# CHEMISTRY

## BOOKS - A2Z CHEMISTRY (HINGLISH)

## ATOMIC STRUCTURE

### Atom Nucleus And Radiation

**1.** Nuclear radius is of the order of $10^{-13}cm$ while atomic radius is of order$10^{-8}cm$. Assuming the nucleus and the atom to be spherical .What fraction of an atom is occupied by nucleus ?

A. $10^{-15}$

B. $10^{-10}$

C. $10^{-13}$

D. $10^{-14}$

**Answer: A**

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**2.** The number of neutrons in dipositive zinc ion with mass number $70$ is.

A. 34

B. 36

C. 38

D. 40

**Answer: D**

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**3.** When beryllium is bombarded with $\alpha - \text{particles}$, extremely penetrating radiations which cannot be deflected by electrical or magnetic field are given out. These are

A. A beam of protons

B. $\alpha - rays$

C. A beam of neutrons

D. $X - rays$

**Answer: C**

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**4.** When atoms are bombarded with alpha particles, only a few in millon suffer deflection, other pass out undeflected. This is because.

A. The force of repulsion on the moving alpha particle is small

B. The force of attraction on the alpha particle to the oppositely charged electrons is very small

C. There is only one nucleus and large number of electrons

D. The nucleus occupies much smaller volume compared to the volume of the atom.

**Answer: D**

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**5.** Nitrogen atom has atomic number 7 And oxygen has atomic number 8. Calculate the total number of electrons in nitrate ion.

A. 8

B. 16

C. 32

D. 64

**Answer: C**

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**6.** If the atomic weight of an element is $23$ times that of the lightest element and it has $11$ protons, then it contains.

A. $11$ protons, $23$ neutrons, $11$ electrons

B. $11$ protons, $11$ neutrons, $11$ electrons

C. $11$ protons, $12\text{neutrons}$, $11$ electrons

D. $11$ protons, $11$ neutrons, $23$ electrons.

**Answer: C**

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**7.** Given that the abundacne of isotopes $.^{54}Fe$, $.^{56}Fe$, and $.^{57}Fe$ is 5%, 90% and 5% respectively. The atomic mass of $Fe$ is

A. $55.85$

B. $55.95$

C. $55.75$

D. $56.05$

**Answer: B**

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**8.** Compared with an atom of atomic weight $12$ and atomic number $6$, the atom of atomic weight $13$ and atomic number $6$.

A. Contains more neutrons

B. Contains more electrons

C. Contains more protons

D. Is a different element

**Answer: A**

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**9.** Pick out the isoelectronic structures from the following

$\underset{I}{CH_3^+}\ \underset{II}{H_3O^+}\ \underset{III}{NH_3}\ \underset{IV}{CH_3^-}$ .

A. I and II

B. I and IV

C. I and III

D. II,III and IV

**Answer: D**

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**10.** The approximate radius of a H-atom is $0.05$ nm, and that of proton is $1.5 \times 10^{-15}$ m. Assuming both hydrogen atom and the proton to be spherical, calculate fraction of the space in an atom of hydrogen that is occupied by the nucleus.

A. $2.7 \times 10^{-14}$

B. $2.7 \times 10^{-10}$

C. $5 \times 10^{-14}$

D. $2 \times 10^{-16}$

**Answer: A**

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**11.** $CO$ has same electrons as of the ion that is isoelectronic with $CO$ is.

A. $N_2^+$

B. $CN^-$

C. $O_2^+$

D. $O_2^-$

**Answer: B**

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**12.** Rutherford's scattering experiment is related to the size of the

A. Nucleus

B. Atom

C. Electron

D. Neutron

**Answer: A**

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**13.** What is the ratio of mass of an electron to the mass of a proton ?

A. $1:2$

B. $1:1$

C. $1:1837$

D. $1:3$

**Answer: C**

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**14.** Atomic number and mass number of an element $M$ are $25$ and $52$ respectively. The number of electrons, protons and neutrons in $M^{+2}$ ion are respectively.

A. $25, 24$ and $27$

B. $25, 27$ and $25$

C. $27, 25$ and $27$

D. $23, 25$ and $27$

**Answer: D**

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**15.** Proton is

A. Nucleus of deuterium

B. Ionised hydrogen molecule

C. Ionised hydrogen atom

D. An $\alpha - \text{particle}$

**Answer: C**

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**16.** Which of the following does not characteristic X -rays ?

A. The radiation can ionize gases

B. It causes $ZnS$ to fluorescence

C. Deflected by electric and magnetic fields

D. Have wavelengths shorter than ultraviolet rays.

**Answer: C**

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**17.** Which of the following shows an increasing value of $e/m$?

A. $\alpha > e^- < p < n$

B. $n < \alpha < p < e^-$

C. $n < p < \alpha < e^-$

D. $e^- < p < n < \alpha$

**Answer: D**

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**18.** Rutherford's $\alpha$ particle scattering experiment eventually led to the conclusion that

A. mass and energy are related

B. electrons occupy space around the nucleus

C. neutrons are buried deep in the nucleus

D. the point of impact with matter can be precisely determined.

**Answer: B**

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**19.** The specific charge of a proton is $9.6 \times 10^7 Ckg^{-1}$, then for and $\alpha -$ particles it will be.

A. $2.4 \times 10^7 Ckg^{-1}$

B. $4.8 \times 10^7 Ckg^{-1}$

C. $19.2 \times 10^7 Ckg^{-1}$

D. $38.4 \times 10^7 Ckg^{-1}$

**Answer: B**

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**20.** Medical experts generally consider a lead of $30\mu gPb$ per $(dL)$ of blood to pose a significant health risk $(Pb = 208)$. Number of lead atoms per $cm^3$ of blood is.

A. $8.64 \times 10^{10}$

B. $8.86 \times 10^{16}$

C. $8.67 \times 10^{12}$

D. $8.68 \times 10^{14}$

**Answer: D**

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**21.** A beam of specific kind of particles of velocity $2.1 \times 10^7 m/s$ is scattered by a gold $(Z = 79)$ nuclei. Find out specific charge (charge/mass) of this particle if the distance of closest approach is $2.5 \times 10^{-14} m$.

A. $4.84 \times 10^{7} C / g$

B. $4.84 \times 10^{-7} C / g$

C. $2.42 \times 10^{7} C / g$

D. $3 \times 10^{-12} C / g$

**Answer: A**

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**22.** Atom consist of electrons , protons and neutrons . If the mass attributed to neutron were halved and that attributed to the electrons were doubled , the atomic mass of $6C^{12}$ would be approximately :

A. Twice

B. $75\ \%$ less

C. $25\ \%$ less

D. one-half of its

**Answer: C**

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**23.** The ration of the $\mathrm{e}//\mathrm{m}$ (specific charge) values of an electron and an $\alpha-$ particle is

A. $2:1$

B. $1:1$

C. $1:2$

D. None of these

**Answer: D**

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**24.** Electromagnetic radiation with maximum wavelengths is :

A. ultraviolet

B. radiowave

C. X-ray

D. infrared

**Answer: B**

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**25.** The fraction of volume occupied by the nucleus with respect to the total volume of an atom is.

A. $10^{-15}$

B. $10^{-5}$

C. $10^{-30}$

D. $10^{-10}$

**Answer: A**

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**26.** The compound in which cation is isoelectronic with anion is.

A. $NaCl$

B. $CsF$

C. $NaI$

D. $K_2S$

**Answer: D**

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**27.** The approximate size of the nucleus of $._{28}^{64}Ni$ is :

A. 3 fm

B. 4 fm

C. 5 fm

D. 2 fm

**Answer: C**

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## Electromagnetic Wave Theory Plank Quantum Theory And Photoelectric Effect

**1.** A 25 watt bulb emits monochromatic yellow light of wavelength of $0.57\mu$ m. Calculate the rate of emission of quanta per second .

A. $5.89 \times 10^{15}\,\sec^{-1}$

B. $7.28 \times 10^{17}\,\sec^{-1}$

C. $5 \times 10^{10} - \sec^{-1}$

D. $7.18 \times 10^{-19}\,\sec^{-1}$

**Answer: D**

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**2.** One molecule of a substance absorbs one quantum of energy. The energy involved with $1.5$ mole of the substance absorbs red light of frequency $7.5 \times 10^{14}\,\mathrm{sec}^{-1}$ will be.

A. $2.99 \times 10^{5} J$

B. $3.23 \times 10^{5} J$

C. $4.48 \times 10^{5} J$

D. $2.99 \times 10^{6} J$

**Answer: C**

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**3.** The wave number of a spectral line is $5 \times 10^{5} m^{-1}$. The energy corresponding to this line will be.

A. $3.39 \times 10^{-23} kJ$

B. $9.93 \times 10^{-23} kJ$

C. $3.45 \times 10^{-24} J$

D. None of these

**Answer: B**

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**4.** The ratio of energy of photon of $\lambda = 2000\text{Å}$ to that of $\lambda = 4000\text{Å}$ is

A. $.^{1}/_{4}$

B. 4

C. $.^{1}/_{2}$

D. 2

**Answer: D**

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**5.** The photons of light having a wavelength $4000\text{Å}$ are necessary to provide $1.00J$ of energy are.

A. $6.023 \times 10^{23}$

B. $6.023 \times 10^{18}$

C. $2.01 \times 10^{18}$

D. $2.01 \times 10^{23}$

**Answer: C**

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**6.** The wavelngth fo a spectrl line for an electronic transition is inversely related to :

A. the number of electrons undergoing the transition

B. the nuclear charge of the atom

C. the difference in the energy of the energy levels involved in the transition

D. the velocity of the electron undergoing the transition.

**Answer: C**

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**7.** A photon of wavelength $300$ nm is absorbed by a gas and then reemitted as two photons. One photon is red with wavelength of $760$ nm. The wave number of the second photon will be.

A. $2.02 \times 10^6 m^{-1}$

B. $3.02 \times 10^6 m^{-1}$

C. $1.02 \times 10^6 m^{-1}$

D. $2.2 \times 10^6 m^{-1}$

**Answer: A**

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**8.** Suppose $10^{17}J$ of energy is needed by the interior of human eye to see an object. How many photons of green light $(1 = 550nm)$ are needed to generate this minimum amount of energy ?

A. 14

B. 28

C. 39

D. 42

**Answer: B**

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**9.** Photoelectric emission is observed from a surface for frequencies $v_1$ and $v_2$ of the incident radiation $(v_1 > v_2)$. If the maximum kinetic

energies of the photoelectrons in two cases are in ratio $1:K$ then the threshold frequency $v_0$ is given by.

A. $\frac{v_2 - v_1}{K - 1}$

B. $\frac{Kv_1 - v_2}{K - 1}$

C. $\frac{Kv_2 - v_1}{K - 1}$

D. $\frac{v_2 - v_1}{K}$

**Answer: B**

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**10.** Which of the following is not a characteristic of plack's quantam theory of radiation ?

A. The energy is not absorbed or emitted in whole number or multiple of quanta

B. Radiation is associated with energy

C. Radiation energy is not emitted or absorbed continuosly but in the form of small packets called quanta

D. This magnitude of energy associated with a quantum is proportional to the frequency.

**Answer: A**

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**11.** The work function of a metal is $4.0eV$. If the metal is irradiated with radiation of wavelength $200$ nm, then the maximum kinetic energy of the photoelectrons would be about.

A. $6.4 \times 10^{-19} J$

B. $3.5 \times 10^{-19} J$

C. $1.0 \times 10^{-18} J$

D. $2.0 \times 10^{-19} J$

**Answer: B**

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**12.** What is the wavelength of the radiation with photon energy which is the mean value of photon energies of radiations with wavelength $\lambda_1 = 4000\text{Å}$ and $\lambda_2 = 6000\text{Å}$ ?

A. $5000\text{Å}$

B. $5200\text{Å}$

C. $5600\text{Å}$

D. $4800\text{Å}$

**Answer: D**

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**13.** Wavelength of radio waves is.

A. $< microwaves$

B. $> microwaves$

C. $\leq$ infarred waves

D. $\leq UV$ rays

**Answer: B**

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**14.** A certain radio station broadcasts on a frequency of $980kHz$ (kilohertz). What is the wavelength of electromagnetic radiation broadcasts by the radio station ?

A. 306 m

B. 3.06 m

C. 30.6 m

D. 3060 m

**Answer: A**

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**15.** Which of the following is not correct according to Planck's quantum theory ?

A. Energy is emitted or absorbed discontinuously

B. Energy of a quantum is directly proportional to its frequency

C. A photon is also a quantum of light

D. Energy less than a quantum can also be emitted or absorbed

**Answer: D**

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**16.** If the threshold wavelength $(\lambda_0)$ for ejection of electron from metal is $350nm$ then work function for the photoelectric emission is

A. $1.2 \times 10^{-18} J$

B. $1.2 \times 10^{-20} J$

C. $6 \times 10^{-19} J$

D. $6 \times 10^{-12} J$

**Answer: C**

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**17.** The kinetic energy of the electron emitted when light of frequency $3.5 \times 10^{15} Hz$ falls on a metal surface having threshold frequency $1.5 \times 10^{15} Hz$ is $\left(h = 6.6 \times 10^{-34} Js\right)$.

A. $1.32 \times 10^{-18} J$

B. $3.3 \times 10^{-18} J$

C. $6.6 \times 10^{-19} J$

D. $1.98 \times 10^{-19} J$

**Answer: A**

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**18.** Light of wavelength $\lambda$ shines on a metal surface with initail X and the metal emit Y electron per second of average Z what will happen to Y and Z if X is doubled ?

A. $y$ will be doubled and $z$ will become half

B. $y$ will remain same and $z$ will be doubled

C. both $y$ and $z$ will be doubled

D. $y$ will be doubled but $z$ will remain same.

**Answer: D**

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**19.** Ultraviolet light of $6.2eV$ falls on an aluminium surface (work function $= 4.2eV$). The kinetic energy (in joule) of the fastest electron emitted is approximately.

