Structure Of Atom

Question1

The quantum numbers of four electrons are given below :

I. $n=4; l=2; m_l=-2; s=-\frac{1}{2}$

II. $n=3; l=2; m_l=1; s=+\frac{1}{2}$

III. $n=4; l=1; m_l=0; s=+\frac{1}{2}$

IV. $n=3; l=1; m_l=-1; s=+\frac{1}{2}$

The correct decreasing order of energy of these electrons is

[NEET 2024 Re]

Options:

A.

IV > II > III > I

B.

I > III > II > IV

C.

III > I > II > IV

D.

I > II > III > IV

Answer: B

Solution:

(I) $n=4, I=2, m_l=-2, s=-\frac{1}{2}$; represents $4d\,(n+I=6)$

(II) $n=3, I=2, m_l=1, s=+\frac{1}{2}$; represents $3d\,(n+I=5)$

(III) $n=4, I=1, m_l=0, s=+\frac{1}{2}$; represents $4p(n+I=5)$

(IV) $n=3, I=1, m_l=-1, s=+\frac{1}{2}$; represents $3p(n+I=4)$

Order of energy depends on the (n + I), greater is the (n + I) value greater is the energy, if (n + I) is same, then it depends on n; if ' n ' is more, energy is more.

Step-1: According to (n + 1)

Energy = (I) > (II) = (III) > (IV)

Step-2 : If n↑, then energy increases

Energy = (I) > (III) > (II) > (IV)

Question2

Given below are two statements:

Statement I: The Balmer spectral line for H atom with lowest energy is located at $\frac{5}{36}R_H \text{cm}^{-1}$.

(R_H =. Rydberg constant)

Statement II: When the temperature of blackbody increases, the maxima of the curve (intensity and wavelength) shifts to shorter wavelength.

In the light of the above statements, choose the correct answer from the options given below:

[NEET 2024 Re]

Options:

A.

Statement I is true but Statement II is false

B.

Statement I is false but Statement II is true

C.

Both Statement I and Statement II are true

D.

Both Statement I and Statement II are false

Answer: C

Solution:

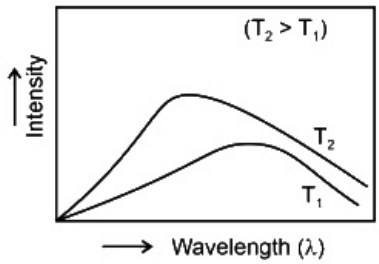
For Balmer series $n_1 = 2$

$n_2 = 3$

$\bar{v} = \frac{1}{\lambda} = R_H \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$

$\bar{v} = R_H \left[\frac{1}{4} - \frac{1}{9} \right]$

$\bar{v} = \frac{5R_H}{36} \text{cm}^{-1}$



Question3

The energy of an electron in the ground state (n = 1) for He^+ ion is −xJ, then that for an electron in n = 2 state for Be^{3+} ion in J is

[NEET 2024]

Options:

A.

−x

B.

$-\frac{x}{9}$

C.

−4x

D.

$-\frac{4}{9}x$

Answer: A

Solution:

$$E_n = -R_H\left(\frac{z^2}{n^2}\right)J$$

For He * $(n = 1)$,

$$E_n = -x = -R_H\left(\frac{2^2}{1^2}\right) = -4R_H$$

$$\therefore\ R_H = \frac{x}{4}$$

For $Be^{3+}(n = 2)$,

$$E_n = -R_H\left(\frac{Z^2}{n^2}\right)J$$

$$= -\frac{x}{4} \times \left(\frac{4 \times 4}{2 \times 2}\right) = -xJ$$

Question4

Match List I with List II

	List I (Quantum Number)		List II (Information provided)
A.	m_l	I.	Shape of orbital
B.	m_s	II.	Size of orbital
C.	l	III.	Orientation of orbital
D.	n	IV.	Orientation of spin of electron

Choose the correct answer from the options given below :

[NEET 2024]

Options:

A.

A-I, B-III, C-II, D-IV

B.

A-III, B-IV, C-I, D-II

C.

A-III, B-IV, C-II, D-I

D.

A-II, B-I, C-IV, D-III

Answer: B

Solution:

• Magnetic quantum number m_l informs about orientation of orbital.

• Spin quantum number m_s informs about orientation of spin of electron.

• Azimuthal quantum number (l) informs about shape of orbital

• Principal quantum number (n) informs about size of orbital

Question5

Select the correct statements from the following
A. Atoms of all elements are composed of two fundamental particles.
B. The mass of the electron is 9.10939×10^{-31}kg.
C. All the isotopes of a given element show same chemical properties:
D. Protons and electrons are collectively known as nucleons.
E. Dalton's atomic theory, regarded the atom as an ultimate particles of matter

Choose the correct answer from the options given below

[NEET 2023]

Options:

A.

C, D and E only

B.

A and E only

C.

B, C and E only

D.

A, B and C only

Answer: C

Solution:

- Atoms consist of three fundamental particles :

Electrons, protons and neutrons
- The mass of the electron is 9.10939×10^{-31}kg
- All the isotopes of a given element show same chemical properties.
- Protons and neutrons present in the nucleus are collectively called as nucleons.
- Dalton's atomic theory, regarded the atom as the ultimate particle of matter

So, the correct statements are B, C, E only

Question6

The relation between n_m,(n_m = . the number of permissible values of

magnetic quantum number (m)) for a given value of azimuthal quantum number (I), is

[NEET 2023]

Options:

A.

$l = 2n_m + 1$

B.

$n_m = 2R + 1$

C.

$n_m = l + 2$

D.

$$I = \frac{n_m - 1}{2}$$

Answer: D

Solution:

Values of n_m (magnetic quantum number) for given azimuthal quantum number can be calculated as following

$n_m = 2I + 1$

$$I = \frac{n_m - 1}{2}$$

Question7

Incorrect set of quantum numbers from the following is :

[NEET 2023 mpr]

Options:

A.

$n = 4, 1 = 3, m_1 = -3, -2, -1, 0, +1, +2, +3,$

$m_s = -1/2$

B.

$n = 5, 1 = 2, m_1 = -2, -1, +1, +2, m_s = +1/2$

C.

$n = 4, 1 = 2, m_1 = -2, -1, 0, +1, +2,$

$m_s = -1/2$

D.

$n = 5, 1 = 3, m_1 = -3, -2, -1, 0, +1, +2, +3$

$m_s = +1/2$

Answer: B

Solution:

$n = 5, \ell = 2, m = -2, -1, +1, +2, m_s = +\frac{1}{2}$

Question8

Given below are two statements :

Statement I : The value of wave function, Ψ depends upon the coordinates of the electron in the atom.

