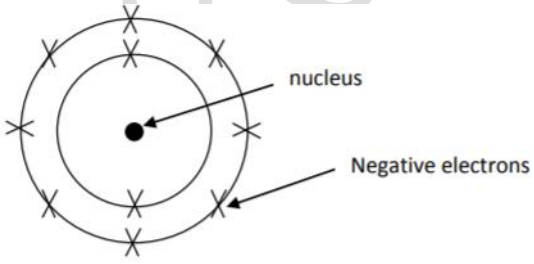


Fig. 1 An Atom

_____ consists of charges carried by electrons, protons, and neutrons
Electricity

Electricity consists of ____ carried by electrons, protons, and neutrons
charges

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Electricity consists of charges carried by____, protons, and neutrons
electrons

Electricity consists of charges carried by electrons, ____, and neutrons
protons

Electricity consists of charges carried by electrons, protons, and_____
neutrons

Electric charges are of ____forms
two

Electric charges are of two forms: _____and Negative.
Positive

Electric charges are of two forms: Positive and____.
Negative

_____ charges are called electrons
Negative

Positive charges are called_____.
protons

Negative charges are called _____
electrons

_____charges are called protons.
Positive

The minimum electric charge is denoted by a symbol_____
e

The electronic charge has a magnitude of ____Coulombs.
1.6×10^{-19}

Electrons carry a charge of_____
1.6×10^{-19} C

The _____contains neutrons, protons, and electrons which travel round the nucleus.
nucleus

The nucleus contains____, protons, and electrons which travel round the nucleus.
neutrons

The nucleus contains neutrons, ____, and electrons which travel round the nucleus.
protons

The nucleus contains neutrons, protons, and ____ which travel round the nucleus.
electrons

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The nucleus contains neutrons, protons, and electrons which travel round the____.
nucleus

The atom has a nucleus of radius _____
10^{-16} m

_____is quantized.
Electric charge

Electric charge is____.
quantized

Electric charge is quantized.
True

_____is a record of the chemical constituents of a substance separated according to their mass and presented as a spectrum as measured using a mass spectrometer.
Mass spectra

One version of this device is known as the_____.
Bainbridge mass spectrometer

_____ operates on the principle that a beam of ions is made to pass through a velocity selector.
Bainbridge mass spectrometer

In the ____ the charged particles all move with the same velocity.
velocity selector

In the velocity selector the ____ particles all move with the same velocity.
charged

In the velocity selector the ____ all move with the same velocity.
charged particles
In the velocity selector the charged particles all move with the same_____.
velocity

In the velocity selector the charged particles all move with the same velocity.
True

In the velocity ____the charged particles all move with the same velocity.
selector

In the velocity selector the charged ____ all move with the same velocity.
particles

In the velocity selector the charged particles all move with the ____ velocity.
same

_____ are elements with unequal mass number but equal atomic number (or same atomic number but different neutrons number)

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Isotopes

Isotopes are ____with unequal mass number but equal atomic number (or same atomic number but different neutrons number)
elements

Isotopes are elements with _____mass number but equal atomic number (or same atomic number but different neutrons number)
unequal

Isotopes are elements with unequal _____but equal atomic number (or same atomic number but different neutrons number)
mass number

Isotopes are elements with unequal mass number but ____atomic number (or same atomic number but different neutrons number)
equal

Isotopes are elements with unequal mass number but equal ____(or same atomic number but different neutrons number)
atomic number

Example 1. Any naturally occurring sample of chlorine contains 35Cl and 37Cl in the proportion 75.53% : 24.47%. For a sample of 100 atoms of 100 atoms of chlorine, determine the average mass of chlorine.

Solution

$$\text{Average mass} = 35X\frac{75.53}{100} + 37X\frac{24.47}{100}$$

$$= 35.50$$

$\therefore$ Relative atomic mass of Cl = 35.57

_____ records the chemical constituents of a substance separated according to their mass and presented as a spectrum as measured by a mass spectrometer.
Mass spectra

Mass spectra records the chemical constituents of a substance separated according to their _____and presented as a spectrum as measured by a mass spectrometer.
mass

Mass spectra records the ____constituents of a substance separated according to their mass and presented as a spectrum as measured by a mass spectrometer.
chemical

Mass spectra records the chemical constituents of a substance separated according to their mass and presented as a ____ as measured by a mass spectrometer.
spectrum

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Mass spectra records the chemical constituents of a substance separated according to their mass and presented as a spectrum as measured by a____.
mass spectrometer

Mass ____ records the chemical constituents of a substance separated according to their mass and presented as a spectrum as measured by a mass spectrometer.
spectra

Mass spectra records the chemical constituents of a substance separated according to their mass and presented as a spectrum as measured by a mass_____.
spectrometer

Mass spectra records the chemical constituents of a ____separated according to their mass and presented as a spectrum as measured by a mass spectrometer.
substance

Mass spectra records the chemical constituents of a substance separated according to_____
their mass and presented as a spectrum as measured by a mass spectrometer

_____ measures the charge to mass ratios.
Mass spectrometer

Mass _____ measures the charge to mass ratios.
spectrometer

Mass spectrometer measures the _____ to mass ratios.
charge

_____ spectrometer measures the charge to mass ratios.
Mass

Mass spectrometer measures the charge to____.
mass ratios

Mass spectrometer measures the charge to mass_____.
ratios

Mass spectrometer measures the charge to mass ratios.
True

_____ are elements with same atomic number but different neutrons number.
Isotopes

Isotopes are _____with same atomic number but different neutrons number.
elements

Isotopes are elements with _____ atomic number but different neutrons number.
same

Isotopes are elements with same _____ number but different neutrons number.
atomic

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Isotopes are elements with same atomic number but different ____ number.
neutrons

Isotopes are elements with same atomic number but different_____.
neutrons number

Isotopes are elements with same ____ but different neutrons number
atomic number

Naturally occurring Strontium contains 84Sr, 86Sr, 87Sr and 88Sr in relative abundance of 0.56%, 9.86%, 7.02%, 82.56% respectively. Calculate the relative atomic mass of Strontium. Answer is_____
87.71

The isotopes of iron are 54Fe, 56Fe, 57Fe and 58Fe in relative abundance of 5.84%, 91.68%, 2.17% and 0.31% respectively. Calculate the relative atomic mass of iron. Answer is_____
55.91

