# TGT/PGT CHEMISTRY Revision Book

# Importent Facts, Formulas & Oneliners Chapter, Topic & Subtopic Wise

<u>Useful for</u> : TGT/PGT/LT-GRADE/NVS/KVS/DSSSB/GIC/GDC/Assistant Professor EMRS/AWES/DIET/AEES and Other Competitive Exam

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## PHYSICAL CHEMISTRY

## Some Basic Concepts of Chemistry

## **Uncertainty in Measurement**

- The number of significant figures in value 5.041 is-
- Express the result of (0.582 + 324.65) to the appropriate number of significant figures- 325.23
- The number of significant figures in value of  $\pi$  are  $\infty$
- The correctly reported answer of the addition of 29.4406, 3.2 and 2.25 will have significant figures-3

## Law's of Chemical Combinations

- The law of conservation of mass can not holds good for.- Nuclear reaction
- Hydrogen and oxygen combine to form H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O containing 5.93% and 11.2% hydrogen respectively, the data illustrates Law of multiple proportions
- 36 g of carbon combines with 32 g of oxygen to form 68 g of CO<sub>2</sub> this best explains-
- Atoms combine in the ratio of small whole numbers to form compounds. This explains-

#### Law of multiple proportion

12 g of carbon combines with 32 g of oxygen to form 44 g of CO<sub>2</sub> this best explains-

#### Law of conservation of mass

■ The pairs of compounds SnCl<sub>2</sub>, SnCl<sub>4</sub> illustrates-Law of multiple proportions -99

## Atomic and Molecular Masses, Mole Concept Molar Masses, Empirical & Molecular Formula

- The molecular mass of glucose  $(C_6H_{12}O_6)$ -
  - 180.162 u
- 1 g-atom of nitrogen represents-11.2 L of N<sub>2</sub> at S.T.P
   The number of oxygen atoms present in 14.6 g of
- magnesium bicarbonate is- 0.6 N<sub>A</sub>
- If N<sub>A</sub> is Avogadro's number, then the number of oxygen atoms in one g-eqivalent of oxygen is- N<sub>A</sub>/2
- 7.5 grams of a gas occupy 5.8 litres of volume at STP, the gas is NO

- Number of Ca<sup>+2</sup> and Cl<sup>-</sup> ion in 111 g of anhydrous CaCl<sub>2</sub> are- N<sub>A</sub>, 2N<sub>A</sub>
   The maximum volume at N.T.P. is occupied by-
  - 1 gm-molecule of CO<sub>2</sub>
- 23g of sodium will react with ethyl alcohol to give-1/2 mole of H<sub>2</sub>
- One mole of nitrogen gas has volume equal to-

22.4 litre of nitrogen at S.T.P.

- An element A (at wt = 75) and another element B (at. wt. = 25) combine to form a compound. The compound contains 75% A by weight. The formula of the compound will be-
- 60 g of a compound on analysis gave 24 g C, 4g H and 32 g O. The empirical formula of the compound is- CH<sub>2</sub>O
- An oxide of a metal (M) contains 40% by mass of oxygen. Metal (M) has atomic mass of 24. The empirical formula of the oxide isMO
- The percentage of oxygen in NaOH is- 40
- A hydrocarbon is composed of 75% carbon. The empirical formula of the compound is- CH<sub>4</sub>
- An alkaloid contains 17.28% of nitrogen and its molecular mass is 162. The number of nitrogen atoms present in one molecule of alkaloid is- Two
- Empirical formula of a compound is CH<sub>2</sub>O and its molecular mass is 90. The molecular formula of the compound is-
- A compound is composed of O and Mn in equal weight ratio. The empirical formula of the compound is. Mn<sub>2</sub>O<sub>7</sub>
- The empirical formula and molecular mass of a compound are CH<sub>2</sub>O and 180 g respectively. The molecular formula of the compound is- C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>
- A metal nitride M<sub>3</sub>N<sub>2</sub> contains 28% of nitrogen. The atomic mass of metal M is 24
- The empirical formula and molecular mass of a compound are CH<sub>2</sub>O and 180 g respectively. The molecular formula of the compound will be-

#### $C_6H_{12}O_6$

55.6 M

## **Stoichiometric Calculations**

- The moles of O<sub>2</sub> required for reacting with 6.8 g ammonia. (.... NH<sub>3</sub> + .... O<sub>2</sub> →.... NO + .... H<sub>2</sub>O) is-0.5
- The molarity of pure water is-

- If 1 ml of water contains 20 drops, then the number of molecules in a drop of water is- 1.673 × 10<sup>21</sup>
- The molar ratio of Cr<sup>2+</sup> to Cr<sup>3+</sup> in a mixture of CrSO<sub>4</sub> and Cr<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> having equal number of sulphate ions in both sulphates is- 3:2
- In an organic compound of molar mass 108 g mol<sup>-1</sup> C, H and N atoms are present in 9 : 1 : 3.5 by weight. Molecular formula can be- C<sub>6</sub>H<sub>8</sub>N<sub>2</sub>
- In the reaction,  $2Al(s) + 6HCl(aq) \rightarrow 2Al^{3+}(aq) + 3H_2(g),-$  11.2 L H<sub>2</sub>(g) at STP is produced for every mole HCl(aq)

#### The molarity of a solution, that contains 5.85 g of NaCl (s) per 500 mL-

#### 0.2 mol L<sup>-1</sup>

- The molality of the solution containing 18.25 g of HCl gas in 500 g of water is 1 m
- The mass percent of carbon in carbon dioxide is 27.27%
- If the density of a solution is 3.12 g mL<sup>-1</sup>, the mass of 1.5 mL solution in significant figures is- 4.7 g
- One mole of carbon weighs 12g, the number of atoms in it is equal to-  $6.022 \times 10^{23}$
- The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is 30

- Number of significant figures in  $6.62 \times 10^{-34}$  Three
- The number of significant figures in  $2.653 \times 10^4$  is 4
- Chemical fertilizer are-
- Urea, Sodium nitrate, Ammonium sulphate ■ Total number of significant figures present in 0.010100 × 10<sup>3</sup> are - 5
- Appropriate significant figures as a result of addition of 3.0223 and 5.041 8.063
- Total seconds as there in 3 days- 259200 s

#### Law of conservation of mass

- Illustrates the law of multiple proportions, the pairs is PbO, PbO<sub>2</sub>
- The main drawback of Dalton's atomic theory is-

It could not explain the law of gaseous

volumes, It could not explain how and why

#### atoms combine to form molecules

- The mass of one mole of a substance in grams is called itsMolar mass
  - The mass percent of oxygen in ethanol is- 34.78%
- The mode of concentration that does not change with temperature- Molality
- A measured temperature on Fahrenheit scale is 200<sup>0</sup>F. This reading on Celsius scale will be-

93.3<sup>°</sup>C

## **EXAM POINT**

Uncertainty in measurement	
The units of surface tension and viscosity of a liquid respectively are-	TS-EAMCET-09.08.2021,
$N m^{-1}, kg m^{-1} s^{-1}$	Shift-I
	WB-JEE-2015
The prefix 10 <sup>18</sup> is-	BITSAT 2015, 2006
For a A + B products the rate of the reaction is given by Rate = K [A] $[B]^2$ . The	AP EAPCET 20.08.2021
units of rate constant (K) will be- $mol^2 L^2 S^{-1}$	Shift-II
Unit of angular momentum of an electron in an orbital of an atom- J-s	Kerala-CEE-2019
The SI unit of electrochemical equivalent is $kg C^{-1}$	MHT CET-03.05.2019,
	SHIFT-I
The absolute zero temperature is 0 Kelvin. In °C unit the absolute zero	NDA (II)-2018
temperature is – –273.15°C	
The SI unit of density is $kg m^{-3}$	MHT CET-2018
The unit of atomic mass, amu is-	<b>MHT CET-2018</b>
The dimension of $[ML^0T^{-2}]$ is- Surface tension	<b>WB-JEE-2017</b>
Dimension of universal gas constant (R) is- $[VPT^{-1}n^{-1}]$	J & K CET-(2012)
How is 0.0120 written as a scientific notation– $1.2 \times 10^{-2}$	UPTU/UPSEE-2011
The charge on an electron in Coulombs is– $1.602 \times 10^{-19}$	<b>BCECE-2009</b>
The value of amu is – $1.66 \times 10^{-27}$ kg	<b>UP CPMT-2003</b>
The radius of an atomic nucleus is generally expressed in units is – Fermi	AP-EAMCET (Medical),
	2001
The particles size of colloidal system is – $10^{-6} \text{ m to } 10^{-9} \text{ m}$	(NEET-1996)
The dimensions of pressure are the same as that of– Energy per unit volume	NEET-1995

Laws of chemical combination	
The mass of one mole of electron is- 0.55 mg	UP CPMT-2010 UPTU/UPSEE-2006
The number of moles of oxygen obtained by the electrolytic decomposition of 108 g water is $3$	JIPMER-2008, JCECE- 2007
The number of moles of $KMnO_4$ reduced by one mole of KI in alkaline medium is-	JCECE-2012 JIPMER-2007
A gas is found to have a formula $[CO]_x$ . Its vapour density is 70, the x is- <b>5.0</b>	BCECE-2007 BITSAT-2006
Number of atoms of He is 100 amu of He (atomic wt. of He is 4) are- 25	BITSAT-2012 BCECE-2008
The number of electron present in 2.3g of NO <sub>2</sub> is– $6.92 \times 10^{23}$	Assam CEE-2021
Number of atom in 5.586 g Fe $(1 - 55.86 \text{ g Fe})$	Assam CEE-2021
$(M = 55.86 \text{ g mol}^{-1})$ is- <b>Twice of 0.6 g of C</b>	
Number of moles of dichromate needed to oxidizes one mole of $\operatorname{Sn}^{2+}$ is- $1/3$	TS-EAMCET 09.08.2021, Shift-I
$KMnO_4$ oxidises oxalic acid in acidic medium. The number of $CO_2$ molecules produced per mole of $KMnO_4$ is 5	TS EAMCET 05.08.2021, Shift-I
The moles of electrons weighs in one kg is $-$ 1.8 × 10 <sup>6</sup>	TS EAMCET 10.08.2021, Shift-II
When oxalic acid is oxidised with acidified $KMnO_4$ , the number of moles of $CO_2$ liberated is (consider balancing the reaction)– 10	TS EAMCET 10.08.2021, Shift-I
The number of sodium ions present in 0.5 mole of sodium ferrocyanide is- $12 \times 10^{23}$	TS-EAMCET (Engg.), 05.08.2021 Shift-II
The volume strength (in L) of $3N H_2O_2$ is approximately– 17	AP EAPCET 24.08.2021 Shift-II
The mole elevation constant is the ratio of Elevation in boiling point to- Molality	AP EAPCET 19-08-2021 Shift-I
One mole of oxygen gas at STP is equal to $6.022 \times 10^{23}$ molecules of oxygen	AP EAMCET (Engg.) 17.09.2020 Shift-I
Units is useful in relating concentration of solution with its vapour pressure– Mole fraction	AP EAMCET (Engg.) 21.09.2020, Shift-I
The gram of sodium (atomic mass 23 u) is required to prepare one mole of ethane from methyl chloride by Wurtz reaction-	MHT CET-02.05.2019, Shift-II
The volume of 1 mole of any pure gas at standard temperature and pressure is always equal to- 0.022414 m <sup>3</sup>	MHT CET-02.05.2019, Shift-II
In the reaction of oxalate with permanganate in acidic medium, the number of electrons involved in producing one molecule of $CO_2$ is-	[JEE Main 2019, 10 Jan Shift-II]
Total number of atoms in 44 g of $CO_2$ is- $1.806 \times 10^{24}$ The amount of water (g) produced by the combustion of 32 g of methane is-	J & K CET-(2019) Assam CEE-2019
72 g100 mL brandy contains 40 mL ethanol. The mole fraction of water is-0.6	CG PET -2018
Mass % of carbon in ethanol is-	Kerala-CEE-2018
The Avogadro number or a mole represents- $6.02 \times 10^{23}$ atoms	HP CET-2018
How many moles of electrons will weigh one kilogram $\frac{1}{9.108 \times 6.023} \times 10^8$	WB-JEE-2018
The number of molecules of 8 g of oxygen gas at NTP is- $\frac{1}{4} \times 6.022 \times 10^{23}$	Assam CEE-2018
Number of electrons present in 3.6 mg of $NH_4^+$ are- $1.20 \times 10^{20}$	AMU-2017
The yield of acetanilide in the reaction (100% conversion) of 2 moles of aniline with 1 mole of acetic anhydride is- <b>270 g</b>	WB-JEE-2017