A. $3 \times 10^{-21}$

B. $3 \times 10^{-19}$

C. $3 \times 10^{-17}$

D. $3 \times 10^{-15}$

**Answer: B**

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**20.** The energy difference between two electronic states is $46.12\text{kcal}/\text{mol}$. What will be the freqency of the light emitted when an electron drops from the higher to the lower energy state ? (Planck' constant $= 9.52 \times 10^{-14} kcal \sec mol^{-1}$)

A. $4.84 \times 10^{15} \text{cycles sec}^{-1}$

B. $4.84 \times 10^{-5} \text{cycles sec}^{-1}$

C. $4.84 \times 10^{-12} \text{cycles sec}^{-1}$

D. $4.84 \times 10^{14} \text{cycles sec}^{-1}$

**Answer: D**

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**21.** The energy required to break one mole of $Cl - Cl$ bonds in $Cl_2$ is $242 kJ mol^{-1}$. The longest wavelength of light capable of breaking a since $Cl - Cl$ bond is

A. 594 nm

B. 640 nm

C. 700 nm

D. 494 nm

**Answer: D**

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**22.** The value of Planck's constant is $6.63 \times 10^{-34} Js$. The velocity of light is $3 \times 10^{8} m / \sec$. Which value is closest to the wavelength of quantum of light with frequency of $8 \times 10^{15} \sec^{-1}$ ?

A. $5 \times 10^{-18} m$

B. $4 \times 10^{-8} m$

C. $3 \times 10^{7} m$

D. $2 \times 10^{-25} m$

**Answer: B**

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**23.** The $MRI$ (magnetic resonance imaging) body scanners used in hospitals operate with $400MHz$ radio frequency. The wavelength corresponding to this radio frequency is.

A. 0.75 m

B. 0.75 cm

C. 1.5 m

D. 2 cm

**Answer: A**

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**24.** Photon of which light has maximum energy :

A. red

B. blue

C. violet

D. green

**Answer: C**

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**25.** A photon of $300$ nm is absorbed by a gas and then emits two photons. One photon has a wavelength $496$ nm then the wavelength of second photon in nm is :

A. 959

B. 859

C. 759

D. 659

**Answer: C**

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## Hydrogen Spectrum

**1.** If velocity of an electron in 1st orbit of H atoms is V , what will be the velocity in 3rd orbit of $Li^{2+}$ ?

A. V

B. V/3

C. 3 V

D. 9 V

**Answer: A**

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**2.** When $Z$ is doubled in an atom, which of the following statements are consistent with Bohr's theory ?

A. Energy of a state is doubled

B. Radius of an orbit is doubled

C. Velocity of electron in an orbit is doubled

D. Energy of a state is halved.

**Answer: C**

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**3.** The shortest wavelength of H-atom in Lyman series is x, then longest wavelength in Balmer series of $He^+$ is

A. $\frac{4}{3}$

B. $\frac{36}{5}$

C. $\frac{1}{4}$

D. $\frac{5}{9}$

**Answer: A**

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**4.** Wavelength of the first line of Paschen series is $-\left(R=109700 cm^{-1}\right)$

A. $[18750 Å]$

B. $[2854 Å]$

C. $[3452 Å]$

D. $[6243 Å]$

**Answer: A**

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**5.** In Bohr series of lines of hydrogen spectrum, third line from the red end corresponds to which one of the following inner orbit jumps of electron for Bohr orbit in atom in hydrogen :

A. $4 \rightarrow 1$

B. $2 \rightarrow 5$

C. $3 \rightarrow 2$

D. $5 \rightarrow 2$

**Answer: D**

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**6.** Which electronic level would allow the hydrogen atom to absorb a photon but not to emit a photon ?

A. 3 s

B. $2p$

C. 2 s

D. 1 s

**Answer: D**

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**7.** The wavelength of the spectral line when the electron is the hydrogen atom undergoes a transition from the energy level $4$ to energy level $2$ is.

A. 486 nm

B. 486 m

C. $486\text{Å}$

D. 486 cm

**Answer: A**

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**8.** Which transition in the hydrogen spectrum have the same wavelength as Balmer transition, $n = 4$ to $n = 2$, of $H2^{+}$ spectrum ?

A. $n_1 = 1, n_2 = 2$

B. $n_1 = 1, n_2 = 3$

C. $n_1 = 3, n_2 = 4$

D. $n_1 = 2, n_2 = 4$

**Answer: A**

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**9.** The wavelength of the radiations emitted when in a hydrogen atom electron falls from infinity to stationary state is : $\left(R_H = 1.097 \times 10^7 m^{-1}\right)$ .

A. $9.1 \times 10^{-8} nm$

B. 192 m

C. 406 nm

D. 91 nm

**Answer: D**

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**10.** When an excited hydrogen atom returned to its ground state, some visible quanta were observed along with other quanta. Which of the following transitions must have occurred ?

A. $2 \rightarrow 1$

B. $3 \rightarrow 1$

C. $3 \rightarrow 2$

D. $4 \rightarrow 2$

**Answer: A**

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**11.** Consider one $He^+$ ion in excited state $(n = 5)$. Which of the following of the following observations will hold true as per the Bohr's model.

A. $10$ emission spectral lines will be seen

B. The ionisation energy needed is less than $2eV$

C. The longest emitted wavelength is less than $10/R(R = \text{Rydberg's constant})$

D. The electronic separation from the centre of nucleus is more than $6\text{Å}$.

**Answer: D**

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**12.** For a hydrogenic ion kinetic energy of electron in its $3^{rd}$ excited state is found to be $54.4eV$. Then series limit $\left(\frac{1}{\lambda}\right)$ for Balmer series, for this ion, is -

A. $109678 \times 16cm^{-1}$

B. $109678/16cm^{-1}$

C. $109678 \times 4cm^{-1}$

D. $109678 \times 64cm^{-1}$

**Answer: A**

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**13.** There are two samples of $H$ and $He^+$ atom. Both are in some excited state. In hydrogen atom, total numberof lines observed in Balmer series is $4$ in $He^+$ atom total number of lines observed in Paschen series is $1$. Electron in hydrogen sample make transitions to lower states from its excited state, then the photon corresponding to the line of maximum energy line Balmer series of $H$ sample is used to further excite the already excited $He^+$ sample. The maximum excitation level of $He^+$ sample will be :

A. $n = 6$

B. $n = 8$

C. $n = 12$

D. $n = 9$

**Answer: C**

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**14.** Which transition in $Li^{2+}$ would have the same wavelength as the $2 \to 4$ transition in $He^{+}$ ion ?

A. $4 \to 2$

B. $2 \to 4$

C. $3 \to 6$

D. $6 \to 2$

**Answer: C**

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**15.** Photons of equal energy were incident on two different gas samples. One sample containing H-atoms in the ground state and the other

sample containing H-atoms in some excited state with a principle quantum number 'n'. The photonic beams totally ionise the H-atoms. If the difference in the kinetic energy of the ejected electrons in the two different cases is $12.75eV$. Then find the principal quantum number 'n' of the excited state.

A. 1

B. 2

C. 3

D. 4

**Answer: D**

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**16.** What is the change in the orbit radius when the electron in the hydrogen atom (Bohr model) undergoes the first Paschen transition ?

A. $4.23 \times 10^{-10}m$

B. $0.35 \times 10^{-10} m$

C. $3.7 \times 10^{-10} m$

D. $1.587 \times 10^{-10} m$

**Answer: C**

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**17.** A certain dye absorbs light of $\lambda = 4000\text{Å}$ and then flueresces light of $5000\text{Å}$. Assuming that under given conditions $50\,\%$ of the absorbed energy is re-emitted out as fluorescence, calculate the ratio of number of quanta emitted out to the number of quanta absorbed.

A. $\frac{5}{8}$

B. $\frac{8}{5}$

C. $\frac{3}{8}$

D. $\frac{8}{3}$

**Answer: A**

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**18.** The number of spectral line that can be possible when electrons in $6^{th}$ shell in hydrogen atom return to the $2^{nd}$ shell :

A. 12

B. 15

C. 14

D. 10

**Answer: D**

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**19.** Ionisation potential of hydrogen atom is $13.6eV$. Hydrogen atom in the ground state is excited by monochromatic light fo energy $12.1eV$ .

The spectral lines emitted by hydrogen according to Bohr`s theory will be.

A. One

B. Two

C. Three

D. four

**Answer: C**

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**20.** The balmer series occurs between the wavelength of $\left[R = 1.0968 \times 10^{7} m^{-1}\right]$.

A. $4623Å$ to $6563Å$

B. $1243Å$ to $6563Å$

C. $3647Å$ to $6563Å$

D. $3647Å$ to $7210Å$

**Answer: C**

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**21.** The radius of hydrogen atom in its ground state is $5.3 \times 10^{-11} m$. After collision with an electron it is found to have a radius of $21.2 \times 10^{-11} m$. The principal quantum number of the final state of the atom is.

A. 2

B. 3

C. 4

D. 5

**Answer: A**

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**22.** Which element has a hydrogen like spectrum whose lines have wavelength one fourth of atomic hydrogen ?

A. $He^+$

B. $Li^{2+}$

C. $Be^{3+}$

D. $B^{4+}$

**Answer: A**

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**23.** The frequency corresponding to transition $n = 1$ to $n = 2$ in hydrogen atom is.

A. $15.66 \times 10^{10} Hz$

B. $24.66 \times 10^{14} Hz$

C. $30.57 \times 10^{14} Hz$

D. $40.57 \times 10^{24} Hz$

**Answer: B**

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**24.** The frequency of light emitted for the transition $n = 4$ to $n = 2$ of $He^{+}$ is equal to the transition in $H$ atom corresponding to which of the following ?

A. $n = 3 \text{to} n = 1$

B. $n = 2 \text{to} n = 1$

C. $n = 3 \text{to} n = 2$

D. $n = 4 \text{to} n = 3$

**Answer: B**

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**25.** If the wavelength of the first line of the Balmer series of hydrogen atom is $656.1\ nm$ the wavelngth of the second line of this series would be

A. $218.7nm$

B. $328.0nm$

C. $486.0nm$

D. 640.0 nm

**Answer: C**

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**26.** The wave number of the first line of Balmer series of hydrogen is $15200cm^{-1}$ The wave number of the first Balmer line of $Li^{2+}$ ion is

A. $15200cm^{-1}$

B. $60800cm^{-1}$

C. $76000 cm^{-1}$

D. $136800 cm^{-1}$

**Answer: D**

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**27.** In hydrogen spectrum, the series of lines appearing in ultra violet region of electromagnetic spectrum are called

A. Lyman lines

B. Balmer lines

C. Pfund lines

D. Brackett lines

**Answer: A**

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**28.** Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?

A. Lyman

B. Paschen

C. Brackett

D. Balmer

**Answer: D**

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**29.** To which electronic transtion between Bohr orbits in hydrogen, the second line in the Balmer series belongs ?

A. $3 \rightarrow 2$

B. $4 \rightarrow 2$

C. $5 \rightarrow 2$

D. $6 \rightarrow 2$

**Answer: B**

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**30.** A photons was absorbed by a hydrogen atom in its ground state, and the elctron was prompted to the fifth orbit. When the excited atom returuned to its ground state, visible and other quanta were emitted. In this process, how many maximum spectral lined could be obtained-

A. $5 \rightarrow 2$

B. $2 \rightarrow 1$

C. $3 \rightarrow 1$

D. $4 \rightarrow 1$

**Answer: A**

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**31.** The energy of hydrogen atom in its ground state is $-13.6eV$. The energy of the level corresponding to the quantum number $n = 5$ is

A. $-0.54eV$

B. $-5.40eV$

C. $-0.85eV$

D. $-2.72eV$

**Answer: A**

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**32.** No. of visible lines when an electron returns from $5^{th}$ orbit up to ground state in $H$spectrum :

A. 5

B. 4

C. 3

D. 10

**Answer: C**

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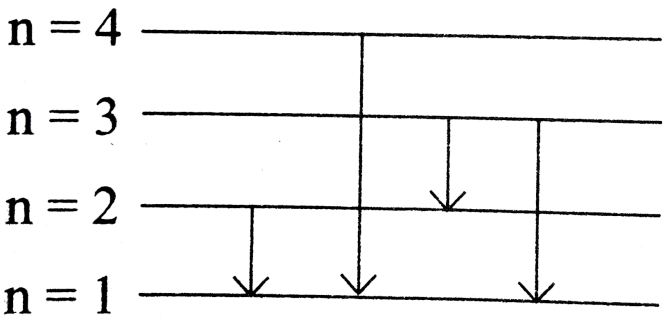
**33.** Suppose that a hypothetical atom gives a red, green, blue and violet line spectrum. Which jump according to figure would give off the red spectral line.




A. $3 \rightarrow 1$

B. $2 \rightarrow 1$

C. $4 \rightarrow 1$

D. $3 \rightarrow 2$

**Answer: D**

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**34.** The angular momentum of an electron in a Bohr's orbit of $He^+$ is $3.1652 \times 10^{-34} kg - m^2/\sec$. What is the wave number in terms of Rydberg constant $(R)$ of the spectral line emitted when an electron falls this level to the first excited state.

$[\text{Use} h = 6.626 \times 10^{-34} Js]$.

A. $3R$

B. $\frac{5R}{9}$

C. $\frac{3R}{4}$

D. $\frac{8R}{9}$

**Answer: B**

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**35.** The number of possible line of Paschen series when electron jumps from seventh excited state up to ground state (in hydrogen like atom) is :

A. 2

B. 5

C. 4

D. 3

**Answer: B**

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## Heisenbergs Uncertainity Principle And Debroglie Equation

**1.** An electron is moving with a kinetic energy of $4.55 \times 10^{-25} J$. What will be Broglie wavelength for this electron ?

A. $5.28 \times 10^{-7} m$

B. $7.28 \times 10^{-7} m$

C. $2 \times 10^{-10} m$

D. $3 \times 10^{-5} m$

**Answer: B**

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**2.** The de-Broglie wavelength of a tennis ball mass $60g$ moving with a velocity of $10m$ per second is approximately :

A. $10^{-16} m$

B. $10^{-25} m$

C. $10^{-33} m$

D. $10^{-31} m$

**Answer: C**

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**3.** The correct set of quantum number for the unpaired electron of chlorine atom is

$n \quad l \quad m_1$ "" $n \quad l \quad m_1$

A. $\begin{matrix} n & l & m_l \\ 2 & 1 & 0 \end{matrix}$

B. $\begin{matrix} n & l & m_l \\ 2 & 1 & 1 \end{matrix}$

C. $\begin{matrix} n & l & m_l \\ 3 & 1 & 1 \end{matrix}$

D. $\begin{matrix} n & l & m_l \\ 3 & 0 & 0 \end{matrix}$

**Answer: C**

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**4.** The momentum of a particle which has a de Broglie wavelength of $2.5 \times 10^{-10} m$ is.