An ____ is a way the scientist gives its own picture of how an atom looks like.
atomic model

An atomic model is a way the ____ gives its own picture of how an atom looks like.
scientist

An atomic model is a way the scientist gives its own ____ of how an atom looks like.
picture

An atomic model is a way the scientist gives its own picture of how ____ looks like.
an atom

_____ is a way the scientist gives its own picture of how an atom looks like.
An atomic model

_____are various pictures of atom which scientists presented how an atom looks like.
Atomic models

_____ sees an atom as a homogeneous sphere of positive charges inside of which negatively charged electrons are attached.
J. J Thomson

_____ model of the atom was given the rather unlikely name of ‘’plum pudding model’’.
J. J Thomson model of an atom

J. J Thomson model of an atom model of the atom was given the rather unlikely name of ‘_____’’.
’plum pudding model

_____ model sees an atom consisting of a positively charged nucleus at the centre of an atom.
Rutherford’s

Negatively charged electrons move round the nucleus in circular orbit just like planets move round the sun.

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_____ charged electrons move round the nucleus in circular orbit just like planets move round the sun.
Negatively

_____ move round the nucleus in circular orbit just like planets move round the sun.
Negatively charged electrons

Negatively charged electrons move round the _____ in circular orbit just like planets move round the sun.
nucleus

Negatively charged electrons move round the nucleus in _____ just like planets move round the sun.
circular orbit

Negatively charged electrons move round the nucleus in _____ orbit just like planets move round the sun.
circular

Negatively charged electrons move round the nucleus in circular orbit just like ____ move round the sun.
planets

Negatively charged electrons move round the nucleus in circular orbit just like planets move round the_____.
sun

The following are the different models of an atom

- J. J Thomson model of an atom
- Rutherford's model
- Electron cloud model
- Bohr's models

J. J Thomson model is also called_____
Plum pudding model

_____ model of an atom was widely accepted as the correct model of an atom.
Bohr's

Bohr's model of an atom was widely accepted as the correct model of an atom.
True

The _____ are those for which the orbital angular momentum is equal to an integral multiple of) 2 (π h η η = and h is the Planck's constant.
allowed orbits

The allowed orbits are those for which the orbital angular momentum is equal to an integral multiple of) 2 (π h η η = and h is the ____ constant.
Planck's

The allowed orbits are those for which the orbital angular momentum is equal to an integral multiple of) 2 (π h η η = and h is the_____.
Planck's constant

L = mvr = n η where n = 1, 2, 3, 4, ------- and n is called_____.

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principal quantum number

_____can jump from the orbit
An electron

An electron can _____ from the orbit
jump

An electron can jump from the_____
orbit

An electron can jump from the orbit
True

The Bohr's theory of an atom are the following:
• Electrons can revolve round the nucleus in only in certain allowed orbits and while they are in these orbits they do not emit radiations (energy). Each orbit has a fixed amount of energy (has kinetic energy due to motion and potential energy due to attraction of the nucleus.)
• The allowed orbits are those for which the orbital angular momentum is equal to an integral multiple of) 2 (π h η η = and h is the Planck's constant. L = mvr = n η where n = 1, 2, 3, 4, ------- and n is called principal quantum number.
• An electron can jump from the orbit of energy E2 to another of energy E1 and the energy difference is emitted as one quantum of radiation of frequency f given by Planck's equation: E2 – E1 = hf

A ____ is a jump from one energy level to another.
transition

A transition is a ____ from one energy level to another.
jump

A transition is a jump from one ____ level to another.
energy

A transition is a jump from one energy level to another.
True

_____ are horizontal lines drawn one above the other to represent the energy levels in increasing order in a hydrogen atom.
Hydrogen spectra

Hydrogen spectra are _____ lines drawn one above the other to represent the energy levels in increasing order in a hydrogen atom.
horizontal

Hydrogen spectra are horizontal lines drawn one above the other to represent the _____in increasing order in a hydrogen atom.
energy levels

Hydrogen spectra are horizontal lines drawn one above the other to represent the energy levels in _____ order in a hydrogen atom.

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increasing

Hydrogen spectra are horizontal lines drawn one above the other to represent the energy levels in increasing order in a_____.
hydrogen atom

Hydrogen _____ are horizontal lines drawn one above the other to represent the energy levels in increasing order in a hydrogen atom.
spectra

Hydrogen spectra are horizontal lines ____one above the other to represent the energy levels in increasing order in a hydrogen atom.
drawn

_____ spectra are horizontal lines drawn one above the other to represent the energy levels in increasing order in a hydrogen atom.
Hydrogen

Hydrogen spectra are horizontal lines drawn one above the other to _____ the energy levels in increasing order in a hydrogen atom.
represent

Hydrogen spectra are horizontal lines drawn one above the other to represent the energy levels in increasing order in a ____ atom.
hydrogen

Hydrogen spectra are_____
horizontal lines drawn one above the other to represent the energy levels in increasing order in a hydrogen atom

_____ is the energy an electron gives out or absorbs when it jumps to another energy level.
Transition energy

Transition energy is the _____ an electron gives out or absorbs when it jumps to another energy level.
energy

Transition energy is the energy an _____ gives out or absorbs when it jumps to another energy level.
electron

Transition energy is the energy an electron gives out or ____ when it jumps to another energy level.
absorbs

_____ energy is the energy an electron gives out or absorbs when it jumps to another energy level.
Transition

Transition energy is the energy an electron gives out or absorbs when it jumps to another_____.
energy level

Transition energy is the energy an electron gives out or absorbs when it ____ to another energy level.
jumps

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In Bohr's model of hydrogen atom, ____which are negatively charged revolve round the nucleus of an atom which is positively charged in certain allowed orbits.
electrons

In ____ model of hydrogen atom, electrons which are negatively charged revolve round the nucleus of an atom which is positively charged in certain allowed orbits.
Bohr's

In Bohr's model of hydrogen atom, electrons which are _____charged revolve round the nucleus of an atom which is _____ charged in certain allowed orbits.
negatively, positively

In Bohr's model of hydrogen atom, electrons which are negatively charged revolve round the _____of an atom which is positively charged in certain allowed orbits.
nucleus