$11/2 \log 1$	ND 4 (II) 2017
How much $CO_2$ is produced on heating of 1 kg of carbon– <b>11/3 kg</b>	NDA (II)-2017
The compound C <sub>6</sub> H <sub>12</sub> O <sub>4</sub> contains– Six times the mass percent of C as compared to the mass percent of H	NDA (II)-2017
The number of moles of $H_2O$ in one litre is-	SRMJEEE – 2015, 2010
If 27 g of water is formed during complete combustion of pure propene ( $C_3H_6$ ),	Kerala-CEE-2016
the mass of propene burnt is– $21 \text{ g}$	Kei ala-CEE-2010
Number of atoms of sulphur in 9.8 grams of $H_2SO_4$ are- 0.6023 × 10 <sup>23</sup>	<b>BCECE-2016</b>
For 1 molar solution of NaCl in water at 25 <sup>o</sup> C and 1-atm pressure show that–	<b>BCECE-2016</b>
Molarity = normality	
20 volume of $H_2O_2$ means- 1 mL of solution liberate 20 mL of $O_2$ at STP	<b>JCECE - 2016</b>
The number of oxygen atoms in 4.4g of $CO_2$ is- 1.2 × 10 <sup>23</sup>	Karnataka-CET-2016
The ions per molecular are produced in the solution, when Mohr salt is dissolved	Karnataka-CET-2015
in excess of water- 5	
A mixture of gases contains $H_2$ and $O_2$ gases in the ratio of 1 : 4 (w/w). The	NEET-2015, cancelled
molar ratio of the two gases in the mixture- 4:1	
The total number of protons in 10g of calcium carbonate is– $3.0115 \times 10^{24}$	Assam CEE-2014
The volume strength of 1 molar solution of $H_2O_2$ is-	JCECE - 2014
The system that contains the maximum number of atoms is— $2 g \text{ of } H_2$	WB-JEE-2014
The volume occupied by 16 g of oxygen gas at S.T.P. is-	AMU-2013
The mass of 112 cm <sup>3</sup> of NH <sub>3</sub> gas at STP is— 0.085  g The number of surface real-surface are solved as a function of $0.018  s$ is	Karnataka-CET-2013
The number of water molecules present in a drop of water weighing 0.018 g is- $6.022 \times 10^{20}$	Karnataka-CET-2013
$H_2O_2$ oxidises MnO <sub>2</sub> is MnO <sub>4</sub> <sup>-</sup> in basic medium, H <sub>2</sub> O and MnO <sub>2</sub> react in the	BCECE-2013
molar ratio of $ 3:2$	<b>D</b> CECE-2015
	COMEDK-2012
Number of atoms in 560 cm <sup>3</sup> of oxygen at S.T.P. is- $\frac{1}{20} \times 6.022 \times 10^{23}$	
The vapour density of a mixture containing NO <sub>2</sub> and N <sub>2</sub> O <sub>4</sub> is 27.6 Mole fraction	AIIMS-2012
of $NO_2$ in the mixture is-	AIIWIS-2012
Avogadro number $(6.023 \times 10^{23})$ of carbon atoms are present in–	J & K CET-(2012)
$44 \text{ grams of } {}^{12}\text{CO}_2$	
The total number of electrons present in 18 mL of water (density = $1 \text{g mL}^{-1}$ ) is–	Karnataka-CET-2012
$6.02 \times 10^{24}$	
The mole fraction of methanol is in 4.5 molal aqueous solution is- 0.05	Kerala-CEE-2012
The number of sodium atoms in 2 moles of sodium ferrocyanide is-	UPTU/UPSEE-2012
48×10 <sup>23</sup>	
If one mole of a substance is present in 1kg of solvent then its concentration is	<b>BCECE-2011</b>
called-Molal conc0.1 mol HCl is equal to-3.65 g	JIPMER-2011
0.1 mol HCl is equal to- The number of molecules of $CO_2$ liberated by the complete combustion of 0.1 g	AP-EAMCET- (Engg.) -
atom of graphite in air is– $6.02 \times 10^{22}$	2010 AF-EAWICET-
The number of water molecules is maximum in– <b>18 moles of water</b>	NEET-2013
The total number of atoms of all elements present in 1 mole of ammonium	AMU – 2010
dichromate is- $114.437 \times 10^{23}$	
In redox reaction 1 g-eq of reducing agent requires P gm-eq. of oxidizing agent.	BITSAT 2010
The value of P is-	
Molality of a solution is equal to-	CG PET- 2010
number of kilogram of solvent	
The molecules present in 5.6 L of sulphur dioxide at STP is- $1.5 \times 10^{23}$	J & K CET-(2010)
The number of atoms in 0.1 mol of triatomic gas is ( $N_A$ =6.02 ×10 <sup>23</sup> mol <sup>-1</sup> )	NEET-2010
$\frac{1.806 \times 10^{23}}{1.806}$	
The moles of helium gas occupy 22.4 L at $0^{\circ}$ C and at 1 atm pressure– <b>1.0</b>	<b>BCECE-2010</b>
1 mole of $CO_2$ contains- $6 \times 10^{23}$ atoms of C	BCECE-2009
If $NO_2(N_2O_4)$ is dissolved in NaOH, we get solution of-	CG PET-2009
Mixture of NaNO <sub>2</sub> and NaNO <sub>3</sub>	

	If 'F' is Faraday and 'N' is Avogadro number, then charge of electron can be
/N	expressed as– F/N
N	The number of molecules in 18 mg of water in terms of Avogadro number N is- $10^{-3}$ N
.2	The volume of oxygen at STP in litres is required to burn 4 gm of methane gas completely– 11.2
O <sup>18</sup> MHT CET-2009	The number of electrons required to reduce $4.5 \times 10^{-5}$ g of Al is- <b>3.01×10<sup>18</sup></b>
O <sub>3</sub> UPTU/UPSEE-2009	Contains greatest number of oxygen atoms- 1 g of O, 1 g of O <sub>2</sub> , 1 g of O <sub>3</sub>
UPTU/UPSEE-2008	One mole of magnesium nitride on the reaction with an excess of water gives– <b>Two moles of NH</b> <sub>3</sub>
O <sub>4</sub> WB-JEE-2008	2 N HCI solution will have same molar concentration as a- $4.0 \text{ N H}_2 \text{SO}_4$
wB-JEE-2008	1 mole of methyl amine on reaction with nitrous acid gives at NTP– 22.4 Litre of nitrogen
en Karnataka-CET, 200	80 g of oxygen contains as many atoms as in- <b>5 g of hydrogen</b>
1	The number of moles of lead nitrate needed to coagulate 2 moles of colloidal $[AgI]I^{-}$ is-
DIISHI 200	The number of electrons in a mole of hydrogen molecule is– $12.046 \times 10^{23}$
of Karnataka-CET-200'	Maximum number of molecules of $CH_3I$ that can react with a molecule of $CH_3NH_2$ are-
	Molarity of a given orthophosphoric acid solution is 3M. It's normality is-9N
re Karnataka-CET-200'	One mole of oxygen at 273 K and one mole of sulphur dioxide at 546 K are
0.	taken in two separate containers, then– Kinetic energy of O <sub>2</sub> < kinetic energy of SO <sub>2</sub>
	The amount of bromine will be required to convert 2 g of phenol into 2, 4, 6-
g	tribromo phenol– 10.22 g
4	138 g of ethyl alcohol is mixed with 72 g of water. The ratio of mole fraction of alcohol to water is-
	$CO_2$ gas obtained by the combustion of 12 mL butane gas is- 48 mL
<b>JCECE - 200</b>	1.25 g NH <sub>3</sub> contains how many atoms– $1.77 \times 10^{23}$
	Number of atoms of He in 100 amu of He (atomic wt. of He is 4) are- 25
C UPTU/UPSEE-2000	One mole of $CO_2$ contains- 6.02 × 10 <sup>23</sup> atoms of C
	In the equation $H_2S + 2HNO_3 \longrightarrow 2H_2O + 2NO_2 + S$ . The equivalent weight of hydrogen sulphide is-
/3 UP CPMT-200	Number of moles of $K_2Cr_2O_7$ reduced by one mole of $Sn^{2+}$ 1/3
ol UPTU/UPSEE-200	The moles of $Al_2(SO_4)_3$ would be in 50 g of the substance- <b>0.140 mol</b>
1	The number of moles of proton which can be easily given by butyne-1 (1mole) is-
O <sup>23</sup> CG PET -2005	1 moles of crystalline NaCl will have how many unit cells– $1.506 \times 10^{23}$
00111 100	In 1 mole of NaCl the protons are- 28 moles
<b>BITSAT 200</b> :	The number of sodium atoms in 2 moles of sodium ferrocyanide is $-$ 48 × 10 <sup>23</sup>
20202 200	Mole fraction of a solute in benzene is 0.2 then find molality of solute- <b>3.2</b>
76	Vapour pressure of dilute aqueous solution of glucose is 750 mm of mercury at 373 K. The mole fraction of solute is- 1/76
sis	One of the mole of a gas at NTP occupies 22.4 litres. This fact was derived from- Avogadro's hypothesis
) <sup>23</sup> J & K CET-(2004	Number of atoms of oxygen present in 10.6 g of Na <sub>2</sub> CO <sub>3</sub> will be- $1.806 \times 10^{23}$
	The numerical value of $\frac{N}{n}$ (where, N is the number of molecules in a given
	sample of gas and n is the number of moles of the gas) is $-$ 6.02×10 <sup>23</sup>
	The mass of 11.2 L of ammonia gas at STP is-8.5 g
40 JCECE - 2003	720 g water contain the number of moles-40

The total number of protons in 10g of calcium carbonate is $(N_0=6.023\times10^{23})$ -	UP CPMT-2003
3.01×10 <sup>24</sup>	
The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphite ion in acidic solution is- $2/5$	AMU-2002
The volume strength of $1.5 \text{ N H}_2\text{O}_2$ solution is- <b>8.4</b>	AMU-2002
One mole of SO <sub>2</sub> corresponds to– $6.02 \times 10^{23}$ molecules of SO <sub>2</sub>	
The number of atoms in 0.004 g of magnesium is close to– $10^{20}$	AMU-2002
Number of atoms in 560 g of Fe (atomic mass = 56 g mol <sup>-1</sup> ) is–	[AIEEE 2002]
Twice that of 70 g $N_2$ , half that of 20 g H	
Weight of 4 L of $N_2$ gas as N.T.P. is- 5 g	J & K CET-(2002)
One mole of $CH_4$ contains- <b>4 g atoms of hydrogen</b>	UP CPMT-2002
120 g of urea is present in 5 L of solution. The active mass of urea is- <b>0.4</b>	UP CPMT-2001
7.5 g of a gas occupies 5.6 L of volume at S.T.P. The gas is-NO	AP-EAMCET (Medical), 2001
Temperature does not affect- Molality	AIIMS-1997-2001
Number of molecules in one litre of water is close to- $55.5 \times 6.023 \times 10^{23}$	J & K CET-(2000)
The number of moles of hydrogen atoms in 3.2 g of methane is- 0.8	J & K CET-(1999)
The number of atoms in 4.25 g of $NH_3$ is approximately– $6 \times 10^{23}$	NEET-1999
The molar concentration of 20g of NaOH present in 5 litre of solution is– 0.1 mols/litre	AIIMS-1998
Volume of a gas at NTP is $1.12 \times 10^{-7}$ cc. The number of molecule in it is- 3.01 × 10 <sup>12</sup>	AIIMS-1998
Ionic compounds contains greater number of ions- 100 g Na <sub>2</sub> O (formula mass 62)	J & K CET-(1998)
At STP, the density of a gas (molecular weight 45) is- 2 g/litres	J & K CET-(1997)
Avogadro's number of oxygen atom weight16 g	AIIMS-1996
The number of moles of water present in 180 gm of water is-	AIIMS 1996
The mole fraction of solute in 20% aqueous $H_2Q_2$ solution is- 0.1168	AP EAMCET- 1992
The number of oxygen atoms in 4.4 g of $CO_2$ is- 1.2 × 10 <sup>23</sup>	NEET-1989
At STP the density of $CCl_4$ vapour of g/L will be nearest to- 6.87	NEET-1988
Components form homogeneous mixture– Ethyl alcohol + water	MHT CET-02.05.2019, SHIFT-III
Volume of water needed to mix with 10 mL 10N HNO <sub>3</sub> to get 0.1N HNO <sub>3</sub> is -990mL	AIIMS-2017
The proposition 'equal volumes of different gases contain equal numbers of molecules at the same temperature and pressure' is known as-	NDA (II)-2017
Avogadro's hypothesis	
On combustion of x-g of ethanol in bomb calorimeter, y-joules of heat energy is produced. The heat of combustion of ethanol $(\Delta H_{comb})$ is–	BCECE-2017
$\Delta H_{comb} = -\frac{y}{x} \times 44  Jmol^{-1}$	
Combination of one volume of nitrogen with three volumes of hydrogen produces- Two volumes of ammonia	NDA (II)-2016
The formation of CO and CO <sub>2</sub> illustrates the law of– Multiple proportion	BITSAT 2014
If Avogadro number $N_A$ , is changed from $6.022 \times 10^{23} \text{ mol}^{-1}$ to $6.022 \times 10^{20} \text{ mol}^{-1}$ , this would change- The mass of one mole of carbon	NEET-2012
The product of atomic weight and specific heat of any element is a constant, approximately 6.4. This is known as- Dulong Pettit law	BITSAT-2011
Gram molecular volume of oxygen at STP is- 22400 cm <sup>3</sup>	Karnataka-CET-2007
The total number of valence electrons in 4.2 g of $N_3^-$ ion is ( $N_A$ is the Avogadro's	NEET-1994
number)– 1.6 N <sub>A</sub>	