A. $2.64 \times 10^{-24} kgm \sec^{-1}$

B. $3.62 \times 10^{-24} kgm \sec^{-1}$

C. $4.64 \times 10^{-24} kgm \sec^{-1}$

D. $3.62 \times 10^{-26} kgm \sec^{-1}$

**Answer: A**

Watch Video Solution

**5.** Velocity of de Broglie wave is given by :

A. $\frac{c^2}{v}$

B. $\frac{hv}{mc}$

C. $\frac{mc^2}{h}$

D. $v\lambda$

**Answer: B**

Watch Video Solution

**6.** The mass of photon having wavelength $1nm$ is :

A. $2.21 \times 10^{-35} kg$

B. $2.21 \times 10^{-33} g$

C. $2.21 \times 10^{-33} kg$

D. $2.21 \times 10^{-26} kg$

**Answer: C**

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**7.** A $3p$ orbital has :

A. two non-spherical nodes

B. two spherical nodes

C. one spherical and one non-spherical node

D. one spherical and two non-spherical nodes

**Answer: C**

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**8.** Uncertainty in the position of an electron mass $\left(9.1 \times 10^{31} kg\right)$ moving with a velocity $300 ms^{-1}$ accurate uptp $0.001\ \%$ will be :

A. $19.2 \times 10^{-2} m$

B. $5.76 \times 10^{-2} m$

C. $1.92 \times 10^{-2} m$

D. $3.84 \times 10^{-2} m$

**Answer: C**

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**9.** The uncertainly in position for an electron is $\frac{\lambda}{4\pi}$ where $\lambda$ is the de Broglie wavelength. The uncertainly in velocity will be -

A. $\frac{V}{2}$

B. $V$

C. 3 V

D. $\frac{V}{4}$

**Answer: B**

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**10.** The de Broglie wavelenth of $1mg$ grain of sand blown by a $20ms^{-1}$ wind is :

A. $3.3 \times 10^{-29}m$

B. $3.3 \times 10^{-21}m$

C. $3.3 \times 10^{-49}m$

D. $3.3 \times 10^{-42}m$

**Answer: A**

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**11.** The wavelength associtated with a golf ball weight $200g$ and moving at a speed of $5mh^{-1}$ is of the order

A. $10^{-10}m$

B. $10^{-20}m$

C. $10^{-30}m$

D. $10^{-40}m$

**Answer: C**

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**12.** Calculate de Broglie wavelength of an electron travelling ar $1\ \%$ of the speed of light.

A. $2.73 \times 10^{-24}$

B. $2.42 \times 10^{-10}$

C. $242.2 \times 10^{10}$

D. None of these

**Answer: B**

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**13.** If the velocity of hydrogen molecule is $5 \times 10^4 cm \sec^{-1}$, then its de-Broglie wavelength is.

A. $2Å$

B. $4Å$

C. $8Å$

D. $100Å$

**Answer: B**

Watch Video Solution

**14.** The de-Broglie wavelength associated with a particle of mass $10^{-6}kg$ moving with a velocity of $10ms^{-1}$, is

A. $6.63 \times 10^{-22}m$

B. $6.63 \times 10^{-29}m$

C. $6.63 \times 10^{-31}m$

D. $6.63 \times 10^{-34}m$

**Answer: B**

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**15.** Minimum de-Broglie wavelength is associated with.

A. Electron

B. Proton

C. $CO_2$ molecule

D. $SO_2$ molecule

**Answer: D**

Watch Video Solution

**16.** An electron has kinetic energy $2.8 \times 10^{-23} J$ de-Broglie wavelength will be nearly.

$\left(m_e = 9.1 \times 10^{-31} kg\right)$.

A. $9.28 \times 10^{-4} m$

B. $9.28 \times 10^{-7} m$

C. $9.28 \times 10^{-8} m$

D. $9.28 \times 10^{-10} m$

**Answer: C**

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**17.** The mass of a photon with a wavelength equal to $1.54 \times 10^{-8} cm$ is.

A. $0.8268 \times 10^{-34} kg$

B. $1.2876 \times 10^{-33} kg$

C. $1.4285 \times 10^{-32} kg$

D. $1.8884 \times 10^{-32} kg$

**Answer: C**

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**18.** Davisson and Germer's experiment showed that.

A. $\beta$ - particles are electrons

B. Electrons come from nucleus

C. Electrons show wave nature

D. None of the above

**Answer: C**

Watch Video Solution

**19.** Calculate the wavelength of a track star running $150$ metre dash in $12.1\,\sec$ if its weight is $50kg$.

A. $9.11 \times 10^{-34}m$

B. $8.92 \times 10^{-37}m$

C. $1.12 \times 10^{-45}m$

D. none of these

**Answer: B**

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**20.** The uncertainty in the position of an electron moving with a velocity of $1 \times 10^4 cms^{-1}$ (accurate up to $0.011\,\%$ ) will be :

A. $1.92cm$

B. $7.68cm$

C. $0.528cm$

D. 3.8 cm

**Answer: C**

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**21.** If uncertainty in position and momentum are equal then uncertainty in velocity is.

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

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

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

D. None of these

**Answer: C**

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**22.** The uncertainty in the position of an electron is equal to its de broglie wavelength .The minimum percent error in its measurement of velocity under this circumstance will be approximately.

A. 4

B. 8

C. 18

D. 22

**Answer: B**

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**23.** According to Heisenberg's uncertainly principle, the product of uncertainties in position and velocities for an electron of mass $9.1 \times 10^{-31} kg$ is.

A. $2.8 \times 10^{-3} m^2 s^{-1}$

B. $3.8 \times 10^{-5} m^2 s^{-1}$

C. $5.8 \times 10^{-5} m^2 s^{-1}$

D. $6.8 \times 10^{-6} m^2 s^{-1}$

**Answer: C**

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**24.** Uncertainty in position of a $0.25g$ particle is $10^{-5}$. Uncertainty of velocity is $\left(h = 6.6 \times 10^{-34} Js\right)$.

A. $1.2 \times 10^{34}$

B. $2.1 \times 10^{-26}$

C. $1.6 \times 10^{-20}$

D. $1.7 \times 10^{-9}$

**Answer: B**

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**25.** Simultaneous determination of exact position and momentum of an electron is.

A. Possible

B. Impossible

C. Sometimes possible sometimes impossible

D. None of the above

**Answer: B**

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**26.** The uncertainty in momentum of an electron is $1 \times 10^{-5} kgm/s$. The uncertainty in its position will be $\left(h = 6.62 \times 10^{-34} kgm^2/s\right)$.

A. $1.05 \times 10^{-28} m$

B. $1.05 \times 10^{-26} m$

C. $5.27 \times 10^{-30} m$

D. $5.25 \times 10^{-28} m$

**Answer: C**

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**27.** The uncertainty in the position of a moving bullet of mass $10g$ is $10^{-5} m$. Calculate the uncertainty in its velocity.

A. $5.2 \times 10^{-28} m / \sec$

B. $3.0 \times 10^{-28} m / \sec$

C. $5.2 \times 10^{-22} m / \sec$

D. $3 \times 10^{-22} m / \sec$

**Answer: A**

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**28.** A $200g$ cricket ball is thrown with a speed of $3.0 \times 10^3 cm \sec^{-1}$. What will be its de Broglie's wavelength ?

$\left[h = 6.6 \times 10^{-27} gcm^2 \sec^{-1}\right]$.

A. $1.1 \times 10^{-32} cm$

B. $2.2 \times 10^{-32} cm$

C. $0.55 \times 10^{-32} cm$

D. $11.0 \times 10^{-32} cm$

**Answer: A**

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**29.** If the uncertainty in the position of an electron is zero the nucertainty in its momentum be

A. zero

B. $< h/(4\pi)$

C. $> h/(4\pi)$

D. infinite

**Answer: D**

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**30.** Heisenberg uncertainty principle states that.

A. Moving bodies exhibit both particle and wave character

B. Neither the position nor the momentum of a particle can be precisely determined.

C. Simultaneous determination of position and momentum of a microscopic particle is not possible.

D. Moving charged particles resemble electromagnetic waves in their behaviour.

**Answer: C**

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**31.** Calculate the uncertainty in velocity of a circuit ball of mass $150g$ if the uncertainty in its position is $1Å\left(h = 6.6 \times 10^{-34} kgm^2 s^{-1}\right)$.

A. $3.5 \times 10^{-24} ms^{-1}$

B. $4.5 \times 10^{-24} ms^{-1}$

C. $3.5 \times 10^{-24} cms^{-1}$

D. $4.5 \times 10^{-24} cms^{-1}$

**Answer: A**

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**32.** In an electron mircroscope, electrons are accelerated to great velocities. Calculate the wavelength of an electron travelling with a

velocity of 7.0 megameters per second. The mass of an electron is $9.1 \times 10^{-28} g$.

A. $1.0 \times 10^{-13} m$

B. $1.0 \times 10^{-7} m$

C. $1.0 m$

D. $1.0 \times 10^{-10} m$

**Answer: D**

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**33.** Calculate the minimum uncertainty in velocity of a particle of mass $1.1 \times 10^{-27} kg$ if uncertainty in its position is $3 \times 10^{-10} cm$.

A. $1.5 \times 10^{-4} m$

B. $2.5 \times 10^{-4} m$

C. $3.5 \times 10^{-4} m$

D. $4.5 \times 10^{-4} m$

**Answer: A**

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**34.** If wavelength is equal to the distance travelled by the electron in one second, then

A. $\lambda = \frac{h}{p}$

B. $\pi = \frac{h}{m}$

C. $\lambda = \sqrt{\frac{h}{p}}$

D. $\lambda = \sqrt{\frac{h}{m}}$

**Answer: D**

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**35.** In H-atom if $r1$ is the radius fo first Bohr orbit de-Broglie wavelength of an elecrton in $3^{rd}$ orbit is :

A. $2\pi a_1$

B. $6\pi a_1$

C. $9\pi a_1$

D. $16\pi a_1$

**Answer: B**

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**36.** In H-atom if $r1$ is the radius fo first Bohr orbit de-Broglie wavelength of an elecrton in $3^{rd}$ orbit is :

A. $2\pi x$

B. $6\pi x$

C. $9x$

D. $\frac{x}{3}$

**Answer: B**

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**37.** The difference between the incident energy and threshold energy for an electron in a photoelectric effect experiment is $5eV$. The de Broglie wavelength of the electron is-

A. $\frac{6.6 \times 10^{-9}}{\sqrt{1456}}m$

B. $\frac{6.6 \times 10^{-9}}{\sqrt{145.6}}m$

C. $\frac{6.6 \times 10^{-9}}{\sqrt{1664}}$

D. $\frac{6.6 \times 10^{-9}}{\sqrt{166.4}}m$

**Answer: B**

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**38.** Uncertainty in position is twice the uncertainty in momentum. Uncertainty in velocity is :

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

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

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

D. $\frac{h}{4\pi}$

**Answer: C**

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**39.** Which of the following best explains light both as a stream of particles and wave motion ?

A. $c = v \times \lambda$

B. $\lambda = \frac{h}{p}$

C. diffraction

D. photoelectric effect.

**Answer: B**

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**40.** The speed of a photon is one hundredth of the speed light in vacuum. What is the de Broglie wavalengths. Assume that one mole of protons has a mass equal to one gram. $h = 6.626 \times 10^{-27} erg \sec.$

A. $3.31 \times 10^{-3} Å$

B. $1.33 \times 10^{-3} Å$

C. $3.13 \times 10^{-2} Å$

D. $1.31 \times 10^{-2} Å$

**Answer: B**

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**41.** What possibly can be the ratio of the de Broglie wavelength for two electrons each having zero initial weighing $200g$ and moving at a speed of $5m/hr$ of the order of.

A. $3:10$

B. $10:3$

C. $1:2$

D. $2:1$

**Answer: D**

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**42.** The wavelength associtated with a golf ball weight $200g$ and moving at a speed of $5mh^{-1}$ is of the order

A. $10^{-1}m$

B. $10^{-20}m$

C. $10^{-30}m$

D. $10^{-40}m$

**Answer: C**

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**43.** An $\alpha -$ particle is accelerated through a potential difference of $V$ volts from rest. The de-Broglie's wavelengths associated with it is.

A. $\sqrt{\frac{150}{V}}\text{Å}$

B. $\frac{0.286}{\sqrt{V}}\text{Å}$

C. $\frac{0.101}{\sqrt{V}}\text{Å}$

D. $\frac{0.983}{\sqrt{V}}\text{Å}$

**Answer: C**

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**44.** The uncertainty in position and velocity of the particle are $0.1nm$ and $5.27 \times 10^{-27} ms^{-1}$ respectively. Then the mass of the particle is : $\left(h = 6.625 \times 10^{-34} Js\right)$.

A. 200 g

B. 300 g

C. 100 g

D. 1000 g

**Answer: C**

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## Section B Assertion Reasoning

**1.** Hydrogen nucleus combines to form helium then energy is released.

Binding energy/nucleon of $He$ is greater than hydrogen.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**


**2.** Water is used as a moderator in nuclear reactor.

Moderator is a light substance that absorb neutrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**3.** The cation energy of an electron is largely determined by its principal quantum number.

The principal quantum number $n$ is a measure of the most probable distance of finding atomic the electron around the nucleus.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**4.** The atoms of different elements having same mass number but different atomic number are known as isobars.

The sum of protons and neutrons, in the isobars is always different.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: C**

Watch Video Solution

**5.** The value of $n$ for a line Balmer series of hydorgen spectrum having the highest wave length is $4$ and $6$.

For Balmer series of hydorgen spectrum, the value $n_1 = 2$ and $n_2 = 3, 4, 5$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**6.** Statement : ${}_{24}Cr$ has more paramangetic nature than ${}_{25}Mn$.

Explanation : $Cr$ has more number of unpaired electron than Mn.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

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**7.** Assertion (A) : For $n = 3, l1$ may be $0, 1$ and $2$ and m may be $0, \pm 1$ and $0, \pm 1$ , and $\pm 2$

Reason (R ) : For each value of n, there are 0 to $(n-1)$ possible value of l for eachvalue of l , there are $0 \rightarrow \pm l$ valie of m

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**8.** $Cu^{+}_{(aq.)}$ has less stable nature than $Cu^{2+}_{(aq.)}$ but $Fe^{3+}_{(aq.)}$ is more stable than $Fe^{2+}_{(aq.)}$.

Half-filled and completely filled, sub-shell are more stable.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: B**

Watch Video Solution

**9.** Statement : Specific charge of $\alpha$-particles is twice to that of proton .

Explanation : Specific charge is given by $e/m$

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**10.** A beam of electrons deflects more than a beam of $\alpha - \text{particles}$ in an electric field.