In Bohr's model of hydrogen atom, electrons which are negatively charged revolve round the nucleus of an atom which is positively charged in certain allowed_____.
orbits

The magnitude of the dipole is given by _____
multiplying the size of one of the charge q by the distance apart. i.e μ = q X r

The quantity mv is called_____
momentum

The product mv X r (i.e momentum times distance of the electron from the nucleus of an atom) is called the_____
angular momentum of an atom

The _____ mv X r (i.e momentum times distance of the electron from the nucleus of an atom) is called the angular momentum of an atom.
product

The product mv X r (i.e momentum times distance of the electron from the nucleus of an atom) is called the _____ of an atom.
angular momentum

The product mv X r is called the_____.
moment of momentum

_____ is when two charges of equal magnitude but oppositely charge are separated by a distance, the product of one of the charge and the distance separating them is the dipole moment.
Magnetic dipole moment

Magnetic dipole moment is when ____
two charges of equal magnitude but oppositely charge are separated by a distance, the product of one of the charge and the distance separating them is the dipole moment

Magnetic dipole moment is when _____charges of equal magnitude but oppositely charge are separated by a distance, the product of one of the charge and the distance separating them is the dipole moment.

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two

Magnetic dipole moment is when two charges of ____ magnitude but oppositely charge are separated by a distance, the product of one of the charge and the distance separating them is the dipole moment.
equal

Magnetic dipole moment is when two charges of equal _____ but oppositely charge are separated by a distance, the product of one of the charge and the distance separating them is the dipole moment.
magnitude

Magnetic dipole moment is when two charges of equal magnitude but oppositely charge are separated by a_____, the product of one of the charge and the distance separating them is the dipole moment.
distance

Magnetic dipole moment is when two charges of equal magnitude but oppositely charge are separated by a distance, the _____ of one of the charge and the distance separating them is the dipole moment.
product

Magnetic dipole moment is when two charges of equal magnitude but oppositely charge are separated by a distance, the product of one of the charge and the distance separating them is the_____.
dipole moment

Magnetic dipole moment is when two charges of equal magnitude but _____are separated by a distance, the product of one of the charge and the distance separating them is the dipole moment.
oppositely charge

_____ is defined as the property of an electron which gives rise to its angular momentum about an axis within the electron.
Electronic spin

Electronic spin is defined as_____
the property of an electron which gives rise to its angular momentum about an axis within the electron

Electronic spin is defined as the property of an electron which gives rise to its ____ about an axis within the electron.
angular momentum

Electronic spin is defined as the property of an electron which gives rise to its _____momentum about an axis within the electron.
angular

Electronic spin is defined as the property of an electron which gives rise to its angular _____about an axis within the electron.
momentum

Electronic spin is defined as the property of an electron which gives rise to its angular momentum about an _____ within the electron.
axis

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Electronic spin is defined as the property of an electron which gives rise to its angular momentum about an axis within the_____.
electron

_____ have a magnetic field and behave like tiny bar magnets.
Electrons

Electrons have a _____ and behave like tiny bar magnets.
magnetic field

Electrons have a magnetic field and behave like _____ bar magnets.
tiny

Electrons have a magnetic field and behave like tiny ____magnets.
bar

Electrons have a magnetic field and behave like tiny bar_____.
magnets

Electrons have a ____ field and behave like tiny bar magnets.
magnetic

Electrons have a magnetic field and behave like_____.
tiny bar magnets

When _____ (or electrons) move round in a circle (around the nucleus) a magnetic field is set up.
electric charges

When electric charges (or electrons) move round in a _____(around the nucleus) a magnetic field is set up.
circle

When electric charges (or electrons) move round in a circle (around the nucleus) a _____ is set up.
magnetic field

The _____ is used to describe an atom magnetic properties.
spin

The spin is used to describe an atom____.
magnetic properties

The spin is used to describe an atom _____ properties.
magnetic

The electrons have_____ different spins
two

The electrons have two different spins: _____ or spin down.
spin up

The electrons have two different spins: spin up or_____.
spin down

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The spin of an electron is described by the_____.
spin quantum number

The spin of an electron in an atom can have a value of _____
+ ½ or - ½

The magnetic spin quantum number can be _____.
ms = + ½ or ms = - ½

The _____states that when two electrons go into the same orbital, one electron has spin ms = + ½ and the other has ms = - ½ .
Pauli exclusion

The Pauli exclusion states that_____
when two electrons go into the same orbital, one electron has spin ms = + ½ and the other has ms = - ½

_____ states that ''it is impossible for two electrons with the same spin quantum number to be in the same orbit''.
Pauli Exclusion Principle

_____ is the orbital and spin arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
Electronic configuration

Electronic configuration is the _____ and spin arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
orbital

Electronic configuration is the orbital and ____ arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
spin

Electronic _____ is the orbital and spin arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
configuration

Electronic configuration is the ____ and____ arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
orbital and spin

Electronic configuration is the orbital and spin arrangement of _____in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
electrons

Electronic configuration is the orbital and spin arrangement of electrons in the_____, specifying the quantum numbers of the electrons in the atom in a given state.
atom

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Electronic configuration is the orbital and spin arrangement of electrons in the atom, specifying the ____ of the electrons in the atom in a given state.
quantum numbers

Electronic configuration is the orbital and spin arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given_____.
state

_____ is also called electronic structure.
Electronic configuration

Electronic configuration is also called_____.
electronic structure

The electronic arrangements of the orbital and spin arrangement of electrons in the atom follow three rules:
1. Electrons go into orbital's with the lowest energy.
2. The Pauli exclusion principle has two versions
i. It is impossible for two electrons with the same spin quantum number to be in the same orbital.
ii. An orbital can contain a maximum of two electrons.
3. Hund's rule: Electrons will fill a set of degenerate orbital by keeping their spin parallel.