## Atomic and molecular masses and mole concept and molar mass, empirical and molecular formula

molar mass, empirical and molecular fo	rinula
The highest number of helium atoms is in- 4 mol of helium	NEET-05.05.2024
In acidic medium, the equivalent weight of $K_2Cr_2O_7$ (Mol. wt. = M) is- M/6	WBJEE-2012
	UPTU/UPSEE-2009
Vapour density of a metal chloride is 83. If equivalent weight of the metal is 6,	AP EAMCET (Engg.)
its atomic weight will be-	21.09.2020, Shift-I
The mass of one atom of $^{12}$ C is – <b>1.9923×10</b> <sup>-23</sup> g	WB-JEE-2020
In a flask, the weight ratio of $CH_4(g)$ and $SO_2(g)$ at 298 K and 1 bar is 1:2. The ratio of the number of molecules of $SO_2(g)$ and $CH_4(g)$ is-	COMEDK-2020
Equivalent mass of $K_2Cr_2O_7$ in acidic solution is equal to- Molecular mass/ 6.	COMEDK-2019
Equivalent weight of $KMnO_4$ is equal to <b>One-fifth its molecular weight</b>	COMEDIC 2019
In acid medium $MnO_4^-$ is reduced to $Mn^{2+}$ , by a reducing agent. Then the	Manipal-2019
equivalent mass of KMnO <sub>4</sub> is given by– $M/5$	
(M = molecular mass)	
The equivalent weight of oxalic acid in $C_2H_2O_4.2H_2O$ is – 63	NDA (I)-2019
In the standardization of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, the equivalent	Manipal-2018
weight of K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> is- Molecular weight/6	-
The masses of oxygen combine with a fixed mass of hydrogen to form $H_2O$ and	COMEDK-2018
$H_2O_2$ , respectively, bear the simple ratio 1:2–	
Law of multiple proportions The number of times the comparative mass of a neutron is heavier than an	
electron is-	J & K CET-(2018)
The compound Na <sub>2</sub> CO <sub>3</sub> . $xH_2O$ has 50% $H_2O$ by mass. The value of "x" is - 6	Kerala-CEE-2017
A bivalent metal has an equivalent mass of 32. The molecular mass of the metal nitrate is-	COMEDK-2016
Sulphur forms the chlorides $S_2Cl_2$ and $SCl_2$ . The equivalent mass of sulphur in	AIIMS-2015
Subjudit forms the emotions $S_2C_{12}$ and $SC_{12}$ . The equivalent mass of subjudit in $SCl_2$ is-	AIIIvi5-2015
$3.011 \times 10^{22}$ atoms of an element weighs 1.15 g. The atomic mass of the element	AP-EAMCET (Engg.)-2015
is- 23	
The equivalent weight of $Na_2S_2O_3$ in the reaction is	JCECE - 2014
$2Na_2S_2O_3 + I_2 \rightarrow Na_2S_4O_6 + 2Nal - M$	
The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4 The ratio of number of their molecule is– 7:32	[JEE Main-2014]
The mass of one molecule of yellow phosphorus is (Atomic mass, $P = 30$ )–	MHT CET-2014
1.993×10 <sup>-19</sup> mg	
Equivalent weight of $(NH_4)_2Cr_2O_7$ in the change is	UP CPMT-2013
$(NH_4)_2Cr_2O_7 \rightarrow N_2 + Cr_2O_3 + 4H_2O - Mol. wt./6$	
The equivalent mass of a certain bivalent metal is 20. The molecular mass of its anhydrous chloride is-	Karnataka-CET-2012
A certain gas takes three times as long to effuse out as helium. Its molecular mass will be-	NEET-2012
Equivalent and molecular masses are same in– Mohr's salt	COMEDK-2011
The equivalent weight of $MnSO_4$ is half of its molecular weight when it is	CG PET- 2011
converted to-	
If the equivalent weight of a trivalent metal is 32.7, the molecular weight of its	JCECE - 2011
chloride is- 204.6	
2g of metal carbonate is neutralized completely by 100 mL of 0.1 N HCl. The equivalent weight of metal carbonate is-	WB-JEE-2011

WB-JEE-2010	In the reaction of sodium this sulphate with $l_2$ in aqueous medium the equivalent
	weight of sodium thiosulphate is equal to- Molar mass of sodium thiosulphate
SCRA-2010	The number of water molecules differing in molecular mass formed by hydrogen isotopes and oxygen isotopes— 6
BITSAT-2010	The vapour density of ozone is-
MPPET- 2009	The equivalent weight of Potassium permanganate (KMnO <sub>4</sub> ) in neutral medium
	will be- $\frac{\text{Atomic weight}}{3}$
BCECE-2009	The standard for atomic mass is— ${}_{6}C^{12}$
J & K CET-(2009)	The equivalent mass of potassium permanganate in alkaline medium is its- Molar mass itself
JCECE - 2009	The formula mass of Mohr's salt is 392. The iron present in it is oxidised by $KMnO_4$ in acid medium. The equivalent mass of Mohr's salt is - <b>392</b>
Karnataka-CET, 2009	A bivalent metal has an equivalent mass of 32. The molecular mass of the metal nitrate is-
Karnataka-CET, 2008	Mass of 0.1 mole of methane is-
J & K CET-(2008)	Electron density in the yz plane of $3d_{x^2-y^2}$ orbital is-
[BITSAT – 2007]	The milliequivalent in 60 ml 4M $H_2SO_4$ is-
UP CPMT-2006	1.520 g of hydroxide a metal on ignition gave 0.995 g of oxide. The equivalent weight of metal is-
AMU-2005	The mass of a photon with wave length 3.6 Å is– $6.135 \times 10^{-29}$ kg
JCECE - 2005	The standard adopted for the determination of atomic weight of elements is based on– $C^{12}$
NEET-2005	The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is- 90 kg
UPTU/UPSEE-2004	The ratio of mass of an electron to the mass of a proton is- 1:1837
UPTU/UPSEE-2004	Equivalent weight of an acid- Depends on the reaction involved
<b>JCECE - 2003</b>	The number of gram equivalent of $H_2SO_4$ in 1000 mL 3M solution is- 6
<b>UP CPMT-2002</b>	The equivalent weight of KMnO <sub>4</sub> in acidic medium is- <b>31.6</b>
<b>UP CPMT-2002</b>	The oxygen obtained from 72 kg water is- 64 kg
AIIMS-1998	The weight of a single atom of oxygen is- $2.656 \times 10^{-23}$ g
AIIMS-1994	The molecular mass of a volatile substance may be measured by– Victor Meyer's method
GUJCET-2015, 2016	The molecular formulae for phosgene and tear gas are and respectively– COCl <sub>2</sub> and CCl <sub>3</sub> NO <sub>2</sub>
TS-EAMCET (Engg.), 05.08.2021 Shift-II	An organic compound contains 60% C; 4.48% H and 35.5% O. Its empirical formula is– $C_9H_8O_4$
AP EAPCET 24.08.2021, Shift-I	In each molecule of carbon tetrachloride. the mass percent of carbon and chlorine respectively are and 7.84 & 92.80
Karnataka-CET-2021	A pure compound contains 2.4g of C, $1.2 \times 10^{23}$ atoms. Its empirical formula is- CHO
[JEE Main 2020, 9 Jan Shift-I]	The mass percentage of nitrogen in histamine is-   37.84
COMEDK-2019	The formula of dichlorobis (urea) copper (II) is- [CuCl <sub>2</sub> {O=C(NH <sub>2</sub> ) <sub>2</sub> } <sub>2</sub> ]
COMEDK-2019	An organic compound is found to contain C= 54.5%, O=36.4% and H=9.1% by mass. Its empirical formula is- $C_2H_4O$
AIIMS 25 May 2019 (Morning)	The empirical formula of the compound if $M = 68\%$ (atomic mass = 34) and remaining 32% oxygen is-

Law of Multiple proportion– H <sub>2</sub> O, H <sub>2</sub> O <sub>2</sub>	J & K CET-(2019)
The percentage of carbon in urea is- 20%	MHT CET-02.05.2019,
(Atomic mass $C = 12$ , $H = 1$ , $N = 14$ , $O = 16$ )	SHIFT-III
A compound contains 26% nitrogen and 74% oxygen. Its molecular formula will be- $$N_2O_5$$	Tripura JEE-2019
The formulas of the compounds respectively are Bleaching powder; Quicklime; Plaster of Paris; Slaked lime–	Assam CEE-2018
$Ca(OCI)_2, CaO, CaSO_4 \frac{1}{2}H_2O, Ca(OH)_2$	
A metal M (specific heat 0.16) forms a metal chloride with 65% chlorine present in it. The formula of the metal chloride will be- MCl <sub>2</sub>	WB-JEE-2018
Two oxides of an non-metal X contain 50% and 40% of non-metal respectively. If the formula of the first oxide is $XO_2$ , Then the formula of second oxide is- $XO_3$	AP EAMCET-2017
An alkane has a C/H ratio (by mass) of 5.1428. Its molecular formula is $-C_6H_{14}$	COMEDK-2017
Blister copper contains percentage of copper 98	SRMJEEE-2016
A compound contain three elements X, Y and Z. The oxidation number. Of X, Y and Z are $+3$ , $+5$ and $-2$ respectively. The possible formula of the compound is- X <sub>3</sub> (YZ <sub>4</sub> ) <sub>3</sub>	BCECE-2016
The percentage of oxygen in CH <sub>2</sub> O is- 53.33%	JCECE - 2016
An organic compound contains C = 40%, H = 13.33% and N = 46.67%. Its empirical formula is- CH <sub>4</sub> N	Karnataka-CET-2016
The empirical formula of a compound is $CH_2$ . One mole of this compound has a mass 42g. Its molecular formula is- $C_3H_6$	CG PET- 2015
An organic compound contains 90% carbon and 10% hydrogen by mass. Its empirical formula is— $C_3H_4$	Kerala-CEE-2015
The formula for sodium trioxalatoaluminate (III) is $-$ Na <sub>3</sub> [Al(C <sub>2</sub> O <sub>4</sub> ) <sub>3</sub> ]	COMEDK-2015
The molecular formula of Dithionic acid is $H_2S_2O_6$	<b>SRMJEEE – 2014</b>
Two oxides of a metal contain 50% and 40% metal (M) respectively. If the formula of first oxide is $MO_2$ , the formula of second oxide will be- $MO_3$	Assam CEE-2014
The percentage of water of crystallisation of a sample of blue vitriol is- 36.07%	JCECE - 2014
A compound contains 38.8% C, 16% H, 42.5% N. The formula of compound will be-	MPPET-2013
The arsenic content of an agricultural insecticide was reported as $28\%$ As <sub>2</sub> O <sub>5</sub> . the percentage of arsenic in this preparation is-	AMU-2013
Analysis shows that a binary compound of X (atomic mass = 10) and Y (atomic mass = 20) contains 50% X. The formula of the compound is- $XY_2$	AMU-2013
Empirical formula of a compound is $CH_2O$ and its molecular mass is 90, the molecular formula of the compound is- $C_3H_6O_3$	Karnataka-CET-2013
An organic compound contains 38.8% carbon, 16% hydrogen & 45.2% nitrogen. Its empirical formula is- CH <sub>3</sub> NH <sub>2</sub>	MPPET - 2012
In a hydrocarbon, mass ratio of hydrogen and carbon is 1:3, the empirical formula of hydrocarbon is– $CH_4$	AIIMS-2012
The formula of chloral is- CCl <sub>3</sub> CHO	JCECE - 2012
The percentage composition by weight of an aqueous solution of solute (molar mass 150) which boils at $373.26K(k_b=0.52)$ is-	CG PET- 2011
An organic contains 49.3% carbon, 6.84% hydrogen and its vapour density is 73. Molecular formula of the compound is– $C_6H_{10}O_4$	BCECE-2010
Molecular formula of Glauber's salt is $-$ Na <sub>2</sub> SO <sub>4</sub> ·10H <sub>2</sub> O	JCECE - 2010
The percentage (by weight) of sodium hydroxide in a 1.25 molal NaOH solution is $-$ <b>4.76%</b>	MHT CET-2009