Statement II : The probability of finding an electron at a point within an atom is proportional to the orbital wave function.
In the light of the above statements, choose the correct answer from the options given below :

[NEET 2023 mpr]

Options:

A.

Statement I is true but Statement II is false.

B.

Statement I is false but Statement II is true.

C.

Both Statement I and Statement II are true.

D.

Both Statement I and Statement II are false.

Answer: A

Solution:

Statement-I is true and statement-II is false.

Question9

Match List - I with List - II :

List - I (quantum number)	List - II (orbital)
(a) $n = 2, l = 1$	(i) 2 s
(b) $n = 3, l = 2$	(ii) 3 s
(c) $n = 3, l = 0$	(iii) 2 p
(d) $n = 2, l = 0$	(iv) 3 d

Choose the correct answer from the options given below :
[NEET Re-2022]

Options:

A. (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

B. (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)

C. (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)

D. (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

Answer: A

Solution:

$\ell = 0 \Rightarrow$ s-subshell

$\ell = 1 \Rightarrow$ p-subshell

$\ell = 2 \Rightarrow$ d-subshell

$\ell = 3 \Rightarrow$ f-subshell

$\therefore$ $n = 2, \ell = 1 \Rightarrow 2p$

$n = 3, \ell = 2 \Rightarrow 3d$

$n = 3, \ell = 0 \Rightarrow 3s$

$n = 2, \ell = 0 \Rightarrow 2s$

Question10

When electromagnetic radiation of wavelength 300 nm falls on the surface of a metal, electrons are emitted with the kinetic energy of $1.68 \times 10^5 Jmol^{-1}$. What is the minimum energy needed to remove an electron from the metal ?
($h = 6.626 \times 10^{-34} Js$, $c = 3 \times 10^8 ms^{-1}$.,

.$N_A = 6.022 \times 10^{23} mol^{-1}$)
[NEET Re-2022]

Options:

A. $2.31 \times 10^{5} J1^{-1}$

B. $2.31 \times 10^{6} J1^{-1}$

C. $3.84 \times 10^{4} J1^{-1}$

D. $3.84 \times 10^{-19} J1^{-1}$

Answer: A

Solution:

$$E_P = \varphi + K.E$$

$$E_P - K.E = \varphi$$

$$E_P = \frac{hc}{\lambda} = 3.975 \times 10^{5} Jmol^{-1}$$

$$K.E = 1.68 \times 10^{5} Jmol^{-1}$$

$$\varphi = (3.975 - 1.68) \times 10^{5}$$

$$= 2.295 \times 10^{5} \approx 2.31 \times 10^{5} Jmol^{-1}$$

Question11

Identify the incorrect statement from the following.
[NEET-2022]

Options:

A. All the five 5d orbitals are different in size when compared to the respective 4d orbitals.

B. All the five 4d orbitals have shapes similar to the respective 3d orbitals.

C. In an atom, all the five 3d orbitals are equal in energy in free state.

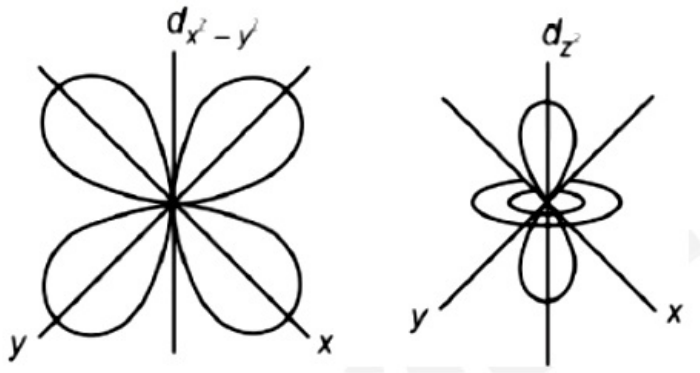
D. The shapes of d_{xy}, d_{yz} and d_{zx} orbitals are similar to each other; and $d_{x^2-y^2}$ and d_{z^2} are similar to each other.

Answer: D

Solution:

In an atom, all the five $3d$ orbitals are equal in energy in free state i.e., degenerate.

- The shape of $d_{x^2-y^2}$ is different then shape of d_{z^2}



- The size of orbital depends on principal quantum number ' n ' therefore all the five 3d orbitals are different in size when compared to the respective 4d orbitals.

- Shape of orbitals depends on azimuthal quantum number 'l' therefore shapes of 4d orbitals are similar to the respective 3d orbitals.

Question12

If radius of second Bohr orbit of the He^+ ion is 105.8pm, what is the radius of third Bohr orbit of Li^{2+} ion? [NEET-2022]

Options:

A. 158.7pm

B. 15.87pm

C. 1.587pm

D. 158.7Å

Answer: A

Solution:

$$r_n \propto \frac{n^2}{Z}$$

$$\frac{r_3(Li^{2-})}{r_2(He^-)} = \frac{(n_3)^2}{Z(Li^{2-})} \times \frac{Z(He^+)}{(n_2)^2}$$

$$\frac{r_3(Li^{2+})}{105.8} = \frac{(3)^2}{3} \times \frac{2}{(2)^2}$$

$$= 105.8 \times \frac{3}{2}$$

$$r_3(Li^{2+}) = 158.7pm$$

Question13

A particular station of All India Radio, New Delhi broadcasts on a frequency of 1, 368 kH z (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is : [speed of light $c = 3.0 \times 10^8\ ms^{-1}$]
[NEET 2021]

Options:

A. 219.3 m

B. 219.2 m

C. 2192 m

D. 21.92 cm

Answer: A

Solution:

Energy of electromagnetic radiation (E)

$= \frac{hc}{\lambda} = h\gamma$

So, $\frac{C}{\lambda} = \gamma \quad \Rightarrow \lambda = \frac{c}{\gamma}$

$\lambda = \frac{3 \times 10^8}{1368 \times 10^3} = 219.3$ m

Question14

4d , 5p, 5f and 6p orbitals are arranged in the order of decreasing energy. The correct option is
(NEET 2019)

Options:

A. 5f > 6p > 4d > 5p

B. 5f > 6p > 5p > 4d

C. 6p > 5f > 5p > 4d

D. 6p > 5f > 4d > 5p

Answer: B

Solution:

Solution:
Higher the value of $(n + l)$ for an orbital, higher is its energy. However, if two different types of orbitals have same value of $(n + l)$, the orbital with lower value of n has lower energy. Therefore, decreasing order of energy of the given orbitals

is 5f > 6p > 5p > 4d .