Electrons go into orbital's with the _____ energy.
lowest

The Pauli exclusion principle has _____ versions
two

The _____ principle has two versions
Pauli exclusion

The _____ exclusion principle has two versions
Pauli

An orbital can contain a maximum of ____ electrons
two

An orbital can contain a ____ of two electrons
maximum

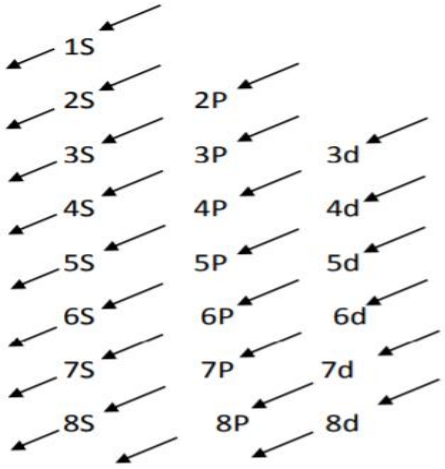
An _____ can contain a maximum of two electrons
orbital

An orbital can contain a maximum of two electrons
True

The _____ method is a way of building up electron structure using the above three rules.
Aufbau

The summary of the Aufbau method is shown below:

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Following the arrows, the electronic structure for the first few elements are:
H= 1S1
He = 1S2
Li = 1S2 , 2S1
Be = 1S2 , 2S2
B = 1S2 , 2S2 , 2P1 and so on.

Write down the electronic structure of Nickel, atomic number 28
$1S^2$, $2S^2$, $2P^6$, $3S^2$, $3P^6$, $4S^2$, $3d^8$

Write down the electronic structure of Zinc, atomic number 30
$1S^2$, $2S^2$, $2P^6$,$3S^2$, $3P^6$, $4S^2$, $3d^{10}$

Electrons fill orbitals in the order_____
1s, 2s, 2p, 3p, 4s, 3d, 4p, 5s, 4d, 5p, 6s, …….

The rules for filling orbitals are the following:
i. As far as possible, electrons will go in the orbital with the lowest energy
ii. The Pauli exclusion principle says that: It is impossible for two electrons with the same spin quantum number to be in the same orbital.
iii. Hund's rule says that: Electrons will start to fill a set of degenerate orbitals keeping their spins parallel.

The 11 electrons of sodium are arrange in the order _____
$1s^2$, $2s^2$, $2p^6$, $3s^1$

Sodium has _____ number of electrons
11

_____ are high – energy photons that are produced when electrons jump (or make transition) from one atomic orbit to another.
X – ray

_____ occurs when photoelectric effect (or free electrons) of high energy (in order of thousands electro volt) penetrate deep into atoms and knock out electrons from deep energy levels.
X – ray

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The fall of electrons from higher energy levels into the gaps left by the knocked-out electrons cause_____
the emission of high energy X – rays

_____ are produced due to electron transition from one orbital to another or when fast moving electron are stopped by a metal target.
X –rays

X –rays are produced due to electron transition from one orbital to another or when fast moving electron are stopped by a_____.
metal target

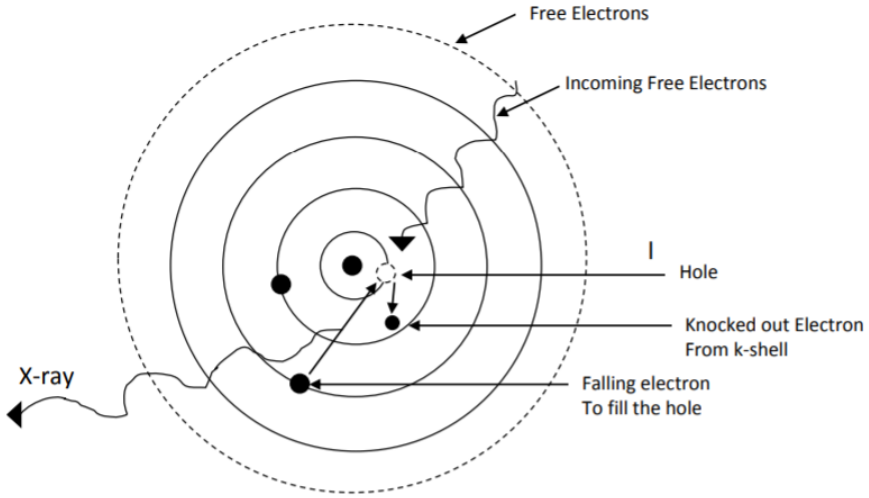


Fig. 7 X-ray production

X – Ray Spectra:

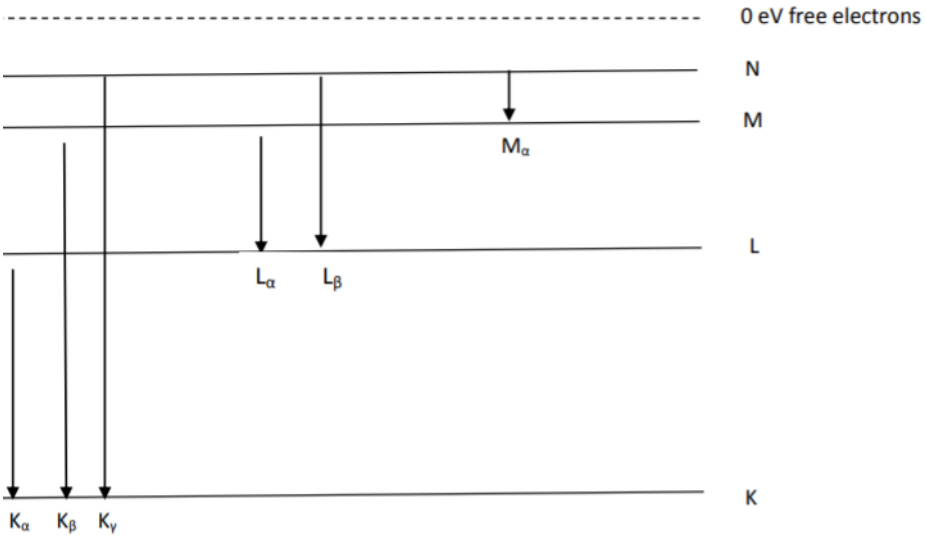


Fig. 8 X – ray spectra

X –rays are produced due to ____ from one orbital to another or when fast moving electron are stopped by a metal target.