WB-JEE-200	An organic compound made of C,H and N contains 20% nitrogen. Its molecular weight is- 70
Kerala-CEE-200	The percentage of an element M is 53 in its oxide of molecular formula $M_2O_3$ . Its atomic mass is about– 27
NEET-200	An organic compound contains carbon, hydrogen and oxygen. Its element analysis gave C, $38.71\%$ and H, $9.67\%$ . The empirical formula of the compound would be-
<b>WB-JEE-200</b>	Composition of azurite mineral is– 2CuCO <sub>3</sub> ·Cu(OH) <sub>2</sub>
WB-JEE-200	An unknown element forms an oxide. The equivalent wt. of the element if the oxygen content is 20% by wt- 32
CG PET -200	A compound has the empirical formula $CH_2O$ . Its vapour density is 30. Its molecular formula is– $C_2H_4O_2$
UP CPMT-200	In a compound C, H and N are present in 9 : 1 : 3.5 by weight. If molecular weight of the compound is 108, then the molecular formula of the compound is- $C_6H_8N_2$
UPTU/UPSEE-200	A compound contains 54.55% carbon, 9.09% hydrogen, 36.36% oxygen. The empirical formula of this compound is– $C_2H_4O$
UPTU/UPSEE-200	A petroleum fraction having boiling range 70-200°C and containing 6-10 carbon atoms per molecule is called– Gasoline
AP EAMCET- 200	The molecular formula of borazole is $B_3N_3H_6$
AP EAMCET- 200	The molecular formula of gypsum is – CaSO <sub>4</sub> .2H <sub>2</sub> O
AP EAMCET- 200	The molecular formula of white phosphorus is— $P_4$
AIIMS-199	The empirical formula of a compound is $CH_2O$ . Its molecular weight is 180. The molecular formula of compounds is- $C_6H_{12}O_6$
AIIMS-199	The percentage of oxygen in NaOH is- 40%
A-P EAMCET-199	The mole percentage of oxygen in a mixture of 7.0 g of nitrogen and 8.0 g of oxygen is-
VITEEE 201	An organic compound having carbon, hydrogen and sulphur contains 4% of sulphur. The minimum molecular weight of the compound is-
VITEEE 201	Caffeine has a molecular weight of 194 u. If it contains 28.9% by mass of nitrogen, number of atom of nitrogen in one molecule of caffeine is-
Kerala CEE -03.07.202	The elemental analysis of an organic compound gave C: 38.71%, H: 9.67% . The empirical formula of the compound is – $CH_3O$
	Stoichiometry Calculation
A.P.EAMCET-1995, 199	An organic compound has an empirical formula $CH_2O$ . Its vapour density is 45. The molecular formula of compound is- $C_3H_6O_3$
GUJCET-202	The fractions of $Fe^{2+}$ and $Fe^{3+}$ in $Fe_{0.93}O$ respectively are – <b>0.85, 0.15</b>
Kerala-CEE-202	An organic compound contains 24% carbon, 4% hydrogen and remaining chlorine. Its empirical formula is- CH <sub>2</sub> Cl
CG PET -201	Pink colour of non-stoichiometric LiCl is due to- Electrons in the lattice
COMEDK-201	The mass of oxygen gas which occupies 5.6 litres at STP would be– Half of the gram atomic mass of oxygen
AMU-201	A metal oxide has the empirical formula, $M_{0.96}O_{1.00}$ . What will be the percentage of $M^{2+}$ ions in the crystal– 91.67
AP EAMCET (Engg.) 201	The number of moles of electrons required to deposit 36g of Al from an aqueous solution of $Al(NO_3)_3$ is (At. wt. of $Al = 27$ )– 4
AP - EAMCET(Medical 200	The ratio of moles of hydrogen produced when two moles of aluminium react with excess HCl and NaOH separately is- 1:1
UP CPMT-200	Value of x in potash alum, $K_2SO_4Al_x (SO_4)_3 \cdot 24H_2O$ is-
BCECE-200	The number of molecules of $CO_2$ spresent in 44g of $CO_2$ is- <b>6.0</b> × 10 <sup>23</sup>
AP-EAMCET-199	The number of molecules present in 3.5 g of CO at 0°C and 760 mm pressure is– $0.125 \times 6.02 \times 10^{23}$

# Structure of Atom

## Sub-Atomic Particles and Atomic Models

- The charge of an electron was discovered by-Millikan
- The element used by Rutherford in his famous scattering experiment was- Gold
- $Be^{2+}$  is isoelectronic with ions- Li
- (<sub>32</sub>Ge<sup>76</sup>, <sub>34</sub>Se<sup>76</sup>) and (<sub>14</sub>Si<sup>30</sup>, <sub>16</sub>S<sup>32</sup>) are the examples of- **Isobars and isotones**
- The ratio of charge and mass would be greater for-Electron
- The nitride ion in lithium nitride is composed of-7-protons + 10 electrons
- The ratio of neutrons in C and Si with respective atomic masses 12 and 28 is- 3:7
- If a species has 16 protons, 18 electrons and 16 neutrons, the species and its charge is
- The compound having number of protons is greater than the number of neutrons but number of protons is less than the number of electrons— OH

## **Developments Leading to The Bohr's Model of Atom**

- The scientist that proposed the atomic model based on the quantisation of energy for the first time is-Neil Bohr
- The value of Rydberg constant is- 109, 677 cm<sup>-1</sup>
- The lowest energy of the spectral line emitted by the hydrogen atom in the Lyman series is  $\frac{3hR_{H}c}{4}$
- A metal surface is exposed to solar radiations–
   The emitted electrons have energy less than a maximum value of energy depending upon the frequency of the incident radiation.
- Bohr's model can explain-Spectrum of any atom or ion containing one electron only
- The species, Bohr's theory is not applicable to  $-He^{2+}$
- The quantum of light energy is called Photon

## Hydrogen Atom

The velocity of electron present in first Bohr orbit of hydrogen atom 2.18 × 10<sup>6</sup> m/s

■ Time taken for an electron to complete one revolution in Bohr orbit of hydrogen atom is-

 $\frac{4\pi^2 mr^2}{nh}$ 

- The wavelength and name of series respectively for the emission transition for H-atom if it starts from the orbit having radius 1.3225 nm and ends at 211.6 pm would be 434 nm, Balmer
- The emission spectrum of hydrogen atom discovered first and the region of the electromagnetic spectrum is belongs, to-

**Balmer**, Visible

- The velocity of electron in second shell of hydrogen atom is- 1.094 × 10<sup>6</sup>m/sec
- If the first ionization energy of H<sup>-</sup> atom is 13.6 eV, then the second ionization energy of He<sup>-</sup> atom is-54.4 eV
- When the electrons of hydrogen atom return to Lshell from shell of higher energy, we get a series of lines in the spectrum. This series is called-

- The electron of a hydrogen atom jump from n = 4 to n = 1 state, the number of different spectral line emitted are-
- The wave number of the spectral line in the emission spectrum of hydrogen will be equal to 8/9 times the rydberg constant if the electron jumps from-

n = 3 to n = 1

- The energy ratio of a photon of wavelength 3000Å and 6000Å is-
- The first line emission of hydrogen atom spectrum in the Balmer species appears at- 5R/36 cm<sup>-1</sup>
- The radius of 2<sup>nd</sup> Bohr's orbit of hydrogen atom is-0.2116 nm
- The maximum energy possessed by an electron is At infinite distance from

#### the nucleus

- The pair where both species have same radius is $r_2Be^{3+}$  and  $r_1H$
- The ratio of ionization energy of H and Be<sup>+3</sup> is-1:16
- The ratio of the energy of the electron in ground state of hydrogen to the electron in 1<sup>st</sup> excited state of Be<sup>3+</sup> is 1:4
- The transition, one quantum of energy is emitted is  $n_2 = 4 \rightarrow n_1 = 2, n_2 = 3 \rightarrow n_1 = 1,$  $n_2 = 2 \rightarrow n_1 = 1$

**Balmer series** 

The wavelength of first line of Balmer spectrum of The set of quantum no. not applicable for an hydrogen will be-6569 Å  $3, 1, -2, +\frac{1}{2}$ electron-If the radius of 2<sup>nd</sup> Bohr orbit of hyderogen atom is  $\frac{9}{4}r_2$ The orbital angular momentum of an electron in fr<sub>2</sub>. The radius of third Bohr orbit will be-√3h orbital-The ratio of highest possible wavelength of Lyman π series is-4/3 K L M N The number of electrons Given Magnitude of kinetic energy in an orbit is equal to-2 8 2 11 Half of the P.E. present in l = 2 is-According to Bohr's theory, the angular momentum 3 The maximum number of electrons that can be held 2h of an electron in the 4<sup>th</sup> orbit isby subshell with azimuthal quantum number " $\ell$ " in π If the radius of  $1^{st}$  Bohr orbit be  $a_0$ , then radius of  $3^{rd}$ an atom is given by- $2(2\ell + 1)$ Bohr orbit would be- $9a_0$ The maximum number of electrons that can be associated with a quantum number n = 3, l = 1 and **Towards Quantium Mechanical** m = -1 is-2 Model of The Atom The quantum number "m" of a free gaseous atom is associated with-**Spatial orientation of orbital** If  $E_e$ ,  $E_\alpha$  and  $E_p$  represents the kinetic energy of an The element is represented by electronic electron,  $\alpha$ -particle and proton respectively and each configuration  $1s^22s^22p_x^12p_y^12p_z^1 -$ N moving with same de-broglie wavelength then-The atomic number of element is 17. The number of  $E_e > E_p > E_{\alpha}$ orbital containing electron pair in its valence shell Heisenberg Uncertainty principle was given byis-If uncertainty in position and velocity are equal, The total number of electrons present in all the porbital of bromine are (Given : Atomic no. of Br = 1 /mh then uncertainty in momentum will be-**2** √ π 35)-17 The number of unpaired electron in  $Fe^{3+}(Z = 26)$ Ľ ■ If de-broglie wavelength of mass 'm' is 100 times of are-5 its velocity then its value in term of its mass 'm' and The orbital angular momentum of p-electron is planck's constant "h" ish given as- $\sqrt{2\pi}$ The wavelength of electron waves in two orbit is in The total number of orbitals in a shell with principle ratio 3:5. The ratio of K.E. of electrons will be-25:9 n<sup>2</sup> quantum number n is-If uncertainty in position and momentum are equal, The represents set of quantum numbers of a 4d 1 h 4, 2, 1, -1/2 electron is then uncertainly in velocity is- $2m\sqrt{\pi}$ Any f-orbital can accommodate upto-2 electrons with opposite spin The de-broglie wavelength associated with a mass  $6.626 \times 10^{-34}$  m The atomic numbers of elements X, Y and Z are 19, of 1kg having K.E. 0.5J is-21 and 25 respectively. The number of electrons For an electron, if the uncertainty in velocity is  $\Delta v$ , present in the M shells of these elements follow the h the uncertainty in position  $\Delta x$  is given by-Z > Y > Xorder-**4πΔv** This electronic configuration shows element of-If uncertainty in the position of an electron is zero, [↑↓|↑↓| ↑ |^↓| |↑↓| the uncertainty in its momentum will beinfinite 2s 2p 1s de-Broglie wavelength associated with a material Fluorine particle is- Inversely proportional to momentum The de-broglie wavelength of an electron moving in The uncertainty in the position of an electron and a circular orbit is  $\lambda$ . proton is equal, the ratio of the uncertainties in the λ velocity of an electron and proton is-1836:1 The minimum radius of the orbit is given by- $2\pi$ The species have the same number of electron in its Last line of Lyman series for H-atom has Ca<sup>2+</sup> outermost as well as penultimate shell iswavelength  $\lambda_1$  Å. The 2<sup>nd</sup> line of Balmer series has The number of waves made by an electron moving in an orbit having maximum magnetic quantum wavelength  $\lambda_2$  Å, then–

number +3 is-

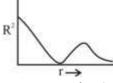
- 4
  - 16

The electron having quantum numbers n = 4 & m = 2 is- the value of  $\ell$  may be 2, The value fo  $\ell$  may

#### be 3, The value of s may be +1/2

 $2\pi$ 

- Change in orbit angular momentum when an electron makes a transition corresponding to 3<sup>rd</sup> line of Balmer series in Li<sup>2+</sup> ion is-
- The ionisation energy of H atom is x J/atom. The wavelength of first Balmer line for He<sup>+</sup> ion is9he 5x
- The total number of orbitals in the principal shell of  $He^+$  that has energy equal to  $\frac{-Rhc}{4}$  (where R is Rydberg's constant) is-
- If  $\Delta E$  is the energy emitted in eV when an electronic transition occurs from higher energy level to lower energy level in H-atom, the  $\lambda$  of the line produced is approximately equal to- $\frac{12375}{\Delta E}^{0} A$
- The energy of a possible excited state of hydrogen is- -3.4 eV
- The ratio of area covered in 2<sup>nd</sup> orbit to first orbit is\_\_\_\_\_\_16:1
- An electron in an atom undergoes transition in such a way potential energy will be  $+\frac{3}{2}x$
- The transition in He<sup>+</sup> ion shall have the same wave number as the first line in Balmer series of hydrogen atom is-
- The maximum number of electrons that can be accomodated in principal number 4 32
- The number of elements would be in the  $11^{nd}$  period of the Periodic Table if the spin quantum numbers could have the value  $+\frac{1}{2}$ , 0,  $-\frac{1}{2}$  12
- In an atom, having 2K, 8L, 18M and 2N electrons in the ground state. The total number of electrons having magnetic quantum number, m = 0 is-14
- The probability density curve for 2s electron appears like as-



- If an electron in H atom has an energy of -78.4 kcal/mol. The orbit in the electron is present is- 2<sup>nd</sup>
- Difference between n<sup>th</sup> and (n + 1)<sup>th</sup> Bohr's radius of H- atom is equal to its (n -1)<sup>th</sup> Bohr's radius. The value of n is-
- Light of wavelength λ shines on a metal surface with intensity x and the metal emits Y electrons per

second of average energy, Z. The happen to Y and Z if x is doubled-

Y will be doubled but Z will remain same

- Splitting of spectral lines under the influence of electric field is called—
   Stark effect
- The conclusions could not be derived from Rutherford's α-particle scattering experiment is– Electrons move in a circular path

of fixed energy called orbits.