Question15

Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?
(NEET 2019)

Options:

A. Brackett series

B. Lyman series

C. Balmer series

D. Paschen series

Answer: C

Solution:

Lyman series : UV region
Balmer series : Visible region
Paschen series : IR region
Brackett series : IR region

Question16

Orbital having 3 angular nodes and 3 total nodes is
(Odisha NEET 2019)

Options:

A. 5p

B. 3d

C. 4f

D. 6d

Answer: C

Solution:

Solution:
Number of spherical/radial nodes in any orbital $= n - l - 1$
Number of planar/angular nodes in orbital $= l = 3$

∴ Total number of nodes in any orbital $= n - 1 = 3$
∴ $n = 4$
Thus, the orbital is 4f .

Question17

In hydrogen atom, the de Broglie wavelength of an electron in the second Bohr orbit is [Given that Bohr radius, $a_0 = 52.9pm$] (Odisha NEET 2019)

Options:

A. 211.6pm

B. 211.6πpm

C. 52.9πpm

D. 105.8pm

Answer: B

Solution:

Solution:
Bohr radius, $a_0 = 52.9pm$
$n = 2$, $r_n = n^2a_0 = (2)^2a_0 = 4 \times 52.9pm = 211.6pm$
The angular momentum of an electron in a given stationary state can be expressed as in equation,
$mvr = n \cdot \frac{h}{2\pi} = 2 \times \frac{h}{2\pi} = \frac{h}{\pi}$
de-Broglie equation $mvr\pi = h$.....(i)
$\lambda = \frac{h}{mv}$; $\lambda mv = h$....(ii)
From equations, (i) and (ii), we get $\lambda = \pi r$
Putting the value of r, $\lambda = 211.6\pi pm$

Question18

Which one is a wrong statement? (NEET 2018)

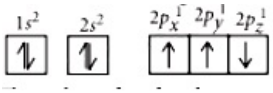
Options:

A. Total orbital angular momentum of electron in s -orbital is equal to zero.

B. An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers.

C.

The electronic configuration of N atom is

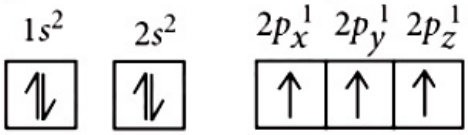


D. The value of m for d_{z^2} is zero.

Answer: C

Solution:

Solution:
According to Hund's rule of maximum multiplicity, the correct configuration of 'N' is



Question19

Which one is the wrong statement? (NEET 2017)

Options:

A. (a) The uncertainty principle is $\Delta E \times \Delta t \geq \frac{h}{4\pi}$

B. Half filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced arrangement.

C. The energy of 2s -orbital is less than he energy of 2p -orbital in case of hydrogen like atoms.

D. de-Broglie's wavelength is given by $\lambda = \frac{h}{mv}$, where m = mass of the particle, v = group velocity of the particle.

Answer: C

Solution:

Solution:
In case of hydrogen like atoms, energy depends on the principal quantum number only. Hence, 2s -orbital will have energy equal to 2p -orbital.

Question20

How many electrons can fit in the orbital for which n = 3 and l = 1? (NEET- II 2016)

Options:

A. 2

B. 6

C. 10

D. 14

Answer: B

Solution:

Solution:
For $n = 3$ and $l = 1$, the subshell is 3p and a particular 3p orbital can accommodate 6 electrons.

Question21

Which of the following pairs of d -orbitals will have electron density along the axes?
(NEET-II 2016)

Options:

A. d_{z^2}, d_{xz}

B. d_{xz}, d_{yz}

C. d_{z^2} , $d_{x^2} - y^2$

D. d_{xy}, $d_{x^2 - y^2}$

Answer: C

Solution:

Solution:
$d_{x^2 - y^2}$ and d_{z}^{2} orbitals have electron density along the axes while d_{xy}, d_{yz} and d_{xz} orbitals have electron density in between the axes.

Question22

Two electrons occupying the same orbital are distinguished by
(NEET -I 2016)

Options:

A. azimuthal quantum number

B. spin quantum number

C. principal quantum number

D. magnetic quantum number.

Answer: B

Solution:

Solution:

For the two electrons occupying the same orbital values of n, l and m_l are same but m_s is different, i.e., $+\frac{1}{2}$ and $-\frac{1}{2}$

Question23

Which is the correct order of increasing energy of the listed orbitals in the atom of titanium (At. no. Z=22) (2015)

Options:

A. 4s,3s,3p.3d

B. 3s,3p,3d,4s

C. 3s,3p,4s,3d

D. 3s,4s,3p,3d

Answer: C

Solution:

$Ti(22) = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$
∴ Order of increasing energy is 3s,3p,4s,3d

Question24

The angular momentum of electron in 'd' orbitals is equal to (2015 Cancelled)

Options:

A. $2\sqrt{3}\hbar$

B. $0\hbar$

C. $\sqrt{6}\hbar$

D. $\sqrt{2}\hbar$

Answer: C

Solution:

Angular momentum $= \sqrt{l\,(l+1)}\hbar$
For d orbital, $l = 2$
Angular momentum $= \sqrt{2(2+1)}\hbar = \sqrt{6}\hbar$

Question25

The number of d-electrons in Fe^{2+} $(Z = 26)$ is not equal to the number of electrons in which one of the following ? (2015 Cancelled)

Options:

A. d- electrons in Fe (Z=26)

B. p - electrons in Ne (Z=10)

C. s- electrons in Mg (Z=12)

D. p- electrons in Cl (Z=17)

Answer: D

Solution:

Number of d-electrons is $Fe^{2+} = 6$
Number of p-electrons Cl=11

Question26

Be^{2+} is isoelectronic with which of the following ions ? (2014)

Options:

A. H^{+}

B. Li^{+}

C. Na^{+}

D. Mg^{2+}

Answer: B

Solution:

Solution:

Species	No. of electrons
Be^{2+}	2
H^{+}	0
Li^{+}	2
Na^{+}	10
Mg^{2+}	10

Question27

Calculate the energy in Joule corresponding to light of wave length 45nm (Planck's constant h = 6.63×10^{-34}J s, speed of light, c = $3 \times 10^{8}ms^{-1}$)
(2014)

Options:

A. 6.67×10^{15}J

B. 6.67×10^{11}J

C. 4.42×10^{-15}J

D. 4.42×10^{-18}J

Answer: D

Solution:

$E = \frac{hc}{\lambda}$ [Given $\lambda = 45nm = 45 \times 10^{-9}m$]
On putting the given values in the equation, we get
$E = \frac{6.63 \times 10^{-34} \times 3 \times 10^{8}}{45 \times 10^{9}} = 4.42 \times 10^{-18}J$

Question28

What is the maximum number of orbitals that can be identified with following quantum numbers ?
n = 3, l = 1, m_l = 0
(2014)

Options:

A. 1

B. 2

C. 3

D. 4

Answer: A

Solution:

Solution:
Only one orbital,$3p_z$ has following set of quantum numbers,n = 3, l = 1 and m_l = 0

Question29

The values of Planck's constant is 6.63×10^{-34} J s.The speed of light is 3×10^{17}nms^{-1}.Which value is closet to the wave length in nanometer of quantum of light with frequency of 6×10^{15}s^{-1}
(2013 NEET)

Options:

A. 50

B. 75

C. 10

D. 25

Answer: A

Solution:

$$c = \upsilon\lambda \Rightarrow \lambda = \frac{c}{\upsilon} = \frac{3 \times 10^{17}}{6 \times 10^{15}} = 50\text{nm}$$

Question30

Based on equation $E = -2.178 \times 10^{-18} J \left(\frac{Z^2}{n^2} \right)$, certain conclusion are written. Which of them is not correct ? (2013 NEET)

Options:

A. Equation can be used to calculate the change in energy when the electron changes orbit

B. For n = 1, the electron has a more negative energy then it does for n = 6 which means that the electron is more loosely bound in the smallest allowed orbit

C. The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from nucleus

D. Larger the value of n, the larger is the orbit radius

Answer: B

Solution:

Solution:
The electron is more tightly bound in the smallest allowed orbit.

Question31

What is the maximum numbers of electrons that can be associated with the following set of quantum numbers ? n = 3, l = 1 and m = -1 (2013 NEET)

Options:

A. 4

B. 2

C. 10

D. 6

Answer: B

Solution:

Solution:
The orbital associated with $n = 3, l = 1$ is 3p.One orbital (with $m = -1$) of 3p subshell can accommodate maximum 2 electrons.

Question32

The outer electronic configuration of Gd (At. No. 64) is (Karnataka NEET 2013)

Options:

A. $4f^{5}5d^{4}6s^{1}$

B. $4f^{7}5d^{1}6s^{2}$

C. $4f^{3}5d^{5}6s^{2}$

D. $4f^{4}5d^{5}6s^{1}$

Answer: B

Solution:

Solution:
The electronic configuration of $_{64}Gd$ is $[Xe]4f^{7}5d^{1}6s^{2}$

Question33

According to law of photochemical equivalence the energy absorbed (in ergs/mole) is given as ($h = 6.62 \times 10^{-27}$ ergs, $c = 3 \times 10^{10} cms^{-1}$, $N_A = 6.02 \times 10^{-23} mol^{-1}$) (Karnataka NEET 2013)

Options:

A. $\frac{1.196 \times 10^{8}}{\lambda}$

B. $\frac{2.859 \times 10^{5}}{\lambda}$

C. $\frac{2.859 \times 10^{16}}{\lambda}$

D. $\frac{1.196 \times 10^{16}}{\lambda}$

Answer: A

Solution:

We know that, $E = \frac{hcN_A}{\lambda}$

$= \frac{6.62 \times 10^{-27} \times 3 \times 10^{10} \times 6.02 \times 10^{23}}{\lambda}$

$= \frac{1.1955 \times 10^{8}}{\lambda} = \frac{1.196 \times 10^{8}}{\lambda}$ ergs mol^{-1}

Question34

The orbital angular momentum of p-electron in given as (2012 Mains)

Options:

A. $\frac{h}{\sqrt{2}\pi}$

B. $\sqrt{3}\frac{h}{2\pi}$

C. $\sqrt{\frac{3}{2}}\frac{h}{\pi}$

D. $\sqrt{6}\frac{h}{2\pi}$

Answer: A

Solution:

Solution:

Orbital angular momentum(m) = $\sqrt{l\,(l\,+1)}\frac{h}{2\pi}$

For p-electrons, $l\,-1$

Thus,

$m = \sqrt{l\,(l\,+1)}\frac{h}{2\pi} = \frac{\sqrt{2}h}{2\pi} = \frac{h}{\sqrt{2}\pi}$

Question35

The correct set of four quantum number for the valence electron of rubidium atom (Z − 37) is (2012)

Options:

A. 5, 1, 1, $+\frac{1}{2}$

B. 6, 0, 0, $+\frac{1}{2}$

C. 5, 0, 0, $+\frac{1}{2}$

D. 5, 1, 0, $+\frac{1}{2}$

Answer: C

Solution:

Solution:
Rb(37) : $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1$
For 5s, n = 5, l = 0, m = 0, s = $+\frac{1}{2}$ or $-\frac{1}{2}$

Question36

Maximum number of electrons in a subshell with l = 3 and n = 4 is (2012)

Options:

A. 14

B. 16

C. 10

D. 12

Answer: A

Solution:

Solution:
l = 3 an n = 4 represent 4f.So total number of electrons in a subshell = $2(2l + 1) - 2(2 \times 3 + 1) = 14$ electrons,Hence f-subshell can contain maximum 14 electrons.

Question37

According to the Bohr theory, which of the following transition in the hydrogen atom will give rise to the least energetic photon ? (2011 Mains)

Options:

A. n = 6 to n = 1

B. n = 5 to n = 4

C. n = 6 to n = 5

D. n = 5 to n = 3

Answer: C

Solution:

Solution:
We know that
$\Delta E \alpha \left[\frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$, where $n_2 > n_1$
$\therefore$ n = 6 to n = 5 will give least energetic photon

Question38

If n = 6, the correct sequence for filling of electrons will be (2011)

Options:

A.

$ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$

B.

$ns \rightarrow (n-1)d \rightarrow (n-2)f \rightarrow np$

C.

$ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$

D.