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electron transition

X –rays are produced due to electron transition from one orbital to another or when fast moving electron are stopped by a _____target.
metal

X –rays are produced due to electron transition from one orbital to another or when fast moving electron are ____ by a metal target.
stopped

The energy and quality of X – rays produced depends on_____
the energy level which the electrons transition takes place

_____ duality means that matter exhibit wave properties and particle properties.
Wave – particle

Wave – particle duality means that matter exhibit _____and particle properties.
wave properties

Wave – particle duality means that matter exhibit wave properties and_____.
particle properties

Wave – particle duality means that matter exhibit _____ properties and particle properties.
wave

Wave – particle duality means that matter exhibit wave properties and ____ properties.
particle

Wave – particle duality means that matter exhibit _____
wave properties and particle properties

Wave properties are _____
diffraction, interference, reflection, refraction, polarization, and superposition and the particle properties are mass, momentum etc

The equation p h mv h λ = = is called_____
De Broglie equation

_____ exhibit both wave and particle
Matter

Matter exhibit both ____ and particle
wave

Matter exhibit both wave and _____
particle

Matter exhibit both _____ and_____
wave and particle

_____ equation sums up the wave – particle duality.

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De Broglie

The key properties of any nucleus include the following

- mass
- radius
- binding energy
- mass defect
- binding energy per nucleon
- angular momentum

_____ is the energy needed to add to the nucleus to separate it into individual protons and neutrons (or nucleons).
Binding energy

_____ is the binding energy divided by the total number of protons and neutrons.
Binding energy per nucleon

Binding energy per nucleon is the _____ divided by the total number of protons and neutrons.
binding energy

Binding energy per nucleon is the binding energy divided by the total number of _____ and neutrons.
protons

Binding energy per nucleon is the binding energy divided by the total number of protons and_____.
neutrons

Binding energy per nucleon is the binding energy divided by the total number of_____ and_____.
protons and neutrons

The total mass of separated neutrons and protons is greater than the mass of the nucleus
True

_____ is the difference in mass between the total mass of individual protons and neutrons and the mass of the nucleus.
Mass defect

Mass defect is the difference in ____ between the total mass of individual protons and neutrons and the mass of the nucleus.
mass

Mass defect is the difference in mass between_____
the total mass of individual protons and neutrons and the mass of the nucleus

Mass defect is_____
the difference in mass between the total mass of individual protons and neutrons and the mass of the nucleus

Mass and energy are related by_____
$E = mc^2$

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amu is an abbreviation for_____
Atomic mass unit

The _____ of the atom depends on both the number of protons and neutrons in the atom.
stability

The stability of the atom depends on both the number of _____ and neutrons in the atom.
protons

The stability of the atom depends on both the number of protons and _____ in the atom.
neutrons

The stability of the atom depends on_____
both the number of protons and neutrons in the atom

The stability of the atom depends on both the number of ____ and____ in the atom.
protons and neutrons

For stable nuclides the following points emerge.
i. The lightest nuclides have almost equal number of protons and protons.
ii. The heaviest nuclides require more neutrons than protons, the heaviest having about 50% more.
iii. Most nuclides have both an even number of protons and neutron.

For unstable nuclides, the following can be noted.
i. They continue to disintegrate until new stable nuclides is formed.
ii. An unstable nuclide nuclear can undergo -1 β decay so as to give an increase of proton number (in which a neutron changes to a proton and an electron). It's neutron – to – proton ratio is thereby decreased.
iii. A n unstable nuclide can undergo a decay so that its proton number decreases and its neutron – to – proton ratio increases.

An ____ nuclear can undergo -1 β decay so as to give an increase of proton number (in which a neutron changes to a proton and an electron).
unstable nuclide

A _____ can undergo a decay so that its proton number decreases and its neutron – to – proton ratio increases.
unstable nuclide

There are ____ types of nuclei
two

The two types of nuclei are _____ and_____
stable nuclei and unstable nuclei

The two types of nuclei are _____ and unstable nuclei
stable nuclei

The two types of nuclei are stable nuclei and _____
unstable nuclei

_____ is the spontaneous emission of α, β, and γ by unstable nuclides to become stable.

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Radioactivity

Radioactivity is_____
the spontaneous emission of α, β, and γ by unstable nuclides to become stable

Radioactivity is the ____of α, β, and γ by unstable nuclides to become stable.
spontaneous emission

Radioactivity is the spontaneous ____of α, β, and γ by unstable nuclides to become stable.
emission

Radioactivity is the spontaneous emission of ____by unstable nuclides to become stable.
α, β, and γ

Radioactivity is the spontaneous emission of α, β, and γ by ____ nuclides to become stable.
unstable

Radioactivity is the ____ emission of α, β, and γ by unstable nuclides to become stable.
spontaneous

Radioactivity is the spontaneous emission of _____
α, β, and γ by unstable nuclides to become stable

Radioactivity is the spontaneous emission of α, β, and γ by unstable nuclides to become_____.
stable

Radioactivity is the spontaneous emission of α, β, and γ by ____ to become stable.
unstable nuclides

Radioactivity is the spontaneous emission of α, β, and γ by _____ nuclides to become_____.
unstable, stable

_____ states that ''the rate of disintegration of a given nuclide at anytime is directly proportional to the number of nuclei N of the nuclide present at that time''.
Radioactive decay law

The unit of λ is_____.
disintegration per second

_____ is the time taken for radioactive nuclei to decay by half its original (or initial) quantity.
Half – life

_____ is denoted by T1/2.
Half – life

Half – life is denoted by____.
T1/2

In 24 days a radioactive isotope decreases from 64g to 2g. What is the half-life of the radioactive material? The answer is_____
T1/2 4.8 days

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The half – life of a radioactive substance is 5.2 years. How long does it take for 60% of a given mass of the material to disintegrate? The answer is_____
t=6.9 years

_____ is a sequence of nuclides, each of which transforms by radioactive disintegration into the next, until a stable nuclide is reached.
Radioactive series

_____ series is a sequence of nuclides, each of which transforms by radioactive disintegration into the next, until a stable nuclide is reached.
Radioactive

Radioactive series is a_____, each of which transforms by radioactive disintegration into the next, until a stable nuclide is reached.
sequence of nuclides

Radioactive series is a sequence of____, each of which transforms by radioactive disintegration into the next, until a stable nuclide is reached.
nuclides

Radioactive series is a sequence of nuclides, each of which transforms by ____into the next, until a stable nuclide is reached.
radioactive disintegration

Radioactive series is a sequence of nuclides, each of which transforms by _____ disintegration into the next, until a stable nuclide is reached.
radioactive

Radioactive series is a sequence of nuclides, each of which transforms by radioactive disintegration into the next, until a ____ nuclide is reached.
stable