Electrons possess negative charge while $\alpha - \text{particles}$ possess positive charge.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: C**

Watch Video Solution

**11.** $K$ and $Cs$ are used in photoelectric cells.

$K$ and $Cs$ emit electrons on exposure to light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**12.** The free gaseous $Cr$ atom has six unpaired electrons.

Half-filled s-orbital has greater stability.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: C**

Watch Video Solution

**13.** $e/m$ ratio in case of anode ray experiment is different for different gases.

The ion of gases formed after the ejection of electron are different of gas is different.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**14.** Band gap in germanium is small.

The energy spread of each germanium atomic energy level is infinitesimally small.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**15.** Spectral line would not ne seen for a $2p_x - 2p_z$ transition

p-orbitals are degenerate orbitals.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**16.** Transition of electron between $p_x$ and $p_y$ would not lead to an spectral line.

p-orbitals are degenerate orbitals.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**17.** Number of sub-shell in a shell is equal to the number of shel.

According to Summerfield :

$$\frac{n}{f} = \frac{\text{Length of major axis}}{\text{Length of minor axis}}.$$

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**18.** Electronic configuration of $._{23}V^{3+}$ ion is $[Ar]^{18}3d^2$ and not $[Ar]183d^04s^2$.

$V^{3+}$ ion is diamagnetic in nature.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: C**

Watch Video Solution

**19.** Statement : Number of waves in an orbit of atom is equal to number of that orbit .

Explanation : Number of waves in an robit is derived by $\frac{2\pi r_n}{\lambda}$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

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**20.** A triply ionized Be-atom has the same radius of $2^{nd}$ orbitas that of ground state of H-atom.

Th radius of an orbit is $r_n = \frac{r_1 \times n^2}{1}$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

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**21.** Statement : wavelength of (I) line of Humphry series is more than (I) line of Lyman series in H-atom

Explanation : $\Delta E = \frac{hc}{\lambda}$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

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**22.** The magnetic moment of $Mg - \text{atom}$ is more than $K - \text{atom}$ as the former has two electrons in outermost shell.

The magnetic moment $N - \text{atom}$ is more than magnetic moment $O - \text{atom}$ and former has more number of unpaired electrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**23.** Statement : All s-orbitla in H-atom corresponds to a non-zero probability density at nucleus .

Explanation : The probability density is given by $\psi^2$ and $\psi \propto e^{Z2/2a_0}$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**24.** The location and momentum of an electron in an orbital are complementary to each other.

The statement is against Heisenberg's uncertainty principle.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: C**

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**25.** Statement : The 3p-orbital has higher energy level than 3s in $He^+$ ion.

Explanation: The energy of an orbital depends upon n and l.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**26.** Assertion (A) : If the potential difference applied to an electron is made $4$ time , the de Broglie wavelength associated is halved

Reason (R ) : On making potential difference $4$ times , velocity is doubled and hence $\lambda$ is halved

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**27.** Statement : Specific charge of $\alpha$-particles is twice to that of proton .

Explanation : Specific charge is given by $e/m$

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**28.** Statement : d-orbital are five fold non-degenerate in presence of magnetic field.

Explanation : In presence of magnetic field, the energy of orbitals becomes altogether different.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**29.** Statement : electromangetic radiations will be emitted for the transtition of $2p$ to $2s$ orbitals in H-atom .

Explanation : Both have same energy level and thus no transition .

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**30.** Statement : The $\psi_{640}$ represents an orbital .

Explanation : The orbital may be $6g$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: B**

Watch Video Solution

**31.** Statement : Monochromatic X-rays fall on lighter elements such as carbon and show scattering and effect is known as Compton effect .

Explanation : $\lambda$ scattered light is always lower than $\lambda$ incident light .

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: B**

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**32.** Humphry series discovered in $H-\text{atomic}$ spectra has lowest energy radiations among all series.

Lowest state for this series is $n_1 = 6$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**33.** A photon of energy $12eV$ can break three molecules of $A_2$ into atoms which has bond dissociation energy of $4eV/\text{molecule}$.

Total energy is conserved and interaction is always one to one between photon and molecule.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

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**34.** Thomson's analysis of cathode ray experiment led him to conclude that electrons were fundamental particles.

$e/m$ ratio for particles in cathode rays was found to be independent of the nature of the gas taken in the tube.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

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Aipmt Neet Questions

**1.** The following quantum numbers are possible for how many orbitals $(s) n = 3, l = 2, m = +2$ ?

A. 1

B. 3

C. 2

D. 4

**Answer: A**

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**2.** Which of the following is isoelectronic ?

A. $CO_2, NO_2$

B. $NO_2^-, CO_2$

C. $CN^-, CO$

D. $SO_2, CO_2$

**Answer: C**

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**3.** The total energy of the electron in the hydrogen atom in the ground state is $-13.6eV$. The $KE$ of this electron is.

A. $13.6eV$

B. zero

C. $-13.6eV$

D. $6.8eV$

**Answer: A**

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**4.** In hydrogen atom, energy of first excited state is $-3.4eV$. Then, $KE$ of the same orbit of hydrogen atom is.

A. $+3.4eV$

B. $+6.8eV$

C. $-13.6eV$

D. $+13.6eV$

**Answer: A**

Watch Video Solution

**5.** The value of Planck's constant is $6.63 \times 10^{-34} Js$. The velocity of light is $3 \times 10^{8} m/\sec$. Which value is closest to the wavelength of quantum of light with frequency of $8 \times 10^{15} \sec^{-1}$ ?

A. $2 \times 10^{-25} nm$

B. $5 \times 10^{-18} nm$

C. $4nm$

D. $3 \times 10^{-7} nm.$

**Answer: C**

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**6.** The frequency of radiations emitted when electron falls from $n = 4$ to $n = 1$ in $H - \text{atom}$ would be (Given $E_1$ for $H = 2.18 \times 10^{-18} J \text{atom}^{-1}$ and $h = 6.625 \times 10^{-34} Js$.)

A. $1.54 \times 1015 s^{-1}$

B. $1.03 \times 1015 s^{-1}$

C. $3.08 \times 1015 s^{-1}$

D. $2.0 \times 1015 s^{-1}$

**Answer: C**

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**7.** The energy of second Bohr orbit of the hydrogen atom is $-328kJmol^{-1}$, hence the energy of fourth Bohr orbit would be.

A. $-82kJmol^{-1}$

B. $-41kJmol^{-1}$

C. $-1312kJmol^{-1}$

D. $-164kJmol^{-1}$

**Answer: A**

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**8.** $\left[Cr(H_2O)_6\right]Cl_3$ (at no. of Cr = 24) has a magnetic moment of $3.83B.M.$ The correct distribution of $3d$ electrons the chromium of the complex.

A. $3d_{xy}^1, 3d_{yz}^1, 3_{xz}^1$

B. $3d_{xy}^1, 3d_{yz}^1, 3_{z^2}^1$

C. $\left(3d^1\_(x^(2) - y^2)\right)$, 3d^1 ._(z^2),3d^1._(xz)`

D. $3d^1\_(xy)$, $\left(3d^1\_\left(x^2-y^2\right)\right)$, $3d^1\_(yz)$

**Answer: A**

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**9.** The uncertainty involved in the measurement of velocity within a distance of $0.1\text{Å}$ is :

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

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

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

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

**Answer: C**

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**10.** The orientation of an atomic orbital is governed by :

A. Azimuthal quantum number

B. Spin quantum number

C. Magnetic quantum number

D. principal quantum number

**Answer: C**

Watch Video Solution

**11.** Consider the following sets of quantum numbers.

(i)
| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 3 | 0 | 0 | $+1/2$ |

(ii)
| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 2 | 2 | 1 | $+1/2$ |

(iii)
| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 4 | 3 | $-2$ | $-1/2$ |

(iv)
| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 1 | 0 | $-1$ | $-1/2$ |

(v)
| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 3 | 2 | 3 | $+1/2$ |

Which of the following sets of quantum number is not possible ?

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

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

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

D. (i) and (iii)

**Answer: C**

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**12.** If uncertainty in position and momentum are equal then uncertainty in velocity is.

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

B. $\frac{1}{m}\sqrt{\frac{h}{\pi}}$

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

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

**Answer: D**

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

A. $1 \times 10^{6} cm s^{-1}$

B. $1 \times 10^{5} cm s^{-1}$

C. $1 \times 10^{11} cm s^{-1}$

D. $1.1 \times 10^{9} cm s^{-1}$

**Answer: D**

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**14.** Maximum number of electrons in a sub-shell of an atom is determined by the following.

A. $2n^2$

B. $4l + 2$

C. $2l + 1$

D. $4l - 2$

**Answer: B**

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**15.** Which of the following is not permissible arrangement of electrons in an atom ?

A. $n = 3, l = 2, m = -2, s = -1/2$

B. $n = 4, l = 0, m = 0, s = -1/2$

C. $n = 5, l = 3, m = 0, s = +1/2$

D. $n = 3, l = 2, m = -3, s = -1/2$

**Answer: D**

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**16.** The energy absorbed by each molecule $(A_2)$ of a substance is $4.4 \times 10^{-19} J$ and bond energy per molecule is $4.0 \times 10^{-19} J$. The kinetic energy of the molecule per atom will be.

A. $2.0 \times 10^{-20} J$

B. $2.2 \times 10^{-19} J$

C. $2.0 \times 10^{-19} J$

D. $4.0 \times 10^{-20} J$

**Answer: A**

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**17.** A $0.66kg$ ball is moving wih a speed of $100m/s$. The associated wavelength will be.

A. $6.6 \times 10^{-32} m$

B. $6.6 \times 10^{-34} m$

C. $1.0 \times 10^{-35} m$

D. $1.0 \times 10^{-32} m$

**Answer: C**

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**18.** The total number of atomic orbitals in fourth energy level of an atom is.

A. 4

B. 8

C. 16

D. 32

**Answer: C**

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**19.** If $n = 6$, the correct sequence for filling of electrons will be.

A. $ns \to np \to (n-1)d \to (n-2)f$

B. $ns \to (n-2)f \to (n-1)d \to np$

C. $ns \to (n-1)d \to (n-2)f \to np$

D. $ns \to (n-2)f \to np \to (n-1)d$

**Answer: A**

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**20.** The energies $E_1$ and $E_2$ of two radiations are $25eV$ and $50eV$ respectively. The relation between their wavelengths, i.e., $\lambda_1$ and $\lambda_2$ will be.

A. $\lambda = \lambda_2$

B. $\lambda_1 = 2\lambda_2$

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

D. $\lambda_1 = 4\lambda_2$

**Answer: B**

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**21.** Maximum number of electrons in a sub-shell with $l = 3$ and $n = 4$ is.

A. 10

B. 12

C. 14

D. 16

**Answer: C**

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**22.** The correct set of four quantum number for the valence (outermost) electron of radiation $(Z = 37)$ is

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

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

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

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

**Answer: A**

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**23.** The angular momentum of p electron is

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

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

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

D. $\frac{h}{\sqrt{4}\pi}$

**Answer: D**

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**24.** The value of Planck's constant is $6.63 \times 10^{-34} Js$. The speed of light is $3 \times 10^{17} nms^{-1}$. Which value is closest to the wavelength of quantum of light with frequency of $6 \times 10^{15} \sec^{-1}$ ?

A. 25

B. 50

C. 75

D. 10

**Answer: B**

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**25.** What is the maximum number of electrons that can be associated with a following set of quantum numbers ? $(n = 3, l = 1 \text{ and } m = -1)$.

A. 2

B. 4

C. 6

D. 10

**Answer: A**

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

A. the larger the value of $n$. The larger is the orbit radius.

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

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

D. 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 the nucleus.

**Answer: C**

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**27.** What is the maximum number of orbitals that can be identified with the following quantum numbers ? $n = 3, l = 1, m_l = 0$.

A. 1

B. 2

C. 3

D. 4

**Answer: A**

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**28.** Calculate the energy in joule corresponding to light of wavelength $45nm$ :

(Planck' constant $h = 6.63 \times 10^{-34} Js$ , speed of light $c = 3 \times 10^{8} ms^{-1}$)

A. $6.67 \times 10^{15}$

B. $6.67 \times 10^{11}$

C. $4.42 \times 10^{-15}$

D. $4.42 \times 10^{-18}$

**Answer: D**

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**29.** For a d electron the orbital angular momentum is

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

B. $\hbar$

C. $\sqrt{6}\hbar$

D. $\sqrt{2}\hbar$

**Answer: C**

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**30.** Magnetic moments $2.84B.$ $M$ is given by :

(At. nos. ni = 28, Ti = 22, Cr = 24, Co = 27).

A. $Cr^{2+}$

B. $Co^{2+}$

C. $Ni^{2+}$

D. $Ti^{3+}$

**Answer: C**

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**31.** The number of $d$ electrons in $Fe^{2+}$ (atomic number of $Fe = 26$) is not equal to that of the.

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**

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**32.** Two electrons occupying the same orbital are distinguished by :

A. Spin quantum number

B. Principal quantum number

C. Magnetic quantum number

D. Azimuthal quantum number

**Answer: A**

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**33.** Which one is the wrong statement ?

A. The uncertainty principle is $\Delta E \times \Delta t \geq h / 4\pi$.

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 the energy of $2p$ orbital in case in Hydrogen like atoms.

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

**Answer: A**

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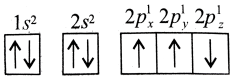
**34.** Which one is a wrong statement ?

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**

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**35.** The discovery of neutron becomes very late because.

A. neutrons are present in nucleus

B. neutrons are highly unstable particles

C. neutrons are chargeless

D. neutrons do not move.

**Answer: C**

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**36.** Proton was discovered by

A. Chadwick

B. Thomson

C. Goldstein

D. Bohr

**Answer: C**

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**37.** Which of the following has the same mass as that of an electron ?

A. Photon

B. Neutron

C. Positron

D. Proton

**Answer: C**

Watch Video Solution

**38.** The masss of an atom is consitituted mainly by

A. neutron and neutrino

B. neutron and electron

C. neutron and proton

D. proton and electron

**Answer: C**

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**39.** The most probable radius (in pm) for finding the electron in $He^+$ is.

A. $0.0$

B. $52.9$

C. $26.5$

D. $105.8$

**Answer: C**

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**40.** If the atomic weight of an element is $23$ times that of the lightest element and it has $11$ protons, then it contains.