- The properties of atom could be explained correctly by Thomson model of atom is-Overall neutrality of atom
- Two atoms are said to be isobars if-

## Sum of the number of protons and neutrons is same but the number of protons is different

- The number of radial nodes for 3p orbital is– 1
- Number of angular nodes for 4d orbital– 2
- The responsible to rule out the existence of definite paths or trajectories of electrons is- Heisenberg's uncertainty principle
  - Total number of orbitals associated with third shell will be- 9
- Orbital angular momentum depends on– l
- Chlorine exists in two isotopic forms. Cl-37 and Cl-35 but its atomic mass is 35.5. This indicates the ratio of Cl-37 and Cl-35 is approximately 1:3
- The pair of ions having same electronic configuration is  $Fe^{3+}$ ,  $Mn^{2+}$
- For the electrons of oxygen atom, is-

#### The two electrons

## present in the 2s orbital have spin

## quantum numbers, m<sub>s</sub> but of opposite sign

■ If waves travelling at same speeds, matter waves have the shortest wavelength-

Alpha particle (He<sup>2+</sup>)

- The number of angular nodes and radial nodes in 3s orbital are—
   0 and 2, respectively
   4d, 5p, 5f and 6p orbitals are arranged in the order
- of decreasing energy–5f > 6p > 5p > 4d
- The series of transitions in the spectrum of hydrogen atom fall in visible region is— Balmer series
- $\blacksquare Be^{2^+} is isoelectronic with the ions- Li^+$
- The ion that is isoelectronic with CO is- CN<sup>-</sup>
- An isotone of  ${}^{76}_{32}$ Ge is-  ${}^{77}_{33}$ As
- Isoelectronic species are-  $CO, CN^-, NO^+, C_2^{2-}$
- ..... ions has electronic configuration  $[Ar]3d^6 Co^{3+}$
- Atomic number and mass number of an element M are 25 and 52 respectively. The number of electrons, protons and neutrons in M<sup>2+</sup> ion are respectively–

23, 25 and 27

 The time taken by the electron in one complete revolution in the n<sup>th</sup> Bohr's orbit of the hydrogen atom is Directly proportional to n<sup>3</sup>

- According to the Bohr theory, the transition in the hydrogen atom will give rise to the least energetic photonn = 6 to n = 5
- modified Bohr's theory by introducing elliptical orbits for electron path Sommerfield
- The ratio of the energy required to remove an electron from the first three Bohr's orbits of hydrogen is- 36:9:4
- The longest wavelength line in Balmer series of spectrum of H-atom- 656 nm
- Total number of spectral lines in UV regions, during transition from 5<sup>th</sup> excited state to 1<sup>st</sup> excited state-
  - Zero
- An electron jumps lower orbit to higher orbit, when– Energy is absorbed
- Electronic energy is negative because- Energy is zero at infinite distance from the nucleus and decreases as the electron comes towards nucleus
- Zeeman effect refers to the Splitting of the spectral lines in a magnetic field
- The principal and azimuthal quantum number of electron in 4f orbitals are- 4, 3
- In any sub-shell, the maximum number of electrons having same value of spin quantum number is- 2*l* + 1
- Two electrons occupying the same orbital are distinguished by Spin quantum number
- The orientation of an atomic orbital is governed by-Magnetic quantum number
- Maximum number of electrons in a subshell of an atom is determined by-
- The subshell can accommodate as many as 10 electrons is- d
- A p-orbital can accommodate upto- Two electrons
  The orbital is with the four lobes present on the axis
- Any f-orbital can accommodate upto- 2 electrons with opposite spin
- The angular momentum of a p-electron is given as-
  - $\frac{h}{\sqrt{2\pi}}$
- The pairs of d-orbitals will have electron density along the axes-  $d_{z^2}$ ,  $d_{x^2-y^2}$
- The total number of atomic orbitals in fourth energy level of an atom is16
- The number of radial nodes in 4s and 3p orbitals are respectively3, 1
- Radial nodes in 3s and 3p-orbitals are respectively– 2, 1
- The number of lobes in most of the d-orbitals are- 4
- The total number of subshells in fourth energy level of an atom is-
- A transition element X has a configuration (Ar)3d<sup>4</sup> in its +3 oxidation state. Its atomic number is 25

The ratio of charge to mass of an electron in coulombs per gram was determined by J.J. Thomson. He determined this ratio by measuring the deflection of cathode rays in electric and magnetic fields. The value he found for this ratio is-

### $-1.76 \times 10^8$ coulombs/g

• The experiment that is responsible for finding out the charge on an electron-

Millikan's oil drop experiment

An element with mass number 81 contains 31.7% more neutrons as compared to protons. The symbol of the atom-

tom–	Br
	35

The wavelength of visible light is-

380 nm – 760 nm

• The spectrum of white light ranging from red to violet is called a continuous spectrum because–

## The violet colour merges into blue, blue into green, green into yellow and so on

- The electron in Bohr's model of hydrogen atom is pictured as revolving around the nucleus in order for it to- **Possess energy**
- The color corresponding to the wavelength of light emitted the electron in a hydrogen atom undergoes transition from n = 4 to n = 2 is-

#### Blue

The series of lines are the only lines in hydrogen spectrum that appear in the visible region-

Balmer

The third line of the Balmer series in the emission spectrum of the hydrogen atom is due to the transition from theFifth Bohr orbit to the

#### second Bohr orbit

■ The frequency of radiation absorbed or emitted the transition occurs between two stationary states with energies E<sub>1</sub> (lower) and E<sub>2</sub> (higher) is given by–

$$\mathbf{v} = \frac{\mathbf{E}_2 - \mathbf{E}_1}{\mathbf{h}}$$

π

The angular momentum of an electron in a given stationary state can be expressed as  $m_e vr = n \frac{h}{2\pi}$ . Based on this expression an electron can move only

in those orbits for which its angular momentum is-

## Integral multiple of $\frac{h}{2\pi}$

According to Bohr's theory, the angular momentum

of an electron in 5<sup>th</sup> orbit is–

- $\label{eq:static_stat$
- If the radius of first Bohr orbit is x pm, then the radius of the third orbit would be- (9 × x) pm

■ The longest wavelength doublet absorption transition is observed at 589 and 589.6 nm. Energy difference between two excited states is-

 $3.31 \times 10^{-22} \text{ J}$ 

- Bohr's theory can also be applied to the ions like– He<sup>+</sup>, Li<sup>2+</sup>, Be<sup>3+</sup>
- According to Bohr's theory, the electronic energy of H-atom in Bohr's orbit is given by-

 $E_{n} = \frac{2.179 \times 10^{-18} \times Z^{2}}{\pi^{2}} J$ 

The trend of energy of Bohr's orbits is— Energy of the orbit increases as we move

away from the nucleus

The negative electronic energy (negative sign for all values of energy) for hydrogen atom means is-

The energy of an electron in the atom is lower than the energy of a free electron at rest that is taken as zero

The energy of the electron in a hydrogen atom has a negative sign for all possible orbits because-

the electron is attracted by the nucleus and is present in orbit n, the energy is emitted and its energy is lowered

- The probability of finding out an electron at a point within an atom is proportional to the-
  - Square of the orbital wave function i.e.,  $\Psi^2$
  - Two electron present in M shell will differ in-Spin quantum number
- The lowest value of n that allows orbital to exist is-5
- Total orbitals and electrons are associated with n = 4 are - 16, 32
- An electron is in of the 3d-orbitals. The possible values of n, *l* and m<sub>1</sub> for this electron is-

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

- The possible values of n, t and  $m_1$  for an atomic orbital 4f are $n = 4, l = 3, m_1 = -3, -2, -1, 0, +1, +2, +3$
- Total electrons in an atom having the quantum numbers n=4 and spin value=-1/2 is- 16

- Total electrons are associated with the given set of quantum numbers n = 3 and l = 1 and m = -1 are 2
- The orbital angular momentum of an electron in 2sorbital isZero
- Two values of spin quantum numbers i.e., +1/2 and -1/2 represent – Two quantum mechanical spin states which refer to the orientation of spin of the electron
- The region where probability density function reduces to zero is called **Nodal surfaces**
- The 3d-orbitals having electron density in all the three axis is3d<sub>2</sub>
- The number of radial nodes and angular nodes for dorbital can be represented as-

## (n-3) radial nodes + 2 angular nodes

= (n - 1) total nodes

- An electron can enter into the orbital when-
- Value of (n + l) is minimum
   Total number of orbitals in total are associated with n<sup>th</sup> energy level is- n<sup>2</sup>
- Effective nuclear charge (Z<sub>eff</sub>) for a nucleus of an atom is defined as- The net positive charge experienced by electron from the nucleus
- The electronic configuration of  $O^{2-}$  ion is- $1s^2 2s^2 2p^6$
- The configuration of the valence orbital of an element with atomic number 22 is- 4s<sup>2</sup> 3d<sup>2</sup>
- Three elements 'X', 'Y' and 'Z' have atomic numbers 18, 19 and 20 respectively. Total electrons present in the M shells of these elements are 8, 8, 8
- The electronic transition from n = 2 to n = 1 will produce shortest wavelength in- Li<sup>2+</sup> ion
- The number of neutrons and electrons, respectively, present in the radioactive isotope of hydrogen is- 2 and 1
- A certain orbital has no angular nodes and two radial nodes. The orbital is 3s
- The maximum number of electrons in a subshell is given by the expression 4l + 2

## **EXAM POINT**

Sub-atomic particles and atomic models		
The pair, of ions in isoelectronic with Al <sup>3+</sup> is–	O <sup>2–</sup> and Mg <sup>2+</sup>	JEE Main-25.06.2022, Shift-I
Molecules contains an incomplete octet of the central atom-	AlCl <sub>3</sub>	Kerala CEE -03.07.2022
The oxide contains an odd electron at the nitrogen atom is-	NO <sub>2</sub>	JEE Main-26.06.2022, Shift-II
The difference between number of Neutrons and Protons is positive for-		MPPET-2013
	Tritium atom	
One atom of $^{39}_{19}$ K contains–	19p; 20n and 19e <sup>-</sup>	AP-EAMCET/1991

There are six electrons, six protons and six neutrons in an atom of an element.	NDA (II)-2016
The atomic number of the element is- 6	
The atomic number of the element with symbol Uus is- 117	TS-EAMCET-2016
The sum of the total number of neutrons present in protium, deuterium and tritium is-	TS-EAMCET (Engg.), 05.08.2021 Shift-II
<sub>20</sub> Ca <sup>40</sup> has magic number of – <b>Protons and Neutrons</b>	AP EAMCET (Medical) - 1998
The species that has the same number of electrons as ${}^{35}_{17}$ Cl is- ${}^{40}_{18}$ Ar <sup>+</sup>	NDA (II)-2017
The characteristics of elements X, Y and Z with atomic numbers, respectively,33, 53 and 83 are-X is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid, Y is a non-metal and Z is a metalloid.	JEE Main 16.03.2021, Shift-II
The masses of an electron, a proton and a neutron respectively will be in the ratio- 1836.15 : 1838.68	AP EAPCET 20.08.2021 Shift-I
Elements X and Y belong to the same group. 19, 55 Set of atomic numbers represent- X and Y	
The number of protons in a negatively charged atom (anion) is-	NDA (II)-2011
Less than the number of electrons in the atom	
Number of protons atomic number of – Element	NDA (II)-2011
Isotope used in brain scan is–	SRMJEEE-2010
The number of electrons and neutrons of an element is 18 and 20 respectively. Its mass number is–	AIIMS-1994
The number of electrons in $[_{19}K^{40}]^{-1}$ is – 20	AIIMS-1994
Positron is- Electron with positive charge	AIIMS-1998
The nitride ion in lithium nitride is composed of- 7 protons + 10 electrons	CG PET -2018
Isoelectronic pair– $CN, O_3$	JCECE - 2013
N <sub>2</sub> and CO are– Isoelectronic	J & K CET-(2002)
The symbol of the species with number of electrons, protons and neutrons as 18,	AMU-2014
16 and 16 respectively is $\frac{32}{16}S^{2-}$	
Atomic number equal to the <b>Number of the protons in the nucleus</b>	AMU-2001
The ratio of electron, proton and neutron in tritium is- 1:1:2	Assam CEE-2014
The number of electrons, protons and neutrons in phosphide ion (P <sup>3-</sup> ) is- 18, 15, 16	Assam CEE-2021
The energy released in an atom bomb explosion is mainly due to-	BCECE-2006
Lesser mass of products than initial material	
n/p ratio during positron decay– Increases	CG PET- 2015
If the de-Broglie wavelength of the electron in n <sup>th</sup> Bohr orbit in a hydrogenic	[JEE Main 2019, 12 Jan
atom is equal to $1.5\pi a_0$ ( $a_0$ is Bohr radius), then the value of n/Z is- 0.75	Shift-II]
The introduction of a neutron into the nucleus of an atom would lead to a change in– Atomic mass	CG PET -2019
The element with atomic number 55 belongs to block of the periodic table is-	CG PET -2004
s-block	
Neutrons are found in atoms of all elements except in– Hydrogen	CG PET -2004
	HP CET-2018
The triad of the nuclei that is isotonic— ${}_{6}C^{14}$ , ${}_{7}N^{15}$ , ${}_{9}F^{17}$	
The triad of the nuclei that is isotonic— ${}_{6}C^{14}$ , ${}_{7}N^{15}$ , ${}_{9}F^{17}$ Three elements X, Y and Z are in the 3rd period of the periodic table. The oxides of X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the	(JEE Main 2020, 2 Sep Shift-II)
The triad of the nuclei that is isotonic— ${}_{6}C^{14}$ , ${}_{7}N^{15}$ , ${}_{9}F^{17}$ Three elements X, Y and Z are in the 3rd period of the periodic table. The oxidesof X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the atomic number of X, Y and Z is—X < Y < Z	(JEE Main 2020, 2 Sep Shift-II)
The triad of the nuclei that is isotonic— $_{6}C^{14}$ , $_{7}N^{15}$ , $_{9}F^{17}$ Three elements X, Y and Z are in the 3rd period of the periodic table. The oxidesof X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the atomic number of X, Y and Z is—X < Y < Z	(JEE Main 2020, 2 Sep Shift-II) (JEE Main-2017)
The triad of the nuclei that is isotonic— $_{6}C^{14}$ , $_{7}N^{15}$ , $_{9}F^{17}$ Three elements X, Y and Z are in the 3rd period of the periodic table. The oxidesof X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the atomic number of X, Y and Z is—X < Y < Z	(JEE Main 2020, 2 Sep Shift-II) (JEE Main-2017) Assam CEE-2020
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The triad of the nuclei that is isotonic— $_{6}C^{14}$ , $_{7}N^{15}$ , $_{9}F^{17}$ Three elements X, Y and Z are in the 3rd period of the periodic table. The oxidesof X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the atomic number of X, Y and Z is—X < Y < Z	(JEE Main 2020, 2 Sep Shift-II) (JEE Main-2017) Assam CEE-2020 (AIEEE 2006)
The triad of the nuclei that is isotonic— $_{6}C^{14}$ , $_{7}N^{15}$ , $_{9}F^{17}$ Three elements X, Y and Z are in the 3rd period of the periodic table. The oxidesof X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the atomic number of X, Y and Z is—X < Y < Z	(JEE Main 2020, 2 Sep Shift-II) (JEE Main-2017) 