Radioactive series is a sequence of nuclides, each of which transforms by radioactive disintegration into the next, until a ____ is reached.
stable nuclide

Radioactive series is a sequence of nuclides, each of which transforms by radioactive ____ into the next, until a stable nuclide is reached.
disintegration

Radioactive ____ is a sequence of nuclides, each of which transforms by radioactive disintegration into the next, until a stable nuclide is reached.
series

Radioactive series is a sequence of nuclides, each of which transforms by radioactive disintegration into the next, until a stable nuclide is_____.
reached

_____ is also known as decay series or disintegration series.
Radioactive series

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Radioactive series is also known as ____ or disintegration series.
decay series

Radioactive series is also known as decay series or_____.
disintegration series

_____ are machines built to accelerate charge particles such as protons to high speed by means of potential differences of hundreds of thousands of volts for nuclear physicists' experiments.
Accelerators

There are _____types of accelerators
four

The following are the types of accelerators:
1. Van de Graff generator
2. Linear accelerator
3. Cyclotron
4. Synchrotron

_____ are sensing devices which sense the presence of charges or changes in something such as radiation or pressure.
Detectors

Detectors are _____devices which sense the presence of charges or changes in something such as radiation or pressure.
sensing

Detectors are sensing devices which sense the presence of charges or changes in something such as ____or pressure.
radiation

Detectors are sensing devices which sense the presence of charges or changes in something such as radiation or____.
pressure

Detectors are _____
sensing devices which sense the presence of charges or changes in something such as radiation or pressure

In a nuclear radiation detector energy is transform from the radiation to atoms of the detector and may cause:
i. Ionization of a gas in the ionization chamber e.g Geiger Muller tube, a cloud or bubble chamber.
ii. Exposure of a photographic emulsion.
iii. Fluorescence of a phosphor as in a scintillation counter.
iv. Mobile charge carriers in a semiconductor solid state detector
_____ is detected by the effect it produces.
Radiation

The radiation is detected by the _____ it produces.
effect

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The following are the types of detectors
1. Ionization Chamber
2. Geiger Muller tube
3. Cloud Chamber
4. Bubble Chamber
5. Scintillation counter
6. Solid state detector

A ____ works on the principle that the radiation produces an effect on it.
detector

A detector works on the _____ that the radiation produces an effect on it.
principle

A detector works on the principle that the _____ produces an effect on it.
radiation

A detector works on the principle that_____
the radiation produces an effect on it

_____ combines both electric and magnetic fields to accelerate charged particles.
Accelerators

_____ operates on the principle that the radiation produce an effect on the detector.
Detectors

The lowest energy level E1 of an atom is called_____ state energy.
ground

The positively charged nucleus and the negatively charged electrons combined to give a neutral atom of radius _____.
10-10 m

Charge quantization is also referred to as _____.
Discrete form of charge

Charge quantization is also referred to as ____ form of charge
Discrete

In Bainbridge mass spectrometer, when charged particles move in the straight horizontal line through both electrical and magnetic fields, the velocity is ____
V = E/B

_____measures the different isotopes of anion.
Mass Spectrometer

Elements of the same atomic number that have different neutrons number are known as _____.
Isotopes

J. J Thomson model of an atom can also be referred as _____

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Plum pudding model

Which model visualises an atom just like planets move around the sun?
Rutherford's model

The atomic model which presents the atom as consisting of positively charged nucleus at the centre of an atom and negatively charged electrons moving round the nucleus in circular orbits is _____.
Rutherford's model

An electron jump from the orbit of energy E2 to and orbit of energy E1 leads to emission of_____
Radiation

An electron jump from the orbit of energy E2 to and orbit of energy E1 leads to emission of ____
Radiation

The lowest lying energy level Eo in the hydrogen spectra is the ____
Ground state

The wavelength of the photon emitted when an electron falls from energy level of 0.56 eV to -1.54 eV is_____.
5.93 x 10-7 m

The arrangement of a negative charge and a positive charge of equal magnitudes a distance r apart from one another is called _____.
an electric dipole

Dipole moment, μ is calculated from the following relation __ ___
μ = q x r

The product of linear momentum, mv and the distance of the electron from the nucleus of an atom r is called _____.
Angular momentum

In Rutherford Nuclear atom model, electron distribution gives ____to the atom
stability

In _____ Nuclear atom model, electron distribution gives stability to the atom
Rutherford

The possible values of the spin quantum number ms are ____.
+1/2 and -1/2

_____ is the property of an electron which is responsible for its angular momentum about an axis within the electron.
Electronic spin

Two possible directions which the electron spin can point at are _____.
Up, down

"It is impossible for two electrons with the same spin quantum number to be in the same orbit ", is a statement of ____ principle.

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Pauli exclusion

Orbital and spin arrangement of electrons in the atom follow the ____ method.
Aufbau

_____ is the orbital and spin arrangement of electrons in the atom, specifying the quantum numbers of the electrons in the atom in a given state.
Electronic Configuration

_____ states that electrons will fill a set of degenerate orbitals by keeping their spin parallel.
Hund's rule

The electronic structure of Nickel, atomic number 28, is_____
1S2, 2S2, 2P6, 3S2, 3P6, 4S2, 3d8

In the X-ray spectra, K-series X-ray are produced when an electron is knocked out of the _____ K-shell.
Lowest

_____ are produced when fast moving electrons are stopped by a metal target.
X-rays

The quality and energy of X-rays produced depend on the _____ at which the electron transition takes place.
energy level

When electrons from L-Shell move in to fill a gap in K-Shell, _____ are produced.
Kα X-rays

The electronic configuration of Zinc, atomic number 30, is _____.
1S2, 2S2, 2P6, 3S2, 3P6, 4S2, 3d10

X – rays is produced when ____ are stopped by a metal target.
fast electrons

_____occurs when free electrons of high energy penetrate deep into atoms and knock out electrons from deep energy levels.
Photoelectric effect

_____ of high-energy photons are produced when electrons jump from one atomic orbit to another
X-ray

When electrons undergo series of transitions between K, L, M and N – shells is known as_____
X – ray spectra

The orbital and spin arrangement of electrons in the atom is called_____ configuration
electronic

The energy and quality of X-rays produced depends on the ____ which the electrons transition takes place.
Energy level

The property of an electron which gives rise to its angular momentum about an axis within the electron defines one of the following?