A. $11$ protons, $23$ neutrons, $11$ electrons

B. $11$ protons, $11$ neutrons, $11$ electrons

C. $11$ protons, $12$ neutrons, $11$ electrons

D. $11$ protons, $11$ neutrons, $23$ electrons.

**Answer: C**

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**41.** The hydride ions $\left(H^{-}\right)$ are isoelectronic with

A. $Li$

B. $He^{+}$

C. $He$

D. $Be$

**Answer: C**

Watch Video Solution

**42.** The number of electrons in the nucleus of $C^{12}$ is

A. 6

B. 12

C. 0

D. 3

**Answer: C**

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**43.** The charge on the atom containing $17$ protons, $18$ neutrons and $18$ electrons is.

A. $+1$

B. $-2$

C. $-1$

D. zero

**Answer: C**

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**44.** Number of protons, neutrons and electrons in the element ${}^{231}_{89}Y$ is.

A. $89, 231, 89$

B. $89, 89, 242$

C. $89, 142, 89$

D. $89, 71, 89$

**Answer: C**

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**45.** When atoms are bombarded with alpha particles, only a few in millon suffer deflection, other pass out undeflected. This is because.

A. The force of repulsion on the moving alpha particle is small

B. The force of attraction on the alpha particle to the oppositely charged electrons is very small

C. There is only one nucleus and large number of electrons

D. The nucleus occupies much smaller volume compared to the volume of the atom.

**Answer: D**

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**46.** Which of the following is not acharacteristic of plack's quentum theory of radiation ?

A. The energy is not absorbed or emitted in whole number or multiple of quantum

B. Radiation is associated with energy

C. Radiation energy is not emitted or absorbed continuosly but in the form of small packets called quanta

D. This magnitude of energy associated with a quantum is proportional to the frequency.

**Answer: A**

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**47.** The spectrum of $He$ is expected to be similar to.

A. H

B. $Li^+$

C. Na

D. $He^+$

**Answer: B**

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**48.** What is the packet of enegry called ?

A. Electron

B. Photon

C. Positron

D. Proton

**Answer: B**

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**49.** The ratio of area covered by second orbital to the first orbital is.

A. $1:2$

B. $1:16$

C. $8:1$

D. $16:1$

**Answer: D**

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**50.** The positive charge of an atom is.

A. spread all over the atom

B. distributed around the nucleus

C. concentrated at the nucleus

D. all of these

**Answer: C**

Watch Video Solution

**51.** Which of the following best explains light both as a stream of particles and wave motion ?

A. Diffraction

B. $\lambda = h/p$

C. Interference

D. Photoelectric effect.

**Answer: B**

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**52.** The de-Broglie wavelength of a particle with mass $1g$ and velocity $100m/\sec$ is.

A. $6.63 \times 10^{-33}$

B. $6.63 \times 10^{-34}m$

C. $6.63 \times 10^{-35}m$

D. $6.65 \times 10^{-35}m$

**Answer: A**

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**53.** If the velocity of hydrogen molecule is $5 \times 10^4 cm\,\sec^{-1}$, then its de-Broglie wavelength is.

A. $2Å$

B. $4Å$

C. $8Å$

D. $100Å$

**Answer: B**

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**54.** The uncertainty in momentum of an electron is $1 \times 10^{-5} kg - m/s$. The uncertainty in its position will be $\left(h = 6.62 \times 10^{-34} kg = m^2/s\right)$.

A. $1.05 \times 10^{-28} m$

B. $1.05 \times 10^{-26} m$

C. $5.27 \times 10^{-30} m$

D. $5.25 \times 10^{-28} m$

**Answer: C**

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**55.** Principal azimuthal , and magnetic quantum numbers are respetively related to

A. size, shape and orientation

B. shape, size and orientation

C. size, orientation and shape

D. None of the above

**Answer: A**

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**56.** The magnetic quantum number specifies.

A. size of orbitals

B. shape of orbitals

C. orientation of orbitals

D. nuclear stability

**Answer: C**

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**57.** Elements up to atomic number $103$ have been synthesized and studied. If a newly discovered element is found to have an atomic number $106$, its electronic configuration will be

A. $[Rn]5f^{14}, 6d^4, 7s^2$

B. $[Rn]5f^{14}, 6d^1, 7s^2 7p^3$

C. $[Rn]5f^{14}, 6d^6, 7s^0$

D. $[Rn]5f^{14}, 6d^5, 7s^1$

**Answer: D**

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**58.** The electronic configuration

$1s^2 2s^2 2p^1._x \; 2p^1._y \; 2p^1 \; \_ \; z.$

A. Oxygen

B. Nitrogen

C. Hydrogen

D. Fluorine

**Answer: B**

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**59.** The quantum numbers $n = 2, 1 = 1$ represent.

A. $1s$ obital

B. $2s$ orbital

C. $2p$ orbital

D. $3d$ orbital

**Answer: C**

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## Aiims Questions

**1.** Azimuthal quantum number defines.

A. $e/m$ ratio of electron

B. spin of electron

C. angular momentum of electron

D. magnetic momentum of electronic

**Answer: C**

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**2.** For principle quantum number $n = 4$ the total number of orbitals having $l = 3$.

A. 3

B. 7

C. 5

D. 9

**Answer: B**

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**3.** The maximum number of electrons that can be accommodated in an orbital is

A. one

B. two

C. three

D. four

**Answer: B**

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**4.** Number of unpaired electrons in $1s^2 2s^2 2p^3$ is.

A. 2

B. 0

C. 3

D. 1

**Answer: C**

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**5.** For the energy levels in an atom , which of the following statement is //are correct ?

A. There are seven principle electron energy levels

B. The second principal energy level can have four sub-energy levels and contains a maximum of eight electrons.

C. The $M$ energy level can have maximum of $32$ electrons

D. The $4s$ sub-energy level is at a higher energy than the $3d$ sub-energy level.

**Answer: B**

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**6.** The statements.

(i) In filling a group of orbitals of equal energy, it is energetically preferable to assign electrons to empty orbital rather than pair placed in

two different.

(ii) When two electrons are placed in two different orbitals, energy is lower of the spins are parallel, are valid for.

A. Aufbau principle

B. Hund's rule

C. Pauli exclusion principle

D. Uncertainty principle

**Answer: B**

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**7.** Energy of atomic orbitals in a particular shell is in the order.

A. $s < p < d < f$

B. $s > p > d > f$

C. $p < d < f < s$

D. $f > d > s > p$

**Answer: A**

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**8.** Which of the following explains the sequence of filling the electrons in different shells.

A. Hund's rule

B. Octet rule

C. Aufbau principle

D. All of these

**Answer: C**

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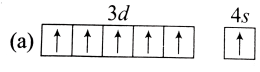
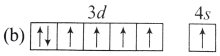
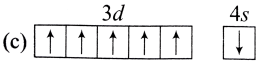
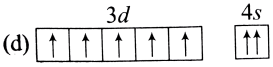
**9.** Which of the following arrangements of electron is mostly likely to the stable ?

A. 


B. 


C. 


D. 


**Answer: A**

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**10.** Wavelength of particular transition for $H$ atom is $400nm$. What can be wavelength of $He$ for same transition ?

A. $400nm$

B. $100nm$

C. $1600nm$

D. $200nm$

**Answer: B**

Watch Video Solution

**11.** The possible number of orientations of a sun-shell is $(2l+1)$

The possible number of electrons in a sub-shell is $(4l+2)$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**12.** Humphry series discovered in $H-\text{atomic}$ spectra has lowest energy radiations among all series.

Lowest state for this series is $n_1 = 6$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**13.** Statement : Aufbau rule is violated in writing electronic configurations of Pd.

Explanation: Pd show diamagnetic nature.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**14.** A resonance hybrid is always more stable than any of its canonical structures.

This stability is due to delocalization of electrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**15.** Cathode rays do not travel in straight lines.

Cathode rays do not penetrate through thick sheets.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: D**

Watch Video Solution

**16.** Electrons revolving around the nucleus do not fall into the nucleus because of centrifugal force.

Revolving electrons are planetary electrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: B**

Watch Video Solution

## Section D Chapter End Test

**1.** Which electronic level would allow the hydrogen atom to absorb a photon but not to emit a photon ?

A. $3s$

B. $2p$

C. $2s$

D. $1s$

**Answer: D**

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**2.** The uncertainty in the position of an electron $\left(mass = 9.1 \times 10^{-28} g\right)$ moving with a velocity of $3.0 \times 10^{4} cms^{-1}$ accurate up to $0.001\ \%$ will be (Use $\frac{h}{4\pi}$ in the uncertainty expression, where $h = 6.626 \times 10^{-27} erg - s$ )

A. $1.92cm$

B. $7.68cm$

C. $5.76cm$

D. $3.84cm$

**Answer: A**

Watch Video Solution

**3.** The position of both an electron and a helium atom is known within $1.0nm$ and the momentum of the electron is known within $50 \times 10^{-26} kgms^{-1}$. The minimum uncertainty in the measurement of the momentum of the helium atom is.

A. $50kgms^{-1}$

B. $60kgms^{-1}$

C. $80 \times 10^{-26}kgms^{-1}$

D. $50 \times 10^{-26}kgms^{-1}$

**Answer: D**

Watch Video Solution

**4.** Atom consist of electrons , protons and neutrons . If the mass attributed to neutron were halved and that attributed to the electrons were doubled , the atomic mass of $6C^{12}$ would be approximately :

A. Will remain approximately the same

B. Will become approximately two times

C. Will remain approximately half

D. Will be reduced by $25\ \%$

**Answer: D**

Watch Video Solution

**5.** The energy of the electron in the first orbit of $He^+$ is $-871.6 \times 10^{-20} J$. The energy of the electron in the first orbit of hydrogen would be.

A. $-871.6 \times 10^{-20} J$

B. $-435.8 \times 10^{-20} J$

C. $-217.9 \times 10^{-20} J$

D. $-108.9 \times 10^{-20} J$

**Answer: C**

Watch Video Solution

**6.** The total number of valence electrons in $4.2g$ of $N_3^-$ ion are :

A. $1.6N_A$

B. $3.2N_A$

C. $2.1N_A$

D. $4.2N_A$

**Answer: A**

Watch Video Solution

**7.** The number of nodal planes in a $p_x$ orbital is.

A. One

B. Two

C. Three

D. zero

**Answer: A**

Watch Video Solution

**8.** The frequency of one of the lines in Paschen series of hydrogen atom is $2.340 \times 10^{14} Hz$. The quantum number $n_2$ Which produces this transition is.

A. 6

B. 5

C. 4

D. 3

**Answer: B**

Watch Video Solution

**9.** Rutherford's scattering experiment is related to the size of the

A. Nucleus

B. Atom

C. Electron

D. Neutron

**Answer: A**

Watch Video Solution

**10.** Which one of the following is considered as the main postulate of Bohr's model of atom.

A. Protons are present in the nucleus

B. Electrons are revolving around the nucleus

C. Centrifugal force produced due to the revolving electrons balances the force of attraction between the electron and the protons.

D. Angular momentum of electron is an integral multiple of $\frac{h}{2\pi}$.

**Answer: D**

Watch Video Solution

**11.** The wavelength of the radiations emitted when in a hydrogen atom electron falls from infinity to stationary state is : $\left(R_H = 1.097 \times 10^7 m^{-1}\right)$ .

A. $406nm$

B. $192nm$

C. $91nm$

D. $9.1 \times 10^{-8} nm$

**Answer: C**

Watch Video Solution

**12.** Calculate de Broglie wavelength of an electron travelling at $1\%$ of the speed of light.

A. $2.73 \times 10^{-24}$

B. $2.4 \times 10^{-10}$

C. $242.2 \times 10^{10}$

D. None of these

**Answer: B**

Watch Video Solution

**13.** According to Heisenberg's uncertainly principle.

A. $E = mc^2$

B. $\Delta x \times \Delta p \geq \frac{h}{4\pi}$

C. $\lambda = \frac{h}{p}$

D. $\Delta x \times \Delta p = \frac{h}{6\pi}$

**Answer: B**

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**14.** The correct set of four quantum number for the valence (outermost) electron of Rubidium $(Z = 37)$ is

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

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

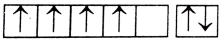
C. $5, 1, 1, +\frac{1}{2}$

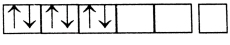
D. $6, 0, 0, +\frac{1}{2}$

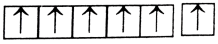
**Answer: A**

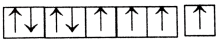
Watch Video Solution

**15.** Which one is the correct outer configuration of chromium.

A. (a) 

B. (b) 

C. (c) 

D. (d) 

**Answer: C**

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**16.** Suppose $10^{-17}J$ of energy is needed by the interior of human eye to see an object. How many photons of green light $(\lambda = 550nm)$ are needed to generate this minimum amount of energy ?

A. 14

B. 28

C. 39

D. 42

**Answer: B**

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**17.** How many chlorine atoms can you ionize in the process $Cl \rightarrow Cl^{+} + e$, by the energy liberated from the following process ?

$Cl + e^{-} \rightarrow Cl^{-} f$ or $6 \times 10^{23}$atoms

Given electron affinity ofm $Cl = 3.61eV$, and $IP$ of $Cl = 17.422eV$.

A. $1.24 \times 10^{23}$atoms

B. $9.82 \times 10^{20}$atoms

C. $2.02 \times 10^{15}$atoms

D. none of these

**Answer: A**

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**18.** If value of azimuthal quantum number $l$ is $2$, then total possible values of magnetic quantum number will be.

A. 7

B. 5

C. 3

D. 2

**Answer: B**

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**19.** Elements up to atomic number $103$ have been synthesized and studied. If a newly discovered element is found to have an atomic number $106$, its electronic configuration will be

A. $[Rn]5f^{14}, 6d^4, 7s^2$

B. $[Rn]5f^{14}, 6d^1, 7s^2 7p^3$

C. $[Rn]5f^{14}, 6d^6, 7s^0$

D. $[Rn]5f^{14}, 6d^5, 7s^1$

**Answer: D**

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**20.** When $3d$ orbital is complete, the new electron will enter the

A. 4 p-orbital

B. 4 f-orbital

C. 4 s-orbital

D. 4 d-orbital

**Answer: A**

Watch Video Solution

**21.** If the radius of the second Bohr of hydrogen atom is $r_2$ then the radius of the third Bohr orbit will be

A. $\frac{4}{9}r_2$

B. $4r_2$

C. $\frac{9}{4}r_2$

D. $9r_2$

**Answer: C**

Watch Video Solution

**22.** The configuration $1s^2, 2s^2 2p^5, 3s^1$ shows

A. Excited state of $O_2^-$

B. Excited state of neon

C. Excited state of fluorine

D. Ground state of fluorine atom

**Answer: B**

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**23.** The four quantum number of the valence electron of potassium are.