$ns \rightarrow np(n-1)d \rightarrow (n-2)f$

Answer: A

Question39

The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relations between their wavelengths i.e,.λ_1 and λ_2 will be

(2011)

Options:

A. $\lambda_1 = \lambda_2$

B. $\lambda_1 = 2\lambda_2$

C. $\lambda_1 = 4\lambda_2$

D. $\lambda_1 = \frac{1}{2}\lambda_2$

Answer: B

Solution:

$E_1 = \frac{hc}{\lambda_1}$ and $E_2 = \frac{hc}{\lambda_2}$;

$\frac{E_1}{E_2} = \frac{hc}{\lambda_1} \times \frac{\lambda_2}{hc} = \frac{\lambda_2}{\lambda_1}$

or $\frac{25}{50} = \frac{\lambda_2}{\lambda_1}$ or $\frac{1}{2} = \frac{\lambda_2}{\lambda_1} \Rightarrow \lambda_1 = 2\lambda_2$

Question40

The total number of atomic orbitals in fourth energy level of an atom is (2011)

Options:

A. 8

B. 16

C. 32

D. 4

Answer: B

Solution:

Solution:
Total number of atomic orbitals in a any energy level is given by n^2

Question41

A 0.66 kg ball is moving with a speed of 100 m/s. The associated wavelength will be ($h = 6.6 \times 10^{-34}$ J s)
(2010 Mains)

Options:

A. 6.6×10^{-32}m

B. 6.6×10^{-34}m

C. 1.0×10^{-35}m

D. 1.0×10^{-32}m

Answer: C

Solution:

According to de-Broglie equation, $\lambda = \frac{h}{mv}$

Given $h = 6.6 \times 10^{-34}$ J s

$m = 0.66$kg $v = 100 ms^{-1}$

$\therefore \lambda = \frac{6.6 \times 10^{-34}}{0.66 \times 100} = 1 \times 10^{-35}$m

---

Question42

Which of the following is not permissible arrangement of electrons in an atom ?
(2009)

Options:

A.

$n = 5, l = 3, m = 0, s = +\frac{1}{2}$

B.

$n = 3, l = 2, m = -3, s = -\frac{1}{2}$

C.

$n = 3, l = 2, m = -2, s = -\frac{1}{2}$

D.

$n = 4, l = 0, m = 0, s = -\frac{1}{2}$

Answer: B

Solution:

Solution:
In an atom,for any value of n,the value of l $-$ 0 to (n $-$ 1).
For a given value of of l the values of $m_1 = -l$ to 0 to $+l$ and the value of $s = +\frac{1}{2}$ or $-\frac{1}{2}$
In option (b),l $-$ 2 and $m_1 = -3$
This is not possible as value of m_1 which are possible for $l = 2$ are $-2, -1, 0 + 1$ and $+2$ only

---

Question43

Maximum number of electrons in a sub shell of an atom is determined by the following
(2009)

Options:

A. $2l + 1$

B. $4l - 2$

C. $2n^2$

D. $4l + 2$

Answer: D

Solution:

Solution:
For a given shell,l ,
the number of sub shells,$m_1 - (2l + 1)$
Since each subshell can accommodate 2 electrons of opposite spin,so maximum number of electrons in a subshell
$= 2(2l + 1) - 4l + 2$

Question44

The measurement of the electron position is associated with an uncertainty in momentum,which is equal to $1 \times 10^{-18} gcms^{-1}$. The uncertainty in electron velocity is (mass of an electron is $9 \times 10^{-28} g$)
(2008)

Options:

A. $1 \times 10^{5} \mathrm{cms}^{-1}$

B. $1 \times 10^{11} \mathrm{cms}^{-1}$

C. $1 \times 10^{9} \mathrm{cms}^{-1}$

D. $1 \times 10^{6} \mathrm{cms}^{-1}$

Answer: C

Solution:

Solution:
Uncertainty in momentum (m Δ v) $= 1 \times 10^{-18} \mathrm{gcms}^{-1}$
Uncertainty in velocity (Δ v) $= \frac{1 \times 10^{-18}}{9 \times 10^{-28}} = 1.1 \times 10^{9} \mathrm{cms}^{-1}$

Question45

If uncertainty in position and momentum are equal ,then uncertainty in velocity is
(2008)

Options:

A. $\frac{1}{\mathrm{m}} \sqrt{\frac{\mathrm{h}}{\pi}}$

B. $\sqrt{\frac{\mathrm{h}}{\pi}}$

C. $\frac{1}{2\mathrm{m}} \sqrt{\frac{\mathrm{h}}{\pi}}$

D. $\sqrt{\frac{\mathrm{h}}{2\pi}}$

Answer: C

Solution:

Solution:
From Heisenberg's uncertainty principle
$\Delta \mathrm{p} \,.\, \Delta \mathrm{x} \geq \frac{\mathrm{h}}{4\pi}$ or ,$\mathrm{m}\Delta \mathrm{v} \times \Delta \mathrm{x} \geq \frac{\mathrm{h}}{4\pi}$
or $(\mathrm{m}\Delta \mathrm{v})^{2} \geq \frac{\mathrm{h}}{4\pi} \quad (\because \Delta \mathrm{x} - \Delta \mathrm{p})$
or $\Delta \mathrm{v} \geq \frac{1}{2\mathrm{m}} \sqrt{\frac{\mathrm{h}}{\pi}}$

Question46

Consider the following sets of quantum numbers :

	n	l	m	s
(i)	3	0	0	+1/2
(ii)	2	2	1	+1/2
(iii)	4	3	-2	-1/2
(iv)	1	0	-1	-1/2
(v)	3	2	3	+1/2

Which of the following sets of quantum number is not possible ? (2007)

Options:

A. (i), (ii),(iii) and (iv)

B. (ii),(iv) and (v)

C. (i), and (iii)

D. (ii),(iii) and (iv)

Answer: B

Solution:

Solution:
(i) represents an electron in 3s orbital
(ii) is not possible as value of l varies from 0, 1, ... (n − 1).
(iii) represents an electron in 4f orbital
(iv) is not possible as value of m varies from $-l$ ..... $+l$
(v) is not possible as value of m varies from $-l$ .... $+l$,it can never be greater than l

---

Question47

Given : The mass of electron is 9.11×10^{-31} kg, Planck's constant is 6.626×10^{-31} Js, the uncertainty involved in the measurements of velocity with in a distance of 0.1 Å is (2006)

Options:

A. $5.79 \times 10^{5} ms^{-1}$

B. $5.79 \times 10^{6} ms^{-1}$

C. $5.79 \times 10^{7} ms^{-1}$

D. $5.79 \times 10^{8} ms^{-1}$

Answer: B

Solution:

$\Delta x \cdot m\Delta v = \frac{h}{4\pi}$

$0.1 \times 10^{-10} \times 9.11 \times 10^{-31} \times \Delta v = \frac{6.626 \times 10^{-34}}{4 \times 3.143}$