The size of the iso-electronic species Cl <sup>-</sup> , Ar and Ca <sup>2+</sup> is affected by– nuclear charge	(JEE Main 2019, 8 April Shift-I)
The atomic number of unnilunium is- 101	(JEE Main 2020, 6 Sep Shift-II)
Constitutes a group of the isoelectronic species are- $NO^+$ , $C_2^{2-}$ , $CN^-$ , $N_2$	JEE Main-09.10.2018
Atoms with identical atomic number but different atomic mass number are known as– <b>Isotopes</b>	J & K CET-(2014)
Negatively charged particles are called– Electrons	J & K CET-(2014)
Mass number of an atom is the sum of-	J & K CET-(2014)
Number of protons + number of neutrons	
Mass of a proton is- 1.00727 amu.	J & K CET-(2014)
$^{39}_{19}$ K and $^{40}_{20}$ C are-	J & K CET-(2001)
The specific heat of a metal is 0.11 and its equivalent weight is 18.61. Its exact atomic weight is 55.83	J & K CET-(1998)
Species is isotonic with ${}_{37}\text{Rb}^{86-}$ ${}_{38}\text{Sr}^{87}$	J & K CET-(1997)
Atoms with same atomic number and different mass numbers are called <b>Isotopes</b>	JCECE - 2009
The number of electrons, neutrons and protons in a species are equal to 10,8 and 8 respectively. The proper symbol of the species is $-\frac{16}{8}O^{2-}$	JIPMER-2011
In long form of periodic table the properties of the elements are a periodic function of their–	JIPMER-2010
If two atoms have equal number of electron it is called– Isoelectronic	JIPMER-2019
The number of electrons, protons and neutrons in a species are equal to 10, 11 and 12 respectively. The proper symbol of the species is $ 23 \atop 11 \atop 12 \atop 11 \atop 12 \atop 11 \atop 12 \atop 11 \atop 12 \atop 12 \atop 12 \atop 11 \atop 12 \atop$	Kerala-CEE-2020
1 u (amu) is equal to- 1.492×10 <sup>-10</sup> J	MHT CET-2010
The number of protons, neutrons and electrons in $\frac{175}{71}$ Lu, respectively, are-	NEET-2020
71, 104and 71	
Isoelectronic speicies are- $CO, CN^-, NO^+, C_2^{2-}$	AMU-2011 NEET-2000
Atomic number of an element is equal to the number of- <b>Protons</b>	UP CPMT-2005
Unit positive charge and 1 amu mass is- Proton	UP CPMT-2003
The atomic number of an element is 17. The number of orbitals containing electron pairs in its valence shell is $3$	UP CPMT-2001
The binding energy of an atom is 128 MeV. The binding energy per nucleon is 8, the number of nucleon is-	UP CPMT-2001
Rutherford's alpha-particle scattering experiment was responsible for the discovery of-	NDA (I)-2017
The number of periods present in the long form of the periodic table is- 7	AP-EAMCET (Med.)-1999
The discovery of cathode rays are made up of electrons- J. J. Thomson	MPPET- 2009
When 4p orbital in any atom is filled completely, the next electron goes in- 5s	AP-EAMCET-1991
According to Aufbau principle, the sub-shell is occupied by the electron, first has-	AP-EAMCET-1993
Rutherford's experiment on scattering of $\alpha$ -particles showed for the first time that the atom has- Nucleus	AP-EAMCET-1995
In Rutherford's α-ray scattering experiment, the alpha particles are detected using a screen coated with- Zinc sulphide	AP-EAMCET-1999
The nucleus of an atom contains- <b>Proton and neutron</b>	MPPET-2008
"The properties of elements are periodic functions of their atomic weights." This periodic law was given by– Mendeleev	AP EAMCET (Engg.) 17.09.2020 Shift-I

AP EAPCET 20.08.2021 Shift-I		The number of protons , neutrons and electrons in ${}^{13}_{6}$ C respective
AIIMS-2011	<b>6, 7, 6</b> e Lyman series	The wavelength of a spectral line emitted by hydrogen atom in
	4	is $\frac{16}{15R}$ cm. the value of n <sub>2</sub> (R = Rydberg constant)–
<b>SRMJEEE – 2008</b>		According to Moseley, a straight line group is obtained on plott
SINIJEEE – 2000		The square root of the frequencies of characteristics X
	omic numbers	against the
AMU-2014	thode ray tube	
BCECE-2004	Neil Bohr	The charge on an electron was discovered by-
BCECE-2009	Au	Rutherford's famous experiment with $\alpha$ - particles used this meta
<b>BCECE-2017</b>	$\mathbf{n}_3 \longrightarrow \mathbf{n}_2$	Transition of an electron in H-atom will emit maximum energy-
CG PET -2007	13.6	
	$-\frac{13.6}{n^2}eV$	The energy of an electron in n <sup>th</sup> orbit of hydrogen atom is-
J & K CET-(2004)	$\sqrt{6}$ h	For d-electron, the orbital angular momentum is-
	2π	
UPTU/UPSEE-2005	or the first time Nucleus	Rutherford's experiment on the scattering of $\alpha$ -particles shower that the atom has-
of atom	hr's model o	Development leading to the B
		The longest wavelength present in Balmer series lines is
	656 nm	[Given Rydberg constant = $1.097 \times 10^7 \text{ m}^{-1}$ ]-
AP-EAMCET-2002	s wave number 10000	The energy of an electromagnetic radiation is $19.875 \times 10^{-13}$ erg in cm <sup>-1</sup> is –
AP-EAMCET-2006	662	(h=6.625×10 <sup>-27</sup> erg-s; c=3×10 <sup>10</sup> cm s <sup>-1</sup> ) The energy of a photon is $3\times10^{-12}$ erg. its wavelength in nm is –
		$(h = 6.62 \times 10^{-27} \text{ erg-s}, c = 3 \times 10^{10} \text{ cm s}^{-1})$
AP-EAMCET-2008		The velocities of two particles A and B are 0.05 and $0.02 \text{ ms}^{-1}$ mass of B is five times the mass of A. The ratio of their de-Brois–
AP EAPCET 23-08-2021		Two particles of masses m & 2m have equal kinetic energie
Shift-I	$\sqrt{2}:1$	wavelength are in the ratio of-
AP EAPCET 23-08-2021 Shift-I	ual to that of a 1098 m/s	With velocity must an electron travel so that its momentum is photon of wavelength 663 nm-
TS-EAMCET (Engg.),	· ·	The relation between the stopping potential $(V_0)$ and frequence
05.08.2021 Shift-II	$V_0 = \frac{hv}{e} - \frac{\phi}{e}$	represented in $[\phi = Work function]$ -
TS EAMCET 10.08.2021, Shift-I	1929	de Broglie was awarded the Nobel Prize in the year-
AP EAMCET (Engg.)-2009	ehyde and one	One mole of alkene X on ozonolysis gave one mole of acet
	nethyl-2butene	mole of acetone. The $\overline{IUPAC}$ name of $\underline{X}$ is-
TS EAMCET 04.08.2021, Shift-I	electron in one	If the wavelength $(\lambda)$ is equal to the distance travelled by the second
	$\lambda = \sqrt{h/m}$	h is the Planck's constant and m is the mass of electron
AP EAPCET 19-08-2021,		If the energies of two light radiations $E_1$ and $E_2$ are 25
Shift-II	In the ratio $\lambda_1$ : 4:1	respectively, then their respective wavelength $\lambda_1$ and $\lambda_2$ would $\lambda_2 =$
<b>SRMJEEE – 2009</b>	An iron ball.	De Broglie relationship has no significance for-
<b>SRMJEEE – 2010</b>	ag moving with $2 \times 10^{-6}$ m	The wavelength associated with a particle of mass $3.313 \times 10^{-5}$ velocity $10^3$ m/s is–

Encounter (addition (add)) has a set of (00 and 50 add)	
Frequencies of radiation (in Hz) has a wavelength of 600 nm- $5.0 \times 10^{14}$	AP-EAMCET- (Engg.)- 2011
If the kinetic energy of a particle is reduced to half, de-Broglie wavelength becomes— $\sqrt{2}$ times	AP-EAMCET (Engg.) 2015
The frequency of radiation emitted, when an electron falls from $n = 3$ to $n = 1$ . in a hydrogen atom would be- 2.92 ×10 <sup>15</sup> s <sup>-1</sup>	AP- EAPCET- 07-09-2021, Shift-I
Transitions of an electron in hydrogen atom emits radiation of the lowest wavelength $n_2 = 2 \text{ to } n_1 = 1$	AP-EAMCET- (Engg.) - 2010
The basis of quantum mechanical model of an atom is– Dual nature of electron	AP-EAMCET (Engg.) 2013
The wave number of 4 <sup>th</sup> line in Balmer series of hydrogen spectrum is- (R = 1,09,677 cm <sup>-1</sup> ) 24,372 cm <sup>-1</sup>	AP - EAMCET (Medical) - 2007
The wavelengths of two photons are 2000Å and 4000Å respectively. The ratio of their energies–	VITEEE 2019
The wavelengths of electron waves in two orbits is 3 : 5. The ratio of kinetic energy of electrons will be-	VITEEE- 2009
Ratio of energy of photon of wavelength 3000Å and 6000Å is- <b>2:1</b>	AIIMS-2012
The de Broglie wavelength associated with a ball of mass 1 kg having kinetic energy $0.5 \text{ J is}$ -	AIIMS-2006
The de- Broglie wavelength of an electron in the ground state of hydrogen atoms is- 0.3328nm	AIIMS-2000
$(K.E. = 13.6eV; 1ev=1.602 \times 10^{-19} J)$	A TIME 1000
The wavelength of visible light is - <b>3800Å-7600Å</b>	AIIMS-1998
The de-Broglie wavelength of a particle with mass 1 g and velocity 100 m/s is- $6.63 \times 10^{-33}$ m	NEET-1999
If the Planck's constant $h = 6.6 \times 10^{-34}$ Js, the de Broglie wavelength of a particle having momentum of $3.3 \times 10^{-24}$ kg ms <sup>-1</sup> will be-	BITSAT 2018
The energy of one mole of photons of radiation whose frequency is $5 \times 10^{14}$ Hz will be- <b>199.51 KJ mol</b> <sup>-1</sup>	AMU-2015, 2007
In hydrogen atom, the de Broglie wavelength of an electron in the second Bohr orbit is [Given that Bohr radius, $a_0 = 52.9$ pm]- 211.6 $\pi$ pm	NEET-Odisha 2019
The mass of a photon with wavelength 3.6Å shall be- $61.35 \times 10^{-34} \text{ kg}$	AMU-2006
The de-Broglie wavelength ( $\lambda$ ) associated with a photoelectron varies with the frequency (v) of the incident radiation as, [v <sub>0</sub> is threshold frequency]–	[JEE Main 2019, 11 Jan Shift-II]
$\lambda \mu \frac{1}{\left(\nu - \nu_0\right)^{\frac{1}{2}}}$	
The wavelength of a ball of mass 100 g moving with a velocity of 100 ms <sup>-1</sup> be– $6.626 \times 10^{-35}$ m	Assam CEE-2020
The energy ratio of a photon of wavelength 3000 Å and 6000 Å is- 2:1	BCECE-2007
The increasing order of wavelength for He <sup>+</sup> ion, neutron (n) and electron (e) particles, moving with the same velocity is- $\lambda_{He^+} < \lambda_n < \lambda_e$	BCECE-2016
The relationship between energy (E) of wavelengths 2000 Å and 8000 Å, respectively is- $E_1 = 4E_2$	BCECE-2016
Equations represent de- Broglie relation— $\lambda = \frac{h}{mv}$	CG PET -2008 WB-JEE-2008 J & K CET-(1999) AIIMS-1994
The wavelength of associated wave of a particle moving with a speed of one- tenth that of light is 7Å. The particle must be- Electron	CG PET -2017
A gas absorbs photon of 355 nm and emits at two wavelengths. If one of the emission is at 680 nm, the other is at-	[AIEEE-2011]