A. $4, 1, 0$ and $\frac{1}{2}$

B. $4, 0, 1$ and $\frac{1}{2}$

C. $4, 0, 0$ and $+\frac{1}{2}$

D. $4, 1, 1$ and $\frac{1}{2}$

**Answer: C**

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**24.** Which of the following electronic configuration is not possible according to Hund's rule?

A. $1s^2 2s^2$

B. $1s^2 2s^1$

C. $1s^2 2s^2 2p_x^1 2p_y^1 2p_x^1$

D. $1s^2 2s^2 2p_x^2$

**Answer: D**

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**25.** The number of $d$ electrons in $Fe^{2+}$ (atomic number of $Fe = 26$) is not equal to that of the:

A. $p$-electrons in $Ne$ (At. No. = 10)

B. $s$-electrons in $Mg$ (At. No = 12)

C. $d$-electrons in $Fe$

D. $p$-electron in $Cl^-$ (At. No. of Cl =17).

**Answer: D**

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**26.** The speed of a photon is one hundredth of the speed light in vacuum. What is the de Broglie wavalengths. Assume that one mole of protons

has a mass equal to one gram. $h = 6.626 \times 10^{-27} erg\,\text{sec}$.

A. $3.31 \times 10^{-3}$ Å

B. $1.33 \times 10^{-3}$ Å

C. $3.13 \times 10^{-2}$ Å

D. $1.31 \times 10^{-2}$ Å

**Answer: B**

Watch Video Solution

**27.** What is the orbit angular momentum of a $d$ electron?

A. $\frac{6h}{2\pi}$

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

C. $\frac{12h}{2\pi}$

D. $\frac{\sqrt{12}h}{2\pi}$

**Answer: B**

Watch Video Solution

**28.** Electrons revolving around the nucleus do not fall into the nucleus because of centrifugal force.

Revolving electrons are planetary electrons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: B**

Watch Video Solution

**29.** The cation energy of an electron is largely determined by its principal quantum number.

The principal quantum number $n$ is a measure of the most probable distance of finding atomic the electron around the nucleus.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

Watch Video Solution

**30.** Statement : wavelength of (I) line of Humphry series is more than (I) line of Lyman series in H-atom

Explanation : $\Delta E = \frac{hc}{\lambda}$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: A**

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Others

**1.** For which of the following species, Bohr theory doesn't apply

A. H

B. $He^+$

C. $Li^{2+}$

D. $Na^+$

**Answer: D**

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**2.** Bohr's model can explain

A. the spectrum of hydrogen atom only

B. spectrum of an atom or ion containing one electron only

C. the spectrum of hydrogen molecule

D. the solar spectrum

**Answer: B**

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**3.** In a hydrogen atom, if the energy of an electron in ground state is $-13.6eV$, then that in the $2^{nd}$ excited state is :

A. $-1.51eV$

B. $-3.4eV$

C. $-6.04eV$

D. $-13.6eV$

**Answer: A**

Watch Video Solution

**4.** If the radius of the second Bohr of hydrogen atom is $r_2$ the radius of the third Bohr orbit will be

A. $\frac{4}{9}r_2$

B. $4r_2$

C. $\frac{9}{4}r_2$

D. $9r_2$

**Answer: C**

Watch Video Solution

**5.** The ratio of energy of the electron in group state of the hydrogen to electron in first excited state of $He^+$ is.

A. $1:4$

B. $1:1$

C. $1:8$

D. $1:16$

**Answer: B**

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**6.** The radius of which of the following orbit is same as that of the first Bohr's orbit of hydrogen atom.

A. $He^{+}(n=2)$

B. $Li^{2+}(n=2)$

C. $Li^{2+}(n=3)$

D. $Be^{3+}(n=2)$

**Answer: D**

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**7.** The ionisation enthalpy of hydrogen atom is $1.312 \times 10^{6} J \cdot mol^{-1}$. The energy required to excited the electron in the atom from n=1 to n=2 is-

A. $8.51 \times 10^5 Jmol^{-1}$

B. $6.56 \times 10^5 Jmol^{-1}$

C. $7.56 \times 10^5 Jmol^{-1}$

D. $9.84 \times 10^5 Jmol^{-1}$

**Answer: D**

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**8.** Bohr model cannot explain spectrum of

A. the hydrogen atom only

B. all elements

C. any atomic or ionic species having one electron only

D. the hydrogen molecule

**Answer: B**

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**9.** Which statement is wrong about Bohr's theory

A. Orbit is a three dimensional area where probability of finding electron is maximum

B. Orbit is a two dimensional track on which electron moves

C. Atom has definite boundary

D. Energies and angular momentum of orbits are quantized.

**Answer: A**

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**10.** The first five ionization energies of an element are $801, 2428, 3660, 25030, 32835 \text{inkJ} / \text{mol}$. Then the element could be.

A. a halogen

B. a noble gas

C. a third group element

D. a second group element

**Answer: C**

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**11.** The kinetic energy of an electron in the second Bohr orbit of a hydrogen atom is [$a_0$ is Bohr radius] :

A. $\frac{h^2}{4\pi^2 m a_0^2}$

B. $\frac{h^2}{16\pi^2 m a_0^2}$

C. $\frac{4h^2}{32\pi^2 m a_0^2}$

D. $\frac{h^2}{64\pi^2 m a_0^2}$

**Answer: C**

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**12.** Which statement is true.

A. Spacing between energy levels $n = 1$ and $n = 2$ in hydrogen atom is greater than that of $n = 2$ and $n = 3$

B. Spacing between energy levels $n = 1$ and $n = 2$ in hydrogen atom is equal to that $n = 2$ and $n = 3$

C. Spacing between energy levels $n = 1$ and $n = 3$ in hydrogen atom is less than that of $n = 2$ and $n = 3$

D. None

**Answer: A**

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**13.** The first four ionization energies of an element are $191, 578, 872$, and $5962 \text{kcal}$. The number of valence electrons in the element is :

A. 1

B. 2

C. 3

D. 4

**Answer: C**

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**14.** If velocity of an electron in $1^{st}$ Bohr orbit of hydrogen atom us $x$, its velocity in $3^{rd}$ orbit will be.

A. $\frac{x}{3}$

B. $3x$

C. $9x$

D. $\frac{x}{9}$

**Answer: A**

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**15.** Energy of an electron is given by $E = -2.178 \times 10^{-18} J\left(\frac{Z^2}{n^2}\right)$. Wavelength of light required to excite an electron in a hydrogen atom from level $n = 1$ to $n = 2$ will be $(h = 6.62 \times 10^{-34} Js$ and $c = 3.0 \times 10^8 ms^{-1})$.

A. $1.214 \times 10^{-7} m$

B. $2.816 \times 10^{-7} m$

C. $6.500 \times 10^{-7} m$

D. $8.500 \times 10^{-7} m$

**Answer: A**

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**16.** The ratio of the velocity of light and the velocity of electron in the first orbit of a hydrogen atom.

$[Given h = 6.624 \times 10^{-27} erg - \sec, m = 9.108 \times 10^{-28} g, r = 0.529 \times 10^{-}$

.

A. 137

B. $\frac{1}{137}$

C. $\frac{1}{13700}$

D. 13700

**Answer: A**

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**17.** The wavelength associated with an electron moving with a velocity of $10^{10} cm per \sec.$

A. $0.0772 Å$

B. $772 Å$

C. $772 nm$

D. $0.772nm$

**Answer: A**

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**18.** The energy of electron in first Bohr's orbit of $H-\text{atom}$ is $-13.6eV$ .

What will be its potential energy in $n=4^{th}$ orbit.

A. $-14.6eV$

B. $-3.4eV$

C. $-0.85eV$

D. $-1.70eV$

**Answer: D**

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**19.** Ionisation energy of $He^+$ is $19.6 \times 10^{-18} J atom^{-1}$. The energy of the first stationary state $(n = 1)$ of $Li^{2+}$ is.

A. $4.41 \times 10^{-16} J atom^{-1}$

B. $-4.41 \times 10^{-17} J atom^{-1}$

C. $-2.2 \times 10^{-15} J atom^{-1}$

D. $8.82 \times 10^{17} J atom^{-1}$

**Answer: B**

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**20.** The energy of second orbit of hydrogen is equal to the energy of ,

A. Fourth orbit of $He^+$

B. Fourth orbit of $Li^{2+}$

C. Second orbit of $He^+$

D. Second orbit of $Li^{2+}$.

**Answer: A**

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**21.** If first ionisation energy of hydrogen be $E$, then the ionisation energy of $He^+$ would be :

A. E

B. 2 E

C. 0.5 E

D. 4 E

**Answer: D**

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**22.** The ratio of $(E_2 - E_1)\text{to}(E_4 - E_3)$ for the hydrogen atom is approximately equal to.

A. 10

B. 15

C. 17

D. 12

**Answer: A**

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**23.** With increasing member, the energy difference between adjacent levels in atoms.

A. decreases

B. increases

C. remains constant

D. decreases for low $Z$ and increases for high $Z$

**Answer: A**

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**24.** Which one of the following is considered as the main postulate of Bohr's model of atom.

A. Protons are present in the nucleus

B. Electrons are revolving around the nucleus

C. Centrifugal force produced due to the revolving electrons balances the force of attraction between the electron and the protons.

D. Angular momentum of electron is an integral multiple of $\frac{h}{2\pi}$.

**Answer: D**

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**25.** The energy of second Bohr orbit of the hydrogen atom is $-328kJmol^{-1}$, hence the energy of fourth Bohr orbit would be.

A. $-41kJmol^{-1}$

B. $-1312kJmol^{-1}$

C. $-164kJmol^{-1}$

D. $-82kJmol^{-1}$

**Answer: D**

Watch Video Solution

**26.** The ratio of the energy of the electron in ground state of hydrogen to the electron in first excited state of $Be^{3+}$ is :

A. $1:4$

B. $1:8$

C. $1:16$

D. $16:1$

**Answer: A**

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**27.** The ratio of the radii of three Bohr orbit is

A. $1:5:3$

B. $1:2:3$

C. $1:4:9$

D. $1:8:27$

**Answer: C**

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**28.** Energy of third orbit of Bohr's atom is.

A. $-13.6eV$

B. $-3.4eV$

C. $-1.51eV$

D. None of these

**Answer: C**

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**29.** If the radius of first Bohr orbit be $a_0$, then the radius of the third orbit would be-

A. $3 \times a_0$

B. $6 \times a_0$

C. $9 \times a_0$

D. $1/9 \times a_0$

**Answer: C**

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**30.** In H-atom electron jumps from $3^{rd}$ to $2^{nd}$ energy level, the energy released is -

A. $3.03 \times 10^{-19} J/\text{atom}$

B. $1.03 \times 10^{-19} J/\text{atom}$

C. $3.03 \times 10^{-12} J/\text{atom}$

D. $6.06 \times 10^{-19} J/\text{atom}$

**Answer: A**

Watch Video Solution

**31.** The ratio of ionization energy of $H$ and $Be^{+3}$ is.

A. $1:1$

B. $1:3$

C. $1:9$

D. $1:16$

**Answer: D**

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**32.** One energy difference between the states $n = 2$ and $n = 3$ is $EeV$, in hydrogen atom. The ionisation potential of $H$ atom is -

A. 3.2 E

B. 5.6 E

C. 7.2 E

D. 13.2 E

**Answer: C**

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**33.** If first ionisation potential of a hypothetical atom is $16V$, then the first excitation potential will be :

A. 10.2 V

B. 12 V

C. 14 V

D. 16 V

**Answer: B**

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**34.** Correct order of radius of the first orbit of $H$, $He^+$, $Li^{2+}$, $Be^{3+}$ is :

A. $H > He^+ > Li^{2+} > Be^{3+}$

B. $Be^{3+} > Li^{2+} > He^+ > H$

C. $He^+ > Be^{3+} > Li^{2+} > H$

D. $He^+ > H > Li^{2+} > Be^{3+}$

**Answer: A**

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**35.** The angular momentum of p electron is

A. $\sqrt{2}h$

B. $h$

C. $\sqrt{6}h$

D. $2h$

**Answer: A**

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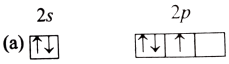
**36.** The orbital diagram in which the Aufbau principle is violated is

A. 


B. 


C. 

(d) 

D. 

**Answer: B**

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**37.** Which of the following sets of quantum numbers is not allowed.

A. $n = 3, l = 1, m = +2$

B. $n = 3, l = 1, m = +1$

C. $n = 3, l = 0, m = 0$

D. $n = 3, l = 2, m = \pm 2$

**Answer: A**

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**38.** Which has the maximum magnetic moment ?

A. $Mn^{2+}$

B. $Fe^{2+}$

C. $Ti^{2+}$

D. $Cr^{2+}$

**Answer: A**

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**39.** The angular momentum of d electron is

A. $\sqrt{6}(h/2\pi)$

B. $\sqrt{2}(h/2\pi)$

C. $(h/2\pi)$

D. $2(h/2\pi)$

**Answer: A**

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**40.** The electrons, identified by quantum number n and l

i. $n = 4, l = 1$ ii. $n = 4, l = 0$ iii. $n = 3, l = 2$ iv. $n = 3, l = 1$

can be placed in the order of increasing energy from the lowest to highest, which is

A. $(iv) < (ii) < (iii) < (i)$

B. $(ii) < (iv) < (i) < (iii)$

C. $(i) < (iii) < (ii) < (iv)$

D. $(iii) < (i) < (iv) < (ii)$

**Answer: A**

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**41.** The number of nodal planes in a $p_x$ orbital is.

A. one

B. two

C. Three

D. zero

**Answer: A**

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**42.** The electronic configuration of an element is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$ .This represents its

A. excited state

B. ground state

C. cationic form

D. anionic from

**Answer: B**

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**43.** The number of d-electrons retained in $Fe^{2+}$ ion is :

A. 5

B. 6

C. 3

D. 4

**Answer: B**

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**44.** The orbital angular momentum for an electron revolving in an orbit is given by $\sqrt{l(l+1)}\frac{h}{2\pi}$. What is the momentum of an s-electron?