$\therefore \Delta v = \frac{6.626 \times 10^{-34}}{0.1 \times 10^{-10} \times 9.11 \times 10^{-31} \times 4 \times 3.143} = 5.79 \times 10^{6} ms^{-1}$

Question48

The orientation of an atomic orbital is governed by (2006)

Options:

A. pricipal quantum number

B. azimuthal quantum number

C. spin quantum number

D. magnetic quantum number

Answer: D

Solution:

Solution:
Principal quantum number represents the name,size and energy of the shell to which the electron belongs.
Azimuthal quantum number describes the spatial distribution of electron cloud and angular momentum.
Magnetic quantum number describes the orientation or distribution of electron
Spin quantum number represents the direction of electron spin around its own axis

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Question49

The energy of second Bohr orbit of the hydrogen atom is $-328 kJ\ mol^{-1}$; hence the energy of fourth Bohr orbit would be (2005)

Options:

A. $-41 kJ\ mol^{-1}$

B. $-82 kJ\ mol^{-1}$

C. $-164 kJ\ mol^{-1}$

D. $-1312 kJ\ mol^{-1}$

Answer: B

Solution:

$E_n = -K\left(\frac{Z}{n}\right)^2$

Z = 1 for hydrogen; n = 2

$E_2 = \frac{-K \times 1}{4} \Rightarrow E_2 = -328 kJ\ mol^{-1}$; $K = 4 \times 328$

$E_4 = \frac{-K \times 1}{16} \Rightarrow E_4 = -4 \times 328 \times \frac{1}{16} = -82 kJ\ mol^{-1}$

Question50

The frequency of radiation emitted when the electron falls from n = 4 to n = 1 in a hydrogen atom will be (Given ionization energy of $H = 2.18 \times 10^{-18} J\ atom^{-1}$ and $h = 6.625 \times 10^{-34} J\,s$)
(2004)

Options:

A. $1.54 \times 10^{15} s^{-1}$

B. $1.03 \times 10^{15} s^{-1}$

C. $3.08 \times 10^{15} s^{-1}$

D. $2.00 \times 10^{15} s^{-1}$

Answer: C

Solution:

$E = h\upsilon$ or $\upsilon = E/h$

For H atom, $E = \frac{-21.76 \times 10^{-19}}{n^2} J\ atm^{-1}$

$\Delta E = -21.76 \times 10^{-19}\left(\frac{1}{4^2} - \frac{1}{1^2}\right)$

$= 20.40 \times 10^{-19} J\ atm^{-1}$

$\upsilon = \frac{20.40 \times 10^{-19}}{6.626 \times 10^{-34}} = 3.079 \times 10^{15} s^{-1}$

Question51

The value of Planck's constant is $6.63 \times 10^{-34} J\ s$. The velocity of light is $3.0 \times 10^{8} ms^{-1}$. Which value is closest to the wavelength in nanometers of a quantum of light with frequency of $8 \times 10^{15} s^{-1}$?
(2003)

Options:

A. 2×10^{-25}

B. 5×10^{-18}

C. 4×10^{1}

D. 3×10^{7}

Answer: C

Solution:

Applying $\upsilon = c/\lambda$

$$\lambda = \frac{c}{\upsilon} = \frac{3 \times 10^{8}}{8 \times 10^{15}} = 37.5 \times 10^{-9}\text{m}$$

$$= 37.5\text{nm} \approx 4 \times 10^{1}\text{nm}$$

Question52

In hydrogen atom, energy of first excited state is -3.4eV. Then find out K . E . of same orbit of hydrogen atom (2002)

Options:

A. $+3.4\text{eV}$

B. $+6.8\text{eV}$

C. -13.6eV

D. $+13.6\text{eV}$

Answer: A

Solution:

Kinetic energy $= \frac{1}{2}mv^2 = \left(\frac{\pi e^2}{nh}\right)^2 \times 2m$

$\left[\because v = \frac{2\pi e^2}{nh}\right]$

Total energy

$$E_n = -\frac{2\pi^2 m e^4}{n^2 h^2} = -\left(\frac{\pi e^2}{nh}\right)^2 \times 2m = -K \text{ . } E$$

$\therefore$ Kinetic energy $= -E_n$

Energy of first excited state is -3.4eV.

$\therefore$ Kinetic energy of same orbit $(n = 2)$ will be $+3.4\text{eV}$.

Question53

Main axis of a diatomic molecule is z, molecular orbital p_x and p_y overlap to form which of the following orbitals.
(2001)

Options:

A. π molecular orbital

B. σ molecular orbital

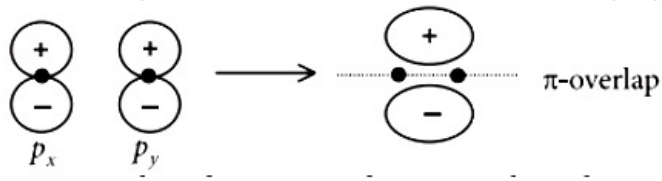
C. δ molecular orbital

D. No bond will form.

Answer: A

Solution:

Solution:
For π overlap, the lobes of the atomic orbitals are perpendicular to the line joining the nuclei.



Hence, only sidewise overlapping takes place.

Question54

The following quantum numbers are possible for how many orbitals?
n = 3, l = 2, m = +2
(2001)

Options:

A. 1

B. 2

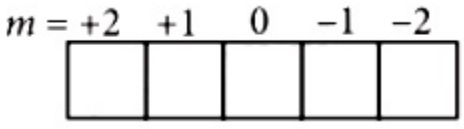
C. 3

D. 4

Answer: A

Solution:

n = 3, l = 2, m = +2
It symbolises one of the five d -orbitals (3d).



Question55

For given energy, $E = 3.03 \times 10^{-19}$ joules corresponding wavelength is ($h = 6.626 \times 10^{-34}$J sec, $c = 3 \times 10^{8}$m/sec)
(2000)

Options:

A. 65.6nm

B. 6.56nm

C. 3.4nm

D. 656nm

Answer: D

Solution:

$$E = \frac{hc}{\lambda} \Rightarrow \lambda = \frac{6.626 \times 10^{-34} \times 3 \times 10^{8}}{3.03 \times 10^{-19}}$$
$$= 656\text{nm}$$

Question56

Isoelectronic species are
(2000)

Options:

A. CO, CN^{-}, NO^{+}, C_2^{2-}

B. CO^{-}, CN, NO, C_2^{-}

C. CO^{+}, CN^{+}, NO^{-}, C_2

D. CO, CN, NO, C_2

Answer: A

Solution:

Solution:
Species having same no. of electrons are called isoelectronics.
The no. of electrons in $CO = CN^{-} = NO^{+} = C_2^{2-} = 14$

So, these are isoelectronic species.