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electronic spin

Which of the following is quantized according to Bohr's theory of atom?
Angular momentum of electron

All but one are the properties of waves_____
Excitation

Einstein's energy mass equation is related by E=mc2. What is C?
Speed

If unstable nuclide undergo beta decay, this will lead to an increase in the number of one of these particles?
Proton

Which nuclides require more neutrons than protons?
heaviest nuclides

The principal quantum number is normally represented by one of these symbols?
L

The potential energy acquired by an electron is attributable to one of the following?
attraction of the nucleus

Which of these scientists visualized an atom as consisting of positively charged nucleus at the centre of an atom?
Rutherford

The negative electric charges are usually called ____.
Electrons

If the emitted radiation should increase in wavelength, the electron continuously loses one of the following as it spirals inward toward the nucleus.
Energy

X-ray wavelength can be measured quite precisely by one of these methods____
crystal diffraction techniques

Electrons in an X-ray tube are accelerated by a potential difference of 10.0kv. If an electron produces one proton on impact with the target, what is the minimum wavelength of the resulting x-rays?
0.124nm

X-rays have many practical application in medicine and industry because x-ray photons are of_____
high energy

Which of the following is not a model of atom?
Albert Einstein model

The energy emitted during excitation is accompanied by ____.
Gamma rays

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The X-rays in the same series, say K or L produced from an element of higher atomic weight is _____ that produced from an element of low atomic weight
less than

The key properties of the nucleus include the following except_____
Heat energy

The following points hold for a stable nuclides except_____
Binding energy is small

The following are types of detectors except____
infra-red

The following are the component of mass spectrometer except_____
magnetic plate

_____ measures the different isotopes of anion.
mass spectrometer

Kα are x-ray produced when electron from (L) shell move in to fill the gap in one of these shells.
L

Who suggested that the orbital angular momentum experienced by an electron in allowed orbit is equal to an integral multiple of ____? (Where h is the Planck's constant. L = mvr = n ħ where n = 1, 2, ____ and n is called principal quantum number).
Bohr's model

Which of the following is not a Bohr's postulate?
An atom or ion emits radiation when an electron makes a transition from an initial allowed orbit with a **quantum ni to a final allowed orbit with quantum number nf.**

X-ray emission is the inverse effect of one of these process_____
photoelectric effect

Which of these is formed as a consequence of transformation of the kinetic energy of an electron into the energy of a proton?
X-ray

The transformation of energy of a photon into kinetic energy of an electron is called _____.
photoelectric emission

When an electron jumps from higher orbit to a lower orbit, it _____energy.
Absorbs

An electron can move in an orbit of certain radius. This is a statement of which of these great scientists?
Bohr's theory of atom

The frequency of electromagnetic radiation emitted by a hydrogen atom which undergoes a transition between energy levels of -1.36 X 10-19 J and -5.45 X 10-19 J, is _____ (Use Planck's constant h = 6.6 X 10-34 Js)
102.6 Hz

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The wavelength of the radiation associated with a transition from energy levels (-4.0 eV) to (-1.8 eV) is _____.
5.625 x 10-7 m

An unstable nuclide can undergo a decay so that its proton number_____
decreases

The integral multiple of charge e equals ne. What is n?
Any number

In what form does charges exist?
Discrete

In the mass spectrometer the ions in the second magnetic field undergo_____
Circular motion

In the velocity selector the charged particles move with_____
Uniform speed
_____ gives the description of allowed states of hydrogen atom
Quantum number

What is the nuclide present after 2 series of alpha decay of Radion-220?
Lead-212

Emission of alpha, gamma and beta particles from nucleus depict _____.
Instability

What emission gives rise to a decrease in proton number?
Alpha

What is a decay giving rise to a neutron - to proton ratio decrease called?
Beta

What happens to the atomic number and mass number of a nucleus that emits a gamma-ray photon?
both remains unchanged

During the decay of a radionuclide, its half-life_____
does not change

An alpha particle consists of_____
two protons, two neutrons, and two electrons

The time in which half of any large sample of identical nuclei will undergo decomposition is called_____
half life

The most penetrating of the following radiations is_____
gamma ray

If an atom's atomic number is given by Z, its atomic mass by A and its neutron number by N, which of the following is correct?

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N = A -Z

The reciprocal of half life of a nuclide is its_____
decay constant

The rate of disintegration of a given nuclide at anytime t is directly proportional to the number of nuclei N of the nuclide present at that time
radioactive decay law

Radioactive decay is____, ____, and_____
Instantaneous, random and statistical

Gamma rays have the same basic nature as_____
x-rays

Matter exhibits___ behaviours
dual

The isotopes of an element all have the same____
atomic number

The weakest of the four fundamental interactions is the_____
gravitational

It is impossible for two electrons with the same spin quantum number to be in the same orbital. According to_____
Pauli exclusion principle

According to Pauli exclusion principle. Two electrons in the same orbital have_____
opposite spins

What parts of its structure are chiefly responsible for an atom's mass?
nucleus

The atomic number of an element is the number of_____
protons in its nucleus

The property of an electron which gives rise to its angular momentum about an axis within the electron is its_____
electron spin

Nearly all the volume occupied by matter consists of_____
empty space

Maximum number of electrons that can be accommodated in a shell is given by_____
2n2

When an electron shifts to an inner shell, it_____
Emits a photon

Decrease in wave numbers occurs from____

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Lyman to Pfund series

Calculate the frequency of electromagnetic radiation emitted by a hydrogen atom which undergoes a transition between energy levels of -1.36 X 10-19 J and -5.45 X 10-19 J. (Take Planck's constant h = 6.6 X 10-34 Js)
6.2Ã—1014 Hz

How many electrons are there in a closed l = 3 subshell?
14

Determine the minimum energy required to eject an electron in the lowest state from the atom?
16 eV

When an atom absorbs a photon of light, which one of the following can happen?
An electron shifts to a state of higher principal quantum number

A proton and an electron come together to form a hydrogen atom in its ground state. If a single photon is emitted in this process, what is its frequency? (The energy of a hydrogen atom in its ground state is â^'2.13 Ã— 10-18 J; h = 6.63 Ã— 10-34 Js)
3.3 Ã— 1015 Hz