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

B. $\sqrt{2}\left(\frac{h}{2}\pi\right)$

C. $+\frac{1}{2}\frac{h}{2\pi}$

D. zero

**Answer: D**

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**45.** Which is the correct order of probability of being found close to the nucleus is.

A. $s > p > d > f$

B. $f > d > p > s$

C. $p > d > f > s$

D. $d > f > p > s$

**Answer: A**

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**46.** The mangnitue of spin angular momentum of electron is givenby :

A. $S = \sqrt{s(s+1)}\frac{h}{2\pi}$

B. $S = \frac{h}{2\pi}$

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

D. $S = \pm\frac{1}{2} \times \frac{h}{2\pi}$

**Answer: C**

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**47.** If nitrogen atoms had el,ectonic configuration is ? It would have energy lower than that of the nornal ground state configuration $1s^2 2s^2 2p^3$ because the electrons would be clear to the nucleus yet $1s^2$ is not oberved because it violates ?

A. Heisenberg uncertainty principle

B. Hund's rule

C. Pauli exclusion principle

D. Bohr postulate of stationary orbits.

**Answer: C**

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**48.** In which of the following case would be probability of finding an electron residing in a $d_{xy}$ orbital be zero ?

A. $xy-$ and $yz-$ planes

B. $xy-$ and $xz-$ planes

C. $xz-$ and $yz-$ planes

D. $z-$ direction, $yz-$ and $xz-$ planes.

**Answer: C**

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**49.** Which set is correct for an electron in $4f -$ or $bitial$ ?

A. $n = 3l = 1$ m_1 = -2 m_s = + .^1//_2`

B. $n = 4l = 4m_l = -4m_s = -.^1/_2$

C. $n = 4l = 3m_l = +1m_s = +.^1/_2$

D. $n = 4l = 3m_l = +4m_s = +.^1/_2$

**Answer: C**

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**50.** Which set of quantum number is not consistent with the quatum mechanical theory.

A. $n = 2, l = 1, m = 1, s = 1/2$

B. $n = 4, l = 3, m = 2, s = -1/2$

C. $n = 3, l = 2, m = 3, s = +1/2$

D. $n = 4, l = 3, m = 3, s = +1/2$

**Answer: C**

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**51.** $+$ and $-$ $sign$ of the lobes of $p_y$ orbital represents.

A. $+ve$ and $-ve$ signs are geometric sign of wave functions.

B. $+ve$ and $-ve$ sign are $+ve$ and $-ve$ charge

C. $+ve$ represents maximum probability of finding electron and $-ve$ represents minimum probability of finding electrons.

D. All of the above

**Answer: A**

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**52.** The maximum number of electrons present in an orbit. $l = 3$, is .

A. 6

B. 8

C. 10

D. 14

**Answer: D**

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**53.** In a malti-electrons atom which of the following orbitals deseribed by the three quantum number will have the same energy in the absence of megnetic and electric field ?

I. $n = 1, l = 0, m = 0$

II. $n = 2, l = 0, m = 0$

III. $n = 2, l = 1, m = 1$

IVgt $n = 3, l = 2, m = 1$

V $n = 3, l = 2, m = 0$

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (iv) and (v)

**Answer: D**

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**54.** Which of the following set of quantum number belongs to highest energy.

A. $n = 4, l = 0, m = 0, s = +\frac{1}{2}$

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

C. $n = 3, l = 1, m = 1, s = +\frac{1}{2}$

D. $n = 3, l = 2, m = 1, s = +\frac{1}{2}$

**Answer: D**

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**55.** An electron has principal quantum number $3$. The number of its (i) sub-shell and (ii) orbitals would be respectively.

A. $3$ and $5$

B. $3$ and $7$

C. $3$ and $9$

D. $2$ and $5$

**Answer: C**

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**56.** Which of the following statement is correct in relation to the hydrogen atom :

A. $3s$- orbital is lower in energy than $3p$-orbital

B. $3p$-orbital is lower in energy than $3d$-orbital

C. $3s$ and $3p$-orbitals are of lower energy than $3d$-orbitals

D. $3s$, and $3p$-orbitals all have the same energy.

**Answer: D**

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**57.** If the quantum number $l$ has a value of $2$ what are the permitted values of the quantum number $m$?

A. 7

B. 5

C. 3

D. 2

**Answer: B**

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**58.** Which electronic configuration is not observing the $(n+l)$ rule.

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

B. $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^7, 4s^2$

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

D. $1s, 2s^2 2p^6, 3s^2 3p^6 3d^8, 4s^2$

**Answer: C**

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**59.** The number of radial nodes of $3s$ and $2p$ orbital are, respectively

A. $2, 0$

B. $0, 2$

C. $1, 2$

D. $2, 1$

**Answer: A**

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**60.** The "spin-only" magnetic moment [in units of Bohr magneton, $(\mu_B)$] or $Ni^{2+}$ in aquenous solution would be :

(At no. $Ni = 28$).

A. 1.73

B. 2.84

C. 4.9

D. 0

**Answer: B**

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**61.** The correct set of four quantum number for the valence (outermost) electron of radiation $(Z = 37)$ is

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

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

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

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

**Answer: A**

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**62.** If a shell is having $g$ sub-shell, which is correct statement about principal quantum number $n$ of this shell.

A. $n \leq 5$

B. $n \geq 5$

C. $n = 5$

D. Cannot be determined

**Answer: B**

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**63.** According to Boohr's theory the angular momentum of an electron in 5th orbit is :

A. $25h/\pi$

B. $1.0h/\pi$

C. $10h/\pi$

D. $2.5h/\pi$

**Answer: D**

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**64.** Which set of quantum number is not possible for electron un $3^{rd}$ shell ?

A. $n = 3l = 2m = -1s = +1/2$

B. $n = 3l = 2m = -1s = -1/2$

C. $n = 3l = 2m = 0s = +1/2$

D. $n = 3l = 3m = 0s = -1/2$

**Answer: D**

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**65.** Identify the incorrect statements

A. An electronic wave function must be symmetrical with respect to the interchange of any two electrons.

B. $\Phi^2$ must remain unchanged when the spin and space coordinates of the paired electrons are interchanged.

C. For an $n$ electron system the wave function $\psi$ will be a function of $3n$ spatial coordinate.

D. Antisymmetrical wave function are found to represent the properties of electron.

**Answer: A**

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**66.** Which of the following set of quantum numbers represents the highest energy of an atom ?

A. $n = 3, l = 1, m = 1, s = +1/2$

B. $n = 3, l = 2, m = 1, s = +1/2$

C. $n = 4, l = 0, m = 0, s = +1/2$

D. $n = 3, l = 0, m = 0, s = +1/2$

**Answer: B**

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**67.** The angle made by angular momentum vector of an electron with Z-axis is.

A. $\cos\theta = l/m$

B. $\cos\theta = \sqrt{\frac{l}{m}}$

C. $\cos\theta = \frac{\sqrt{(l+1)l}}{m}$

D. $\cos\theta = \frac{m}{\sqrt{(l+1)l}}$

**Answer: D**

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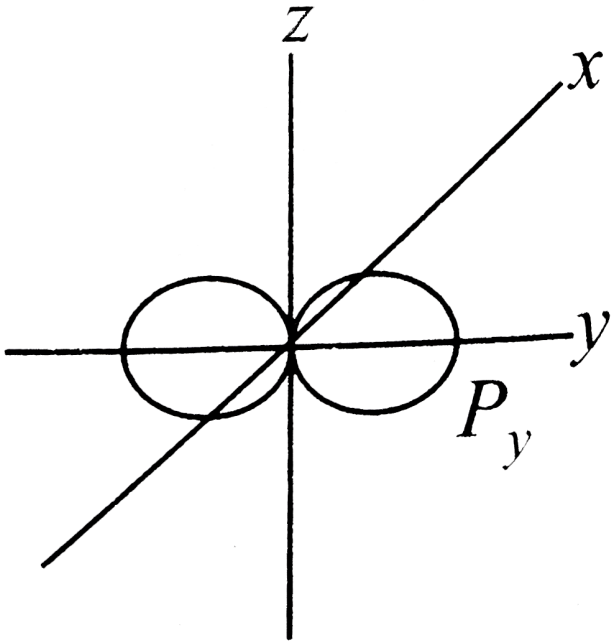
**68.** Which of the following orbitals are symmetric about the y-axis ?




A. $p_x$

B. $p_y$

C. $d_x^2 - y^2$

D. $d_{xy}$

**Answer: B**

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**69.** The total spin resulting from a $d^7$ configuration is :

A. $3/2$

B. $1/2$

C. 2

D. 1

**Answer: A**

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**70.** Magnetic moment of $V(Z=23), Cr(Z=24),$ and $Mn(Z=25)$ are $x, y, z$ respectively hence

A. $z < y < x$

B. $x = y = z$

C. $x < z < y$

D. $x < y < z$

**Answer: C**

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**71.** The valence shell electronic configuration of the $Fe^{2+}$ is.

A. $3s^2 3d^6$

B. $3s^1 3d^7$

C. $3s^0 3d^8$

D. $3s^2 3d^5$

**Answer: A**

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**72.** The number of $d$ electrons in $Fe^{2+}$ (atomic number of $Fe = 26$) is not equal to that of the.

A. p-"electrons" in Ne (At. No. = 10)

B. s-"electrons" in Mg(At. No. = 12)

C. d-electric in Fe

D. p-"electrons" in $Cl^-$ (At. No. of Cl = 17)

**Answer: D**

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**73.** The electrons, identified by quantum number $n$ and $l$ can be placed in the order of increasing energy from the lowest to highest as :

(1) $n = 4, l = 1$

(2) $n = 4, l = 0$

(3) $n = 3, l = 2$

(4) $n = 3, l = 1$

A. $(3) < (4) < (2) < (1)$

B. $(4) < (2) < (3) < (1)$

C. $(2) < (4) < (1) < (3)$

D. $(1) < (3) < (2) < (4)$

**Answer: B**

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**74.** Which of the following electronic configuration is not possible according to Hund's rule.

A. $1s^2 2s^2$

B. $1s^2 2s^1$

C. $1s^2 2s^2 2p_x^1 2p_y^1 2p_x^1$

D. $1s^2 2s^2 2p_x^2$

**Answer: D**

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**75.** The four quantum number of the valence electron of potassium are.

A. $4, 1, 0, \text{ and } \frac{1}{2}$

B. $4, 0, 1 \text{ and } \frac{1}{2}$

C. $4, 0, 0 \text{ and } +\frac{1}{2}$

D. $4, 1, 1 \text{ and } \frac{1}{2}$

**Answer: C**

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**76.** The configuration $1s^2, 2s^2 2p^5, 3s^1$ shows

A. Excited state of $O_1^-$

B. `Excited state of neon

C. Excited state of fluorine

D. Ground state of fluorine atom

**Answer: B**

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**77.** For principle quantum number $n = 4$ the total number of orbitals having $l = 3$.

A. 3

B. 7

C. 5

D. 9

**Answer: B**

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**78.** $Cu^{2+}$ will have the following electronic configuration.

A. $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}$

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

C. $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^9$

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

**Answer: C**

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**79.** The electronic configuration of an element with atomic number7 i.e. nitrogen atom is.

A. $1s^2, 2s^1, 2p._x^3$

B. $1s^2 m 2s^2 2p^1._x \ 2p^2._p$

C. $1s^2, 2s^2 2p^1._x \ 2p^2._y \ 2p^2._z$

D. $1s^1, 2s^2 2p^2._x \ 2p^2._y$

**Answer: C**

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**80.** A gas absorbs a photon of $355nm$ and emits at two wavelengths . If one of the emission is at $680$ nm , the other is at :

A. 1035 nm

B. 325 nm

C. 743 nm

D. 518 nm

**Answer: C**

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**81.** Which electronic configuration for oxygen is correct according to Hund's rule of multiplicity.

A. $1s^2, 2s^2 2p^2._x 2p^1._y 2p^1._z$

B. $1s^2, 2s^2 p^2._x 2p^2._y 2p^0._z$

C. $1s^2, 2s^2 2p^3._x 3p^1._y 2p^0._z$

D. None of these

**Answer: A**

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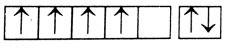
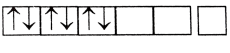
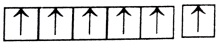
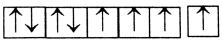
**82.** Which one is the correct outer configuration of chromium.

A. (a) 

B. (b) 

C. (c) 

D. (d) 

**Answer: C**

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**83.** The electronic configuration of silver atom in ground state is.

A. $[Kr]3d^{10}4s^1$

B. $[Xe]4f^{14}5d^{10}6s^1$

C. $[Kr]4d^{10}5s^1$

D. $[Kr]4d^9 5s^2$

**Answer: C**

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**84.** Among $V(Z=23), Cr(Z=24), Mn(Z=25)$ which will have highest magnetic moment.

A. V

B. Cr

C. Mn

D. all of them will have equal magnetic moment

**Answer: B**

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**85.** The number of electrons having $l = 0$ chlorine atom $(Z = 17)$ is

A. 2

B. 4

C. 6

D. 5

**Answer: C**

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**86.** Which of the following statements is not correct ?

A. The shape of an atomic orbital depends on the azimuthal quantum number

B. The orientation of an atomic is given by magnetic quantum number

C. The energy of an electron in an atomic orbital of multi electron atom depends on the principal quantum number only

D. The number of degenerate atomic orbitals of one type depends on the values of azimuthal and magnetic quantum numbers.

**Answer: C**

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**87.** Which of the following statements is not correct ?

A. Special stability of half-filled and fully-filled atomic configurations amongst $s-$ and p-block elements is reflected in ionization potential tends along a period.

B. Special stability of half-filled and fully-filled atomic configurations amongest $s-$ and p-block elements is reflected in electron affinity trends along a period.

C. Aufbau order is not obeyed in cases where energy difference between $ns$ and $(n-1)d$ subshell is large.

D. Specical stability of half-filled subshell is attributed to higher exchange energy of stabilization.

**Answer: C**

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**88.** Which of the following is true ?

A. The outer electronic configuration of the ground state chromium atom is $3d^4 4s^2$.

B. Gamma rays are electromagnetic radiations of wavelength of $10^{-6}cm$ to $10^{-5}cm$.

C. The energy of the electron in the $3d$ orbital is less than that in the $4s$ orbital of a hydrogen atom.

D. The electron density in the $xy-$ plane in $3d_{x^2-y^2}$ orbital is zero.

**Answer: C**

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**89.** Which of the following is true ?