Question57

The uncertainty in momentum of an electron is 1×10^{-5}kgm/s. The uncertainty in its position will be (h = 6.62×10^{-34}kgm^2/s) (1999)

Options:

A. 5.27×10^{-30}m

B. 1.05×10^{-26}m

C. 1.05×10^{-28}m

D. 5.25×10^{-28}m

Answer: A

Solution:

Solution:

$\Delta x \times \Delta p = \frac{h}{4\pi}$

(Heisenberg uncertainty principle)

$\Rightarrow \Delta x = \frac{6.62 \times 10^{-34}}{4 \times 3.14 \times 10^{-5}} = 5.27 \times 10^{-30}$m

---

Question58

Who modified Bohr's theory by introducing elliptical orbits for electron path? (1999)

Options:

A. Rutherford

B. Thomson

C. Hund

D. Sommerfeld

Answer: D

Solution:

Sommerfield modified Bohr's theory considering that in addition to circular orbits electrons also move in elliptical orbits.

Question59

The de Broglie wavelength of a particle with mass 1g and velocity 100m/s is
(1999)

Options:

A. 6.63×10^{-35}m

B. 6.63×10^{-34}m

C. 6.63×10^{-33}m

D. 6.65×10^{-35}m

Answer: C

Solution:

Solution:

$$\lambda = \frac{h}{mv} = \frac{6.63 \times 10^{-27}\,\text{erg sec}}{1\text{g} \times 10^{4}\text{cm/s}}$$
$$= 6.63 \times 10^{-31}\text{cm} = 6.63 \times 10^{-33}\text{m}$$

Question60

The Bohr orbit radius for the hydrogen atom (n = 1) is approximately 0.530Å. The radius for the first excited state (n = 2) orbit is (in Å)
(1998)

Options:

A. 4.77

B. 1.06

C. 0.13

D. 2.12

Answer: D

Solution:

For n^{th} orbit of 'H' atom, $r_n = n^2 \times r_1$
⇒ radius of 2^{nd} Bohr's orbit.
$r_2 = 4 \times r_1 = 4 \times 0.530 = 2.120Å$

Question61

The position of both, an electron and a helium atom is known within 1.0nm Further the momentum of the electron is known within $5.0 \times 10^{-26} kgms^{-1}$. The minimum uncertainty in the measurement of the momentum of the helium atom is
(1998)

Options:

A. $8.0 \times 10^{-26} kgms^{-1}$

B. $80 kgms^{-1}$

C. $50 kgms^{-1}$

D. $5.0 \times 10^{-26} kgms^{-1}$

Answer: D

Solution:

Solution:
According to uncertainty principle the product of uncertainty in position and uncertainty in momentum is constant for a particle.
i.e., $\Delta x \times \Delta p = \frac{h}{4\pi}$
As, $\Delta x = 1.0nm$ for both electron and helium atom, so Δp is also same for both the particles. Thus uncertainty in momentum of the helium atom is also $5.0 \times 10^{-26} kgms^{-1}$

Question62

The ion that is isoelectronic with CO is
(1997)

Options:

A. CN^-

B. N_2^+

C. O^{2-}

D. N_2^-

Answer: A

Solution:

since both CO and CN^- have 14 electrons, therefore these are isoelectronic (i.e. having same number of electrons).

Question63

What will be the longest wavelength line in Balmer series of spectrum? (1996)

Options:

A. 546nm

B. 656nm

C. 566nm

D. 556nm

Answer: B

Solution:

Solution:
The longest wavelength means the lowest energy. We know that relation for wavelength

$$\frac{1}{\lambda} = R_H \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

here, $n_1 = 2$, $n_2 = 3$

R_H (Rydberg constant $= 109677 cm^{-1}$

$$\frac{1}{\lambda} = 109677 \left(\frac{1}{(2)^2} - \frac{1}{(3)^2} \right) = 15233$$

or, $\lambda = \frac{1}{15233} = 6.56 \times 10^{-5} cm$

$= 6.56 \times 10^{-7} m = 656nm$

Question64

In a Bohr's model of an atom, when an electron jumps from n = 1 to n = 3, how much energy will be emitted or absorbed? (1996)

Options:

A. 2.389×10^{-12} ergs

B. 0.239×10^{-10} ergs

C. 2.15×10^{-11} ergs

D. 0.1936×10^{-10} ergs

Answer: D

Solution:

Energy of an atom when n = 1
$E_1 = -\frac{1312}{(1)^2} = -1312 \text{kJ mol}^{-1}$
Similarly energy when n = 3, $(E_3) = -\frac{1312}{(3)^2}$
$= -145.7 \text{kJ mol}^{-1}$
The energy absorbed when an electron jumps from n = 1 to n = 3
$E_3 - E_1 = -145.7 - (-1312) = 1166.3 \text{kJ mol}^{-1}$
$= \frac{1166.3}{6.023 \times 10^{23}} = 193.6 \times 10^{-23} \text{kJ}$
$= 193.6 \times 10^{-20} \text{J}$ [1 joule $= 10^7$ ergs]
$\Rightarrow 193.6 \times 10^{-13}$ ergs $= 0.1936 \times 10^{-10}$ ergs

---

Question65

Uncertainty in position of an electron (mass $= 9.1 \times 10^{-28}$g) moving with a velocity of 3×10^4cm/s accurate upto 0.001% will be (Use h/(4π) in uncertainty expression where h = 6.626×10^{-27} erg second) (1995)

Options:

A. 5.76cm

B. 7.68cm

C. 1.93cm

D. 3.84cm

Answer: C

Solution:

Mass of an electron (m) = 9.1×10^{-28}g
Velocity of electron (v) = 3×10^4cm/s
Accuracy $= 0.001\% = \frac{0.001}{100}$ and Planck's constant
(h) = 6.626×10^{-27} erg-second.
We know that actual velocity of the electron
$(\Delta v) = 3 \times 10^4 \times \frac{0.001}{100} = 0.3$cm/s
Therefore, uncertainty in the position of the electron,
$(\Delta x) = \frac{h}{4\pi m \Delta v} = \frac{6.626 \times 10^{-27}}{4\pi \times (9.1 \times 10^{-28}) \times 0.3}$
= 1.93cm