number (v) against $\left(\frac{1}{n^2}\right)$ will be (The Rydberge constant, R <sub>H</sub> is in wave number unit)—Shift-I invareable constant, R <sub>H</sub> is in wave number of the de-Broglie wavelength of a particle of mass m is 100 times its velocity, $J & K CET (2009)$ then its value in terms of its mass (m) and planck's constant (h) is— $10\sqrt{\frac{h}{m}}$ J & K CET (2010) J & K CET (2010) JPMER-2005Dual nature of particle was given by— (de-Broglie equation plip of wavelength 663 min is (h = 6.63 × 10 <sup>-34</sup> Js)— $2 \times 10^{29}$ J & K CET (2010) JPMER-2005The relationship between the energy E1 of the radiation with a wavelength from a height x, when it reaches the ground is proportional to— $L_{1} = 2E_{2}$ Kerala-CEE-2009 $L_{1} = 2E_{2}$ The de Broglie wavelength of the matter wave associated with an object dropped from a height x, when it reaches the ground is proportional to— $L_{1} = 2E_{2}$ NEET-2011 $L_{1} = 2E_{2}$ Time period of a wave is $5 \times 10^{-3}$ see what is the frequency— $2 \times 10^{2} s^{4}$ UPTU/UPSEE-2020 $L = 4E^{2} constant (h) is object is approximately equaldectrom in a size 5 \times 10^{-3} see what is the frequency—2 \times 10^{2} s^{4}PEAMCET (Medical)—2013The uncertainty in welceity of an electron in an atom cannot beelectron in a size 5 \times 10^{-3} and 4 \times 10^{-2} r_{2} = \sqrt{\frac{h}{2}}AP EAMCET 44.88,2021,Shift-IThe the uncertainty in momentum and uncertainty in the position of a particle areequal, then the uncertainty indive be s$	For emission line of atomic hydrogen from $n_i = 8$ to $n_f = n$ , the plot of wave	<b>JEE Main 2019, 9 Jan</b>
unit)-linear with slope RuThe de Brogle wavelength of particle is- Inversely proportional to its momentumJ & K CET-(2012)If the de-Brogle wavelength of a particle of mass m is 100 times its velocity, then its value in terms of its mass (m) and planck's constant (h) is- $10\sqrt{\frac{h}{m}}$ The de-Brogle wavelength of helium atom at room temperature is- 7,34 × 10 <sup>-11</sup> mJ & K CET-(2013)Dual nature of particle was given by-de-Brogle equationJ&K CET (2010)Inter claiton ship between the energy E <sub>1</sub> of the radiation with a wavelength from a height x, when it reaches the ground is proportional to- from a height x, when it reaches the ground is proportional to- $\sqrt{x}$ Kerala-CEE-2005The energies E <sub>1</sub> and E <sub>2</sub> of the radiations are 25 eV and 50 eV respectively. The relation between their wavelength i.e. $\lambda_1$ and $\lambda_2$ will between the wavelength i.e. $\lambda_1$ and $\lambda_2$ will between their wavelength i.e. $\lambda_1$ and $\lambda_2$		
The de Broglie wavelength of particle is- Inversely proportional to its momentum If the de-Broglie wavelength of a particle of mass m is 100 times its velocity, then its value in terms of its mass (m) and planck's constant (h) is- 10 $\sqrt{\frac{h}{m}}$ J & K CET-(2009)The de-Broglie wavelength of helium atom at room temperature is- 7.34 × 10 <sup>-11</sup> mJ&K CET (2010) JIPMER-2005 The number of photons emitted per second by a 60 W source of nonochromatic light of wavelength 63 m is (h = 6.6.3 × 10 <sup>-35</sup> Jb)- 2 × 10 <sup>26</sup> J&K CET (2010) JIPMER-2005The relationship between the energy E1 of the radiation with a wavelength 16000 Å ss- $F_{R} = 2E_2$ The de Broglie wavelength of the matter wave associated with an objeed dropped from a height x, when it reaches the ground is proportional to $\sqrt{x}$ Kerala-CEF-2020Time period of a wave is 5 × 10 <sup>-3</sup> sec what is the frequency- $2 \times 10^{2} s^{-1}$ UPTU/UPSEE-2008 If the uncertainty in velocity of a moving object is 10×10 <sup>4</sup> m s <sup>-1</sup> and the uncertainty in the volcity of a moving object is approximately equal to that of- $6.6 \times 10^{-31} Js$ )AP EAPCET 24.08.2021, Shift-1StextCET 04.08.2021, Micro particles having a very high speed Micro particles having a very high speed Micro particles having a very high speed Micro particles having a very high speed $6.6 \times 10^{-26} m$ AP EAMCET 04.08.2021, Shift-1The energy of a ploton is $3 \times 10^{-12}$ erg. Its wavelength in nm is - $6.6 \times 10^{-26} m$ GZ JCCEC - 2009AP EAPCET 24.08.2021, Micro particles having a very high speedMicro particles having a very high speed Micro particles having a very high speed 		
Inversely proportional to its momentumInversely proportional to its momentumIf the de-Broglie wavelength of a particle of mass m is 100 times its velocity, then its value in terms of its mass (m) and planck's constant (h) is- 10 $\sqrt{\frac{h}{m}}$ J & K CET-(2009)The de-Broglie wavelength of helium atom at room temperature is- 7,34 × 10 <sup>-11</sup> mJCECE - 2013Dual nature of particle was given by- light of wavelength 63 nm is (h = 6.63 × 10 <sup>-54</sup> Js)- 2× 10 <sup>20</sup> Z × 10 <sup>20</sup> The number of photons emitted per second by a 60 W source of monochromatic light of wavelength 63 nm is (h = 6.63 × 10 <sup>-54</sup> Js)- 2× 10 <sup>20</sup> Kerala-CEE-2009The relationship between the energy E1 of the radiation with a wavelength 600 Å and the energy E2 of the radiation with a wavelength 16000 Å is- E1 = 2E2Kerala-CEE-2019The de Broglie wavelength of the matter wave associated with an object dropped from a height x, when it reaches the ground is proportional to- $\sqrt{x}$ NEET-2011The energies E1 and E2 of two radiations are 25 eV and S0 eV respectively. The elation between their wavelength is a $\lambda_1$ and $\lambda_2$ will be- $\lambda_1 = 2\lambda_2$ NEET-2011Time period of a wave is 5 × 10 <sup>-3</sup> see what is the frequency- Lation between their wavelength is elay by would be given by- $\Delta v \ge \frac{1}{2m} \sqrt{\frac{h}{\pi}}$ AP EAPCET 24.08.2021, Shift-1Both the position and exact velocity of an electron in an atom cannot be determined simultaneously and accurately. This is known as- <b>Micro particle having a very high speed</b> TS EAMCET 04.08.2021, Shift-1The uncertainty in principle is in general significant to- Micro particle having a very high speedTS EAMCET 04.08.2021, Shift-1He desonglie wavelength of an elec	· · · · · · · · · · · · · · · · · · ·	
If the de-Broglie wavelength of a particle of mass m is 100 times its velocity, then its value in terms of its mass (m) and planck's constant (h) is— $10\sqrt{\frac{h}{m}}$ J & K CET-(2009)         The de-Broglie wavelength of helium atom at room temperature is— 7.34 × 10 <sup>-11</sup> m       JCECE - 2013         Dual nature of particle was given by— de-Broglie equation JIPMER-2005       J & K CET (2010) JIPMER-2005         The number of photons emitted per second by a 60 W source of monochromatic plant of wavelength 663 m is (h = 6.63 × 10 <sup>-34</sup> Js)— 2× 10 <sup>-30</sup> Kerala-CEE-2009         The relationship between the energy E <sub>1</sub> of the radiation with a wavelength 16000 Å is- E <sub>1</sub> = 2 E <sub>2</sub> .       Kerala-CEE-2005         The de Broglie wavelength of the matter wave associated with an object dropped from a height x, when it reaches the ground is proportional to— $\sqrt{x}$ NEET-2011         The energies E <sub>1</sub> and E <sub>2</sub> of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths its. $\lambda_1$ and $\lambda_2$ will be— $\lambda_1 = 2\lambda_2$ NEET-2011         Time period of a wave is 5 10 <sup>-3</sup> cw hat its the frequency— $2 \times 10^3$ s²       UPTU/UPSEE-2008       AP EAPCET 24.08.2021, 2013         If the uncertainty in velocity of a moving object is $1.0 \times 10^{-6}$ ms <sup>-3</sup> and the uncertainty in its position is 58 m, The mass of this object is approximately equal that of - (h = 6.26 \times 10^{-34} Js)       AP EAPCET 24.08.2021, Shift-1         Both the position and exaet velocity of an electron in an atom cannot be determined simultaneously and accurately. This is known as— (G e E-2012, ML-2004)       TS E-AMCET 04.08.2021, Shift-1		J & K CET-(2012)
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Image: Medical wavelengths for electrons accelerated through 200 V and     (Medical)-1997       Manipal-2020     NEET-1999		
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The ratio of de-Broglie wavelengths for electrons accelerated through 200 V and Manipal-2020	Uncertainty principle is valid for- <b>Proton</b>	
50 V is- 1:2	The ratio of de-Broglie wavelengths for electrons accelerated through 200 V and	

Manipal-2018	If uncertainty in position and velocity are equal, then uncertainty in momentum
	will be- $\frac{1}{2}\sqrt{\frac{\mathrm{mh}}{\pi}}$
NEET-2008	f uncertainty in position and momentum are equal, then uncertainty in velocity
	S- $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$
UP CPMT-2011	If $E_e$ , $E_\alpha$ and $E_p$ represent the kinetic energies of an electron, $\alpha$ -particle and a proton respectively each moving with same de-Broglie wavelength then–
AP-EAMCET-1991	$E_e > E_p > E_{\alpha}$ Series of lines is found in the UV region of atomic spectrum of hydrogen–
AP-EAMCET-1999	Lyman           Among the first lines of Lyman, Balmer, Paschen and Brackett series in hydrogen atomic spectra, the highest energy has –         Lyman
AP-EAMCET-2000	The values of $n_1$ and $n_2$ for the 2 <sup>nd</sup> line in the Lyman series of hydrogen atomic spectrum is – <b>1 and 3</b>
AP-EAMCET-2007	The wavelength of spectral line emitted by hydrogen atom in the Lyman series is $\frac{16}{15R}$ cm. The value of n <sub>2</sub> (R=Rydberg constant)– 4
TS-EAMCET (Engg.) 05.08.2021 Shift-II	The ratio of the highest to the lowest wavelength of Lyman series is- 4:3
SCRA - 2009	Extracted through alloy formation-
AP EAPCET 19-08-2021 Shift-I NEET-1998	The spectrum of Helium is expected to be similar to that of-
COMEDK-2012	Electron transitions in the H-atom will release the largest amount of energy– n=2 to n=1
AP-EAMCET (Medical), 2006	The first emission line on hydrogen atomic spectrum in the Balmer series appears
AP EAMCET (Medical) - 1998	at (R = Rydberg constant) $-\frac{5R}{36}$ cm <sup>-1</sup>
AP-EAMCET (Engg.) - 1998	
AP-EAMCET (Medical), 2006	The values of $n_1$ and $n_2$ respectively for $H_\beta$ line in the Lyman series of hydrogen atomic spectrum are- <b>1 and 3</b>
AIEEE-2011	The frequency of light emitted for the transition $n = 4$ to $n = 2$ of He <sup>+</sup> is equal to the transition in H atom corresponding— $n = 2$ to $n = 1$
WB-JEE-2010	Orbitals will have zero probability of finding the electron in the yz plane– $\mathbf{p}_x$
WB-JEE-2014	$(_{32}\text{Ge}^{76}, _{34}\text{Se}^{76})$ and $(_{14}\text{Si}^{30}, _{16}\text{S}^{32})$ are examples of— isobars and isotones
<b>UP CPMT-2002</b>	$_{19}$ K <sup>40</sup> and $_{20}$ Ca <sup>40</sup> are known as– isobars
<b>UP CPMT-2010</b>	O <sub>2</sub> and O <sub>3</sub> are- allotropes
<b>MHT CET-2008</b>	An isobar of $_{20}Ca^{40}$ is-
UP CPMT-2010	Isotones have- same number of neutrons
NEET-2002	Isoelectronic is- CN <sup>-</sup> ,CO
AP-EAMCET (Medical), 2006	Cl <sup>-</sup> , Ar, Ca <sup>2+</sup> , Ti <sup>4+</sup> clement represents is– <b>Isoelectronic sequence</b>