A. According to Pauli's exclusion principle, no two electrons in an atom can have the same values of quantum numbers $n$, $l$ and $m$.

B. The total energy of an electron in an orbital is half of its potential energy.

C. The speed of an electron in an orbital increases with increase of quantum number $n$.

D. The energy of an electron in an orbital decreases with increase of its quantum number $n$.

**Answer: B**

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**90.** Which of the following is false?

a.The energy of an electron in an orbital of a hydrogen-like species depends only on the principle quantum number n.

b. The angular momentum of electron in an orbital of a multielectron atom depends on the quantum number l and m

c. The experimental value of angular momentum of an orbital is given as $\sqrt{l(l-1)}\left(\frac{h}{2\pi}\right)$

d. The z-component of angular momentum of an electron in an orbital is given as $m\left(\frac{h}{12\pi}\right)$

A. The energy of an electron in an orbital of a hydrogen like species depends only on the principle quantum number $n$.

B. The angular momentum of an electron in an orbital of a multielectron atom depends on the quantum numbers $l$ and $m$.

C. The expression of angular momentum of an electron in an orbital is given as $\sqrt{l(l-1)}\left(\frac{h}{2\pi}\right)$.

D. The z-component of angular momentum of an electron in an orbital is given as $m\left(\frac{h}{2\pi}\right)$.

**Answer: B**

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**91.** Which of the following statement is incorrect ?

A. Probabilities are found by solving Schrödinger wave equation.

B. Energy of the electron in an atom at infinite distance is zero and yet it si maximum.

C. Some spectral line of an element may have the same wave number.

D. The position and momentum of a rolling ball can be measured accurately.

**Answer: C**

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**92.** For s-orbitals, since ($\Psi$ orbitals wave function) is independent of angles, the probability density $\left(\Psi^2\right)$ is

A. also independent of angles

B. spherically symmetric

C. both (a) and (b) are correct

D. both (a) and (b) are incorrect

**Answer: C**

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**93.** With increasing member, the energy difference between adjacent levels in atoms.

A. decreases

B. increases

C. remains constant

D. decreases for low $Z$ and increases for high $Z$

**Answer: A**

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**94.** How many electrons can fit into the orbitals that comprise the $3^{rd}$ quantum shell $n = 3$ ?

A. 2

B. 8

C. 18

D. 32

**Answer: C**

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**95.** Which of the following statements concerning the four quantum numbers is false-

A. $n$ gives idea of the size of an orbital

B. $l$ gives the shape of an orbital

C. $m_s$ gives the enegry of the electron in the orbital in absence of magnetic field.

D. $m_s$ gives the direction of spin angular momentum of the electron in an orbital.

**Answer: C**

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**96.** The possible value of $l$ and $m$ for the last electron in the $Cl^-$ $ion$ are :

A. $1 \text{ and } 2$

B. $2 \text{ and } +1$

C. $3 \text{ and } -1$

D. $1 \text{ and } -1$

**Answer: D**

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**97.** $d_z^2$ orbital has :

A. Two lobes along z-axis and a ring along $xy - \text{plane}$

B. Two lobes along z-axis and two lobes along xy-plane

C. Two lobes along z-axis and a ring along yz-plane

D. Two lobes and a ring along z-axis.

**Answer: A**

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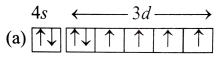
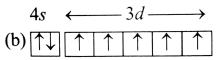
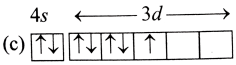
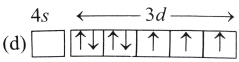
**98.** The managanese $(Z = 25)$ has the outer configuration.

A. 


B. 


C. 


D. 

**Answer: B**

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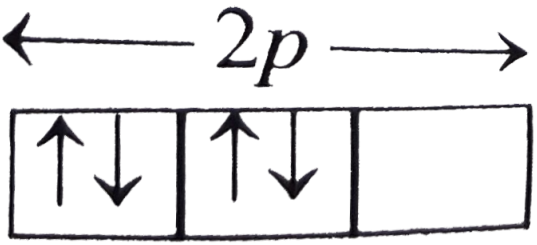
**99.** If the electronic structure of oxygen atom is written as




$1s^2, 2s^2$ it would violate-

A. Hund's rule

B. Pauli's exclusion principle

C. Both Hund's and Pauli's principles

D. None of these

**Answer: A**

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**100.** A given orbital is labelled by the magnetic quantum number $m = -1$. This cannot be.

A. s-orbital

B. d-orbital

C. p-orbital

D. f-orbital

**Answer: A**

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**101.** The quantum number of obtained from the Schrödinger wave length is.

A. n

B. l

C. m

D. s

**Answer: D**

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**102.** The set of quantum number not applicable to an electron

A. $n = 1, l = 1, m = 1, s = +1/2$

B. $n = 1, l = 0, m = 0, s = +1/2$

C. $n = 1, l = 0, m = 0, s = -1/2$

D. $n = 2, l = 0, m = 0, s = +1/2$

**Answer: A**

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**103.** Maximum numbers of electrons in a subshell is given by-

A. $(2l+1)$

B. $2(2l+1)$

C. $(2l+1)2$

D. $2(2l+1)2$

**Answer: B**

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**104.** Which of the following sets of quantum numbers represents an impossible arrangement?

A.

| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 3 | $-2$ | $-2$ | $.^1/_2$ |

B.

| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 4 | 0 | 0 | $.^1/_2$ |

C.

| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 3 | 2 | $-3$ | $.^1/_2$ |

D.

| $n$ | $l$ | $m$ | $s$ |
|---|---|---|---|
| 5 | 3 | 0 | $.^1/_2$ |

**Answer: C**

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**105.** Which of the following statements about nodal planes is/are not true.

A. A plane on which there is zero probability of finding an electron

B. A plane on which there is maximum probability that the electron will be found

C. $\Psi^2$ is non zero at nodal plane

D. None of these

**Answer: B**

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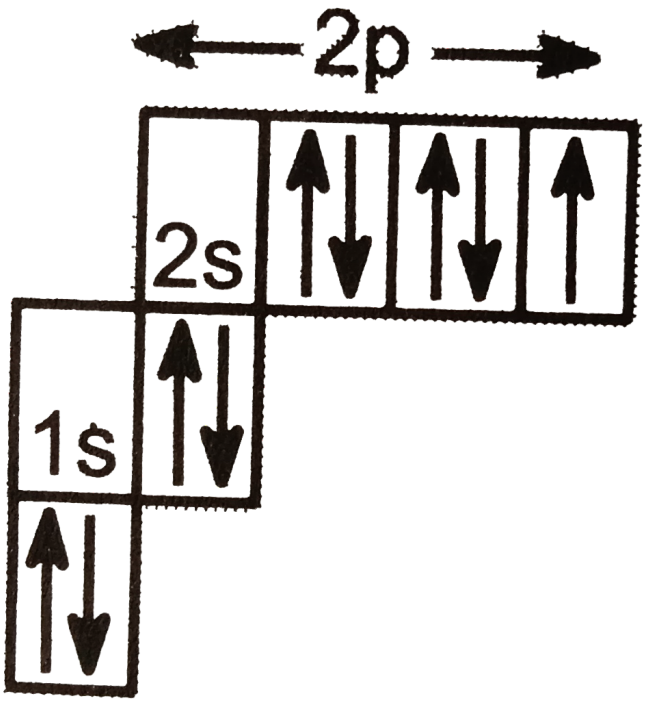
**106.** Which element is represented by the following electronic configuration ?




A. Nitrogen

B. Fluorine

C. Oxygen

D. None of these

**Answer: D**

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**107.** For the energy level in an atom which one of the following statement is correct ?

A. The $4s$ sub-energy level is a higher energy than the $3d$ sub-energy level

B. The M-energy level can have maximum of $32$ electrons

C. The second principal energy level can have four orbitals and contain a maximum of $8$ electrons

D. The $5th$ main energy level can have maximum of $49$ electrons.

**Answer: C**

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**108.** The electronic configurations of $Cr^{24}$ and $Cu^{29}$ are abnormal -

A. Due to extra stability of exactly half filled and exactly fully filled sub shells

B. Because they belong to d-block

C. both (a) and (b)

D. None of the above

**Answer: A**

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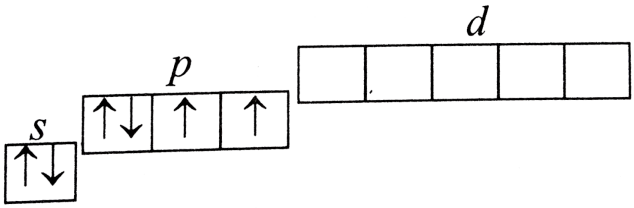
**109.** The below configuration is not correct as it violates




A. Only Hund's rule

B. Only Pauli's exclusion principle

C. $(n+1)$ rule

D. (Hund + Pauli) rule

**Answer: B**

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**110.** The maximum probability of finding electron in the $d_{xy}$ orbital is -

A. Along the x-axis

B. Along the y-axis

C. At an angle of $45^\circ$ from the $x$ and y-axis.

D. At an angle of $90^\circ$ from the $x$ and y-axis.

**Answer: C**

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**111.** In centre-symmetrical system, the orbital angular momentum, a measure of the momentum of a particle travelling around the nucleus, is quantised. Its magnitude is

A. $\sqrt{l(l+1)}\frac{h}{2\pi}$

B. $\sqrt{l(l-1)}\frac{h}{2\pi}$

C. $\sqrt{s(s+1)}\frac{h}{2\pi}$

D. $\sqrt{s(s-1)}\frac{h}{2\pi}$

**Answer: A**

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**112.** The orbital angular momentum of an electron in $2s$ orbital is

A. $+\frac{1}{2}\frac{h}{2\pi}$

B. zero

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

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

**Answer: B**

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**113.** What are the values of the orbital angular momentum of an electron in the orbitals $1s$, $3s$, $3d$ and $2p$ ?

A. $0, 0, \frac{h}{2\pi}\sqrt{6}, \frac{h}{2\pi}\sqrt{2}$

B. $1, 1, \frac{h}{2\pi}\sqrt{4}, \frac{h}{2\pi}\sqrt{2}$

C. $0, 1, \frac{h}{2\pi}\sqrt{6}, \frac{h}{2\pi}\sqrt{3}$

D. $0, 0, \frac{h}{2\pi}\sqrt{20}, \frac{h}{2\pi}\sqrt{6}$

**Answer: A**

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**114.** The z-component of angular momentum of an electron in an atomic orbit is government by the

A. Principle quantum number

B. Azimuthal quantum number

C. Magnetic quantum number

D. Spin quantum number

**Answer: C**

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**115.** Which of the following symbols represent an atomic orbital ?

A. $\Psi_{n,l,m} = R_n \Theta_l \Phi_m$

B. $\Psi_{n,l,m} = R_{n,l} \Theta_l \Phi_m$

C. $\Psi_{n,l,m} = R_n \Theta_{l,m} \Phi_m$

D. $\Psi_{n,l,m} = R_{n,l} \Theta_{l,m} \Phi_m$

**Answer: C**

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**116.** Which orbitals is non-directional ?

A. s

B. p

C. d

D. All of these

**Answer: A**

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**117.** For which orbital angular probability distribution is maximum at an angle of $45^\circ$ to the axial direction ?

A. $d_{x^2-y^2}$

B. $d_{z^2}$

C. $d_{xy}$

D. $P_x$

**Answer: C**

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**118.** If n and $l$ are respectively the principal and azimuthal quantum numbers , then the expression for calculating the total number of electrons in any energy level is :

A. $\sum_{l=1}^{l=n} 2(2l+1)$

B. $\sum_{l=1}^{l=n=1} 2(2l+1)$

C. $\sum_{l=0}^{l=n+1} 2(2l+1)$

D. $\sum_{l=0}^{l=n-1} 2(2l+1)$

**Answer: D**

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**119.** The quantum number $+1/2$ and $-1/2$ for the electron spin represent

A. Rotation of the electron in clockwise and anticlockwise direction respectively

B. Rotation of the electron in anticlockwise and clockwise direction respectively.

C. Magnetic moment of the electron pointing up and down respectively

D. Two quantum mechanical spin states which have no classical analogue.

**Answer: D**

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**120.** Total number of electrons having $n + l = 3$ in $Cr(24)$ atom in its ground state is.

A. 8

B. 10

C. 12

D. 6

**Answer: A**

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**121.** The orbital with zero orbital angular momentum is.

A. s

B. p

C. d

D. f

**Answer: A**

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**122.** Which of the following is electronic configuration of $Cu^{2+}(Z = 29)$ ?

A. $[Ar]4s^1 3d^8$

B. $[Ar]4s^2 3d^{10} 4p^1$

C. $[Ar]4s^1 3d^{10}$

D. $[Ar3d^9$

**Answer: D**

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**123.** Given is the electronic configuration of element $X$

| $K$ | $L$ | $M$ | $N$ |
|---|---|---|---|
| 2 | 8 | 11 | 2 |

The number of electrons present with $l = 2$ in an atom of element $X$ is.

A. 3

B. 6

C. 5

D. 4

**Answer: A**

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**124.** Consider the ground state $Cr$ atom $(Z = 24)$. The number of electron with the azimuthal number $l = 1$ and $2$ ,respectively are

A. 16 and 5

B. 12 and 5

C. 16 and 4

D. 12 and 4

**Answer: B**

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**125.** The corrent schrodger wave equation for an electron with $E$ as total energy and V as potential energy is

A. $\frac{\partial^2\Psi}{\partial x^2}+\frac{\partial^2\Psi}{\partial y^2}+\frac{\partial^2\Psi}{\partial z^2}+\frac{8\pi^2}{mh^2}(E-V)\Psi=0$

B. $\frac{\partial^2\Psi}{\partial x^2}+\frac{\partial^2\Psi}{\partial y^2}+\frac{\partial^2\Psi}{\partial z^2}+\frac{8\pi m}{h^2}(E-V)\Psi=0$

C. $\frac{\partial^2\Psi}{\partial x^2}+\frac{\partial^2\Psi}{\partial y^2}+\frac{\partial^2\Psi}{\partial z^2}+\frac{8\pi^2 m}{h^2}(E-V)\Psi=0$

D. $\frac{\partial^2\Psi}{\partial x^2}+\frac{\partial^2\Psi}{\partial y^2}+\frac{\partial^2\Psi}{\partial z^2}+\frac{8\pi^2 m}{h}(E-V)\Psi=0$

**Answer: C**

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