Question66

The radius of hydrogen atom in the ground state is 0.53 Å. The radius of Li^{2+} ion (atomic number = 3) in a similar state is
(1995)

Options:

A. 0.53Å

B. 1.06Å

C. 0.17Å

D. 0.265Å

Answer: C

Solution:

Solution:
Due to ground state, state of hydrogen atom (n) = 1;
Radius of hydrogen atom (r) = 0.53Å
Atomic no. of Li(Z) = 3
Now, radius of Li^{2+} ion $= r \times \frac{n^2}{Z} = 0.53 \times \frac{(1)^2}{3}$
$= 0.17Å$

Question67

For which of the following sets of four quantum numbers, an electron will have the highest energy?

	n	l	m	s
(a)	3	2	1	+1/2
(b)	4	2	-1	+1/2
(c)	4	1	0	−1/2
(d)	5	0	0	−1/2

(1994)

Options:

A. a

B. b

C. c

D. d

Answer: B

Solution:

Solution:
Energy of electron depends on the value of $(n + l)$ The subshell are $3d$, $4d$, $4p$ and $5s$, $4d$ has highest energy.

Question68

Which one of the following is not isoelectronic with O^{2-} ? (1994)

Options:

A. Tl^{+}

B. Na^{+}

C. N^{3-}

D. F^{-}

Answer: A

Solution:

Solution:
The number of electrons in O^{2-}, N^{3-} F^{-} and Na^{+} is 10 each, but number of electrons in Tl^{+} is 80

Question69

Electronic configuration of calcium atom can be written as (1992)

Options:

A. $[Ne]4p^2$

B. $[Ar]4s^2$

C. $[Ne]4s^2$

D. $[Kr]4p^2$

Answer: B

Solution:

Atomic no. of Ca = 20
∴ Electronic configuration of Ca = $[Ar]4s^2$

Question70

The energy of an electron in the n^{th} Bohr orbit of hydrogen atom is (1992)

Options:

A. $\frac{13.6}{n^4}eV$

B. $\frac{13.6}{n^3}eV$

C. $\frac{13.6}{n^2}eV$

D. $\frac{13.6}{n}eV$

Answer: C

Solution:

Solution:
Energy of an electron in n^{th} Bohr orbit of hydrogen atom $= \frac{-13.6}{n^2}eV$

Question71

In a given atom no two electrons can have the same values for all the four quantum numbers. This is called (1991)

Options:

A. Hund's Rule

B. Aufbau principle

C. Uncertainty principle

D. Pauli's Exclusion principle.

Answer: D

Solution:

This is a Pauli's exclusion principle.

Question72

For azimuthal quantum number l = 3, the maximum number of electrons will be
(1991)

Options:

A. 2

B. 6

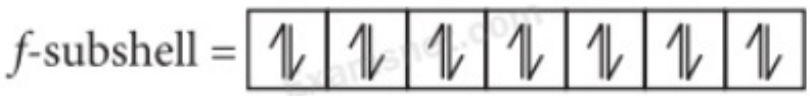
C. 0

D. 14

Answer: D

Solution:

l = 3 means f -subshell
Maximum no. of electrons in f -subshell = 14



Question73

The order of filling of electrons in the orbitals of an atom will be
(1991)

Options:

A. 3d , 4s, 4p, 4d , 5s

B. 4s, 3d , 4p, 5s, 4d

C. 5s, 4p, 3d , 4d , 5s

D. 3d , 4p, 4s, 4d , 5s

Answer: B

Solution:

As per Aufbau principle, in the ground state of the atoms, the orbitals are filled in order of their increasing energies.

Question74

The electronic configuration of Cu (atomic number 29) is (1991)

Options:

A. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$

B. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

C. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^6 5s^2 5p^1$

D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^6 3d^3$

Answer: B

Solution:

Solution:
Electronic configuration of Cu is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

Question75

The total number of electrons that can be accommodated in all the orbitals having principal quantum number 2 and azimuthal quantum number 1 are (1990)

Options:

A. 2

B. 4

C. 6

D. 8

Answer: C

Solution:

$n = 2, l = 1$ It means $2p$ -orbitals. Total no. of electrons that can be accommodated in all the $2p$ orbitals $= 6$

Question76

An ion has 18 electrons in the outermost shell, it is
(1990)

Options:

A. Cu^{+}

B. Th^{4+}

C. Cs^{+}

D. K^{+}

Answer: A

Solution:

Solution:
Cu^{+} ion has 18 electrons in its outermost shell. Electronic configuration of Cu^{+} is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$

Question77

Which of the following statements do not form a part of Bohr's model of hydrogen atom? 10
(1989)

Options:

A. Energy of the electrons in the orbits are quantized.

B. The electron in the orbit nearest the nucleus has the lowest energy.

C. Electrons revolve in different orbits around the nucleus.

D. The position and velocity of the electrons in the orbit cannot be determined simultaneously.

Answer: D

Solution:

Solution:
It is uncertainty principle and not Bohr's postulate.

Question78

Number of unpaired electrons in N^{2+} is/are
(1989)

Options:

A. 2

B. 0

C. 1

D. 3

Answer: C

Solution:

$N^{2+} = 1s^2 2s^2 2p^1$
$\therefore$ No. of unpaired electrons $= 1$

Question79

The maximum number of electrons in a subshell is given by the expression
(1989)

Options:

A. $4l - 2$

B. $4l + 2$

C. $2l + 2$

D. $2n^2$

Answer: B

Solution:

No. of orbitals in a subshell $= 2l + 1$
$\Rightarrow$ No. of electrons $= 2(2l + 1) = 4l + 2$

Question80

The spectrum of He is expected to be similar to that
(1988)

Options:

A. H

B. Li^+

C. N a

D. H e^+

Answer: B

Solution:

Solution:
Both He and Li^+ contain 2 electrons each.

Question81

The number of spherical nodes in 3p orbitals are/is (1988)

Options:

A. one

B. three

C. none

D. two

Answer: A

Solution:

Solution:
No. of radial nodes in 3p -orbital $= n - l - 1$
$= 3 - 1 - 1 = 1$

Question82

If r is the radius of the first orbit, the radius of n^{th} orbit of H -atom is given by (1988)

Options:

A. r_0n^2

B. r_0n

C. r_0/n

D. $r_0^2n^2$

Answer: A

Solution:

Radius of n^{th} orbit of H-atom $= r_0n^2$
where r_0 = radius of the first orbit.