Lines which shows spectrum of hydrogen atom are_____
isolated

The wavelengths in the bright-line emission spectrum of an element are_____
characteristic of the particular element

How much energy is needed to remove the electron from a hydrogen atom when it is in the n = 4 state?
0.85 eV

A photon is emitted by an atom when one of the atom's electrons_____
shifts to a lower energy level

How many electrons are able to share an orbital in an atom?
2

Elements having same mass number but different atomic number are_____
Isobars

The series of spectral lines obtained when an electron jumps in n1 orbit is called_____
Lyman series

What is the number of atomic orbitals in nth shell?
n2

Which of the following was not a proposition of Rutherford model of an atom?
Nucleus consists of protons and neutrons

Which of the Bohrâ's postulates was incorrect?
Electrons revolve around the nucleus in fixed circular orbits

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Isotopes of an element have nuclei with____
same number protons but different numbers of neutrons

Which particles primarily determine the mass of a given atom?
neutrons and protons

The number of protons and neutrons in a given atom defines the____
mass number

Which series is further divided into smaller lines?
Balmer series

When an electron shifts to an inner shell, it_____
Emits a photon

An atom has a radius of_____
10-10 m

A record of the chemical constituents of a substance separated according to their mass and presented as a spectrum is known as_____
mass spectra

Atoms of same element having same atomic number but different atomic mass are____
Isotopes

The radius of the nucleus of an atom is_____
10-16 m

If the electric field in the velocity selector of a Bainbridge mass spectrograph is 104 V/m and the magnetic flux density in both magnetic fields is 0.2 Wb/m2 what is the speed of an ion which will go undeviated through the slit system?
5Ã—104 m/s

What are fundamental constituents of an atom?
protons, neutrons and electrons

A hydrogen atom is in its ground state. Incident on the atom is a photon having an energy of 10.5 eV. What is the result?
The photon passes by the atom without interaction

Nuclides having same neutron number but different proton number are_____
Isotones

Which of the following defines the decay constant lambda of a radioactive nuclide?
activity/number of undecayed nuclei

A radioactive material has a half-life of 3 minutes. If you begin with 512 000 radioactive atoms, **approximately how many would you expect to have after 12 minutes?**

Which of the following is NOT correct about unstable nuclides?
An unstable nuclide nuclear can undergo decay so as to give an increase of mass number

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Which of the following is NOT correct about the stability of nuclides?
The lightest nuclides have greater number of protons then neutrons

The stability of the atom depends on ____ in the atom
both the number of protons and neutrons

Which nuclei have the largest average binding energy per nucleon? The ones with nucleon number____
between30 and 100

The wave behaviour of tennis balls is not observed because____
their wavelengths are too small

The chemical identity of an atom is determined by the number of____ in its nucleus
protons

How many quantum states are there in n = 3?
18

The DeBroglie waves can be regarded as ____ waves
probability

As the speed of a particle increases, the de Broglie wavelength of the particle____
decreases

The wave behaviour of tennis balls is not observed because____
their wavelengths are too small

Which of the following terms cannot be used to describe both an electron and an atom?
mass

Bohr's model predicts that the energies of an element's characteristic X rays
increase with increase in atomic number

The spikes in the spectrum of X-rays are due to____
photons absorbed by electrons in the ground state

Sulphur is element number 16. how many electrons do you expect to find in each shell of the sulphur atom?
2,8,6

The statement that "no two electrons can have the same set of quantum numbers" is____
Pauli's exclusion principle

In the hydrogen atom, if the quantum number n=3, what values can l take on?
0,1,2

The orbital quantum number determines the ____ of the atom
angular

If the energy of the Bohr hydrogen atom is greater than zero, then the____
the electron is no longer bound to the nucleus

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"An electron can circle an atomic nucleus indefinitely without radiating energy if its orbit an integral number of electron wavelengths in circumference" is a statement of ____
Bohr's theory of the hydrogen atom

The plum pudding model of the atom was proposed by____
J. J. Thomson

Evaluate the ionization potential of hydrogen, E^{o}_{1}, in units of electron-volts (eV).
13.6

An electron in the ground state of the Bohr atom has a radius of 0.053 nm. What is the radius of the first excited state?
0.212 nm

Which of the following is NOT a feature of the Bohr model of the atom?
an electron probability cloud

The chemical identity of an atom is determined by the number of ____ in its nucleus
protons

Atoms whose nuclei contain the same number of protons but different numbers of neutrons are called____
isotopes

Which of the following is NOT considered to be a success of Bohr's theory of the atom?
Explaining why electrons in fixed orbits do not radiate

The term charge quantization refers to the fact that____
any charge is an integral multiple of the electronic charge

The interaction which is responsible for the existence of bulk matter is the____
electromagnetic interaction

Which of the following is NOT true about the atom?
The protons are chargeless

Which of the following experiments does NOT demonstrate the wavy property of matter?
photoelectric effect

Which of the following is NOT correct about x-ray spectra?
The K-series x-rays are less penetrating than the L-series x-rays

The atomic number of sulphur is 16. How many electrons do you expect to find in each shell of a sulphur atom in its ground state?
2, 8, 6

Calculate the wavelength in nanometers of photons having an energy of 1.80 eV?
691 nm

If electrons in hydrogen atoms are excited to the fourth Bohr orbit, how many different frequencies of light may be emitted?

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6

Two hydrogen atoms have electrons in the n =3 energy level. One of the electrons jumps to the n = 2 level, while the other jumps to the n = 1. which property is larger for the first photon?
wavelength

A gas can be identified by means of its spectral lines because each element____
emits characteristic wavelengths when electrically excited

Which of the following is NOT a feature of the Bohr model of the atom?
an electron probability cloud

A spectral line is emitted when an atom undergoes a transition between two levels with a difference of 2.4 eV. What is the wavelength of the line?
518 nm

Electrons of energy 12.2 eV are fired at hydrogen atoms in a discharge tube. Determine the principal quantum number which corresponds to the highest state to which the atoms can be excited?
3

In a transition to a state of excitation energy 10.19 eV a hydrogen atom emits 4890 A photon. Determine the binding energy of the initial state?
0.87 ev

The energy of a hydrogen atom when its electron that orbits in its smallest possible orbit is called____
ground state

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