If the radius of the 3 <sup>rd</sup> Bohr's orbit of hydrogen atom is $r_3$ and the radius of 4 <sup>th</sup> JEE Main-26.06.2022, Shift-1Bohr's orbit is $r_4$ . Then:- $r_4 = \frac{16}{9}r_3$ JEE Main-26.06.2022, Shift-1The hydrogen line spectrum provides evidence for the- Quantized nature of atomic energy statesMPPET- 2009The energy of an electron in the first orbit will be- the energy of an electron in the first Bohr orbit is $v_1$ . Its velocity in the third Bohr's orbit is-MPPET- 2009The energy of the electron in the first Bohr orbit is $v_1$ . Its velocity in the third Bohr's orbit is-SCRA-2010The energy of the electron in the hydrogen atom is given by the expression :- the angular momentum of the electron is quantisedAP-EAMCET-1991The basic assumption of Bohr's model of hydrogen atom is that : the angular momentum of the electron is quantisedAP-EAMCET-1992The energy of an electron present in Bohr's second orbit of hydrogen atom is $t_{-}$ a 4 to $n = 3$ AP-EAMCET (Engg.) 2001The energy of an electron present in Bohr's second orbit of hydrogen atom is $t_{-}$ a 4 to $n = 3$ AP-EAMCET (Engg.) 2001The energy (in ev) associated with the electron in the 1 <sup>rd</sup> orbit of Li <sup>2rd</sup> size - 122.4 wavelength of the first line of Balmer series is 655 nm, then the wavelengths of its second line and limiting line respectively are a 485.9 nm & 364.4 nmAP EAPCET 24.08.2021 AP EAPCET 19.08.2021 AP EAPCET 24.08.2021 AP EAPCET 24.08.2021 AP EAPCET 24.08.2021 AP EAPCET 24.08.2021 AP EAPCET 24.08.2021 AP EAPCET 2	Hydrogen Atom	
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Quantized nature of atomic energy statesThe energy of an electron in the first orbit will be9EThe velocity of an electron in the first Bohr orbit is v <sub>1</sub> . Its velocity in the thirdSCRA-2010Bohr's orbit is - $v_1/3$ The energy of the electron in the hydrogen atom is given by the expression :-AP-EAMCET-1991 $\frac{2\pi^2 L^2 e^4}{n^2 h^2}$ AP-EAMCET-1995The basic assumption of Bohr's model of hydrogen atom is that : the angular momentum of the electron is quantisedAP-EAMCET-1994The radius of the second Bohr's orbit is :- $0.212 \text{ nm}$ AP-EAMCET-1995In the Bohr hydrogen atom, the electronic transition emiting light of Dangest wavelength isAP-EAMCET (Eng.) 2001The energy of an electron present in Bohr's second orbit of hydrogen atom is to: - $-328 \text{ Id mu}^{-1}$ AP-EAMCET (Eng.) 2001An electron is moving in Bohr's fourth orbit. Its dc-Broghe wavelength isAPAP-EAMCET (Eng.) 2001The energy (in ev) associated with the electron in the 1° orbit of Li <sup>-1</sup> is $-122.4$ TS-EAMCET (Eng.) 2001The energy (in ev) associated with the electron in the 1° orbit of Li <sup>-1</sup> is $-122.4$ TS-EAMCET (Eng.) 2001The electron in the hydrogen jump on absorbing 12.75 eV of energy would jump to orbit- $AP \text{ EAPCET 25.08.2021, Min-11}$ The electron in the hydrogen jump on absorbing 12.75 eV of energy would jump to orbit- $AP \text{ EAPCET 24.08.2021, Min-11}$ The electron in the hydrogen atom is equal to- $AP \text{ EAPCET 24.08.2021, Min-11}$ The wavelength (in A) of an emission line obtained for Li <sup>-2</sup> during an electronic Her at the site of the electronic Her at	Bohr's orbit is $r_4$ . Then:- $r_4 = \frac{10}{9}r_3$	Shirt-i
The energy of an electrons in the 3 <sup>o</sup> orbit of an atom is -E.       MPPET- 2009         The energy of an electron in the first orbit will be-       -9E         The velocity of an electron in the first Bohr orbit is v <sub>1</sub> . Its velocity in the third Bohr's orbit is-       v <sub>1/3</sub> The energy of the electron in the hydrogen atom is given by the expression :-       -2 $\pi^2 Z^2 e^4$ -2 $\pi^2 Z^2 e^4$ -3 <sup>h</sup> The basic assumption of Bohr's model of hydrogen atom is that :       AP-EAMCET-1991         The angular momentum of the electron is quantised       AP-EAMCET-1997         The angular momentum of the electron is quantised       AP-EAMCET-1997         The neargy of an electron present in Bohr's second orbit of hydrogen atom is is -       AP-EAMCET-1997         An electron is moving in Bohr's fourth orbit. Its de-Broghe wavelength is \.       AP EAMCET (Engg.) 2001         An electron is moving in Bohr's fourth orbit. Its de-Broghe wavelength is \.       The         The energy of an electron orbit is-       4 $\lambda$ The energy of it wavelength of the first line of Balmer, series is 656 nm, then the wavelength of the first line of Balmer, series is 656 nm, then the wavelength of the first orbit of H atom $M^2$ orbit is-       4 $\lambda$ P EAPCET 24.08.2021, 07.08.2021 Stint-11         The energy associated with the first excited state energy of the electron in hydrogen atom is equal to - the first excited state energy of the electron in hydrogen atom is equal to - the first excited state energy of the electron in a B	The hydrogen line spectrum provides evidence for the-	SCRA-2012
The energy of an electron in the first orbit will be-       -9E         The velocity of an electron in the first Bohr orbit is v <sub>1</sub> . Its velocity in the third       SCRA-2010         Bohr's orbit is-       v <sub>1</sub> /3         The energy of the electron in the hydrogen atom is given by the expression :-       -2 $\pi^2 Z^2 e^4$		
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22If the energy of an electron in the second Bohr orbit of H-atom is -E, the energy of the electron in the Bohr's first orbit is-SRMJEEE - 2010In a hydrogen atom, the electron is at a distance of 4.768 Å from the nucleus. The angular momentum of the electron is-AP- EAMCET(Medical) - 2010		SKNJEEE - 2007
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In a hydrogen atom, the electron is at a distance of 4.768 Å from the nucleus. The angular momentum of the electron is- AP- EAMCET(Medical) - 2010		<b>SRMJEEE – 2010</b>
The angular momentum of the electron is— $\frac{3h}{2010}$		
The angular momentum of the electron is-		
The angular momentum of the electron is $\frac{1}{2\pi}$	The angular momentum of the electron is <b>3h</b>	2010
	The angular momentum of the electron is $-\frac{1}{2\pi}$	

According to Bohr's theory, the angular momentum for an electron of 3rd orbit	
is 3カ	VITEEE 2014
In the hydrogen transition spectrum would have the same wavelength as the Balmer transition, $n = 4$ to $n = 2$ of He <sup>+</sup> spectrum- $n = 2$ to $n = 1$	VITEEE-2013
The degeneracy of the level of H-atom that has energy $\left(-\frac{R_{\rm H}}{9}\right)$ is - 9	VITEEE 2013
The energy of electron in n <sup>th</sup> orbit of hydrogen atom is- $-\frac{13.6}{n^2}eV$	AMU EXPLORER-2002 Karnataka-CET-2016
The spectrum of $H^+$ is expected to be similar to that of– $He^+$	AMU EXPLORER-2002
The ratio of energy of the electron in ground state of hydrogen to the electron in first excited state of $Be^{3+}$ is- 1:4	Assam CEE-2014
The energy of an electron in second Bohr orbit of hydrogen atom is-	AIIMS 26 May 2019
$-5.44 \times 10^{-19} \text{ J}$	(Evening)
	BITSAT 2017
	BCECE-2010
The wave number of the spectral line in the emission spectrum of hydrogen will be equal to $8/9$ times the Rydberg's constant if the electron jumps from $n = 3$ to $n = 1$	BCECE-2014
The wave number of the limiting line in Lyman series of hydrogen is $109678$	BITSAT-2014
$cm^{-1}$ . The wave number of the limiting line in Balmer series of He <sup>+</sup> would be:- 109678 cm <sup>-1</sup>	B115A1-2014
If the radius of H is 0.53 Å, then the radius of ${}_{3}\text{Li}^{2+}$ is <b>0.17</b> Å	BITSAT-2012
The first emission line in the atomic spectrum of hydrogen in the Balmer series	BITSAT-2016
appears at- $\frac{5R}{36}$ cm <sup>-1</sup>	
Bohr's radius of $2^{nd}$ orbit of Be <sup>3+</sup> is equal to that of- first orbit of hydrogen	CG PET -2009
The radius of the second Bohr orbit in terms of the Bohr radius, $a_0$ , in $Li^{2+}$ is–	[ <b>JEE Main 2020, 8 Jan</b>
$\frac{4a_0}{3}$	Shift-II]
Bohr model of hydrogen atom was unable to explain-	J & K CET-(2012)
Heisenberg's uncertainty principle	
Energy of one mole of photons of radiation whose frequency is $5 \times 10^{14}$ Hz is- 199.51 kJ mol <sup>-1</sup>	J & K CET-(2014)
The value of Rydberg constant is 109678 cm <sup>-1</sup>	J & K CET-(2007)
The wavelength of a spectral line in Lyman series, when electron jumping back to 2 <sup>nd</sup> orbit, is-	J & K CET-(2007)
The value of $n_1$ in the relationship is $\frac{1}{\lambda} = R_H \left( \frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$ is correct when $n_2 > n_1$	J & K CET-(2001)
corresponds to Paschen lines in the Hydrogen spectrum– 3	
Transition from $n=4, 5, 6$ to $n=3$ in hydrogen spectrum gives- <b>Paschen series</b>	J & K CET-(2000)
The expression of angular momentum of an electron in a Bohr's orbit is: $\frac{\mathbf{nh}}{2\pi}$	JCECE - 2003
Ratio of kinetic energy of hydrogen and helium gas at 300 K is :- 1:1	<b>JCECE - 2006</b>
When an electron in hydrogen spectrum jumps from $n = 7$ to $n = 2$ , the total	<b>JCECE - 2016</b>
number of spectral lines possible are- 15	JCECE - 2010
An electron is moving in Bohr's fourth orbit. Its de-Broglie wave length is $\lambda$ . The	JIPMER-2014
An electron is moving in Bohr's fourth orbit. Its de-Broglie wave length is $\lambda$ . The circumference of the fourth orbits is— The ratio of the difference in energy between the first and the second Bohr orbit	
An electron is moving in Bohr's fourth orbit. Its de-Broglie wave length is $\lambda$ . The circumference of the fourth orbits is— The ratio of the difference in energy between the first and the second Bohr orbit to that between the second and the third Bohr orbit is— <b>27/5</b>	JIPMER-2014 JIPMER-2012
An electron is moving in Bohr's fourth orbit. Its de-Broglie wave length is $\lambda$ . The circumference of the fourth orbits is— The ratio of the difference in energy between the first and the second Bohr orbit	JIPMER-2014

If the energies of the two photons in the ratio of 3 : 2, their wavelength will be in the ratio of - 2 : 3	-CET-2011
The radius of the first Bohr orbit of hydrogen atom is 0.529Å. The radius of the third orbit of $H^+$ will be-Kerala <b>Kerala</b>	-CEE-2007
The ratio of frequency corresponding to the third line in Lyman series of hydrogen atomic spectrum to that of the first line in Balmer series of Li <sup>2+</sup>	-CEE-2012
spectrum is- $\frac{3}{4}$	
The shortest wavelength of the line in hydrogen atomic spectrum of Lyman series when $R_{\rm H} = 109678 \text{ cm}^{-1} \text{ is}$ - <b>911.7</b> Å	-CEE-2014
In the hydrogen atom spectrum, the emission of the least energetic photon taken place during the transition from n= 6 energy level to n =energy level 5	-CEE-2016
The energy of an electron is the 3s orbital (excited state) of H – atom is – –1.5eV Kerala	-CEE-2017
	anipal-2018
	NEET-1988
	NEET-1992
	NEET-1999
The energy of second Bohr orbit of the hydrogen atom is $-328 \text{ kJ mol}^{-1}$ . hence the energy of fourth Bohr orbit would be- $-82 \text{ kj mol}^{-1}$	NEET-2005
Number of spectral lines of Lyman series of electron when it jumps from 6 to first level (in Lyman series), is- 15	CPMT-2009
The wave number of 4 <sup>th</sup> line in Balmer series of hydrogen spectrum is– $(R = 1,09,677 \text{ cm}^{-1})$ – UP C	CPMT-2008
The energy of second Bohr orbit of the hydrogen atom is $-328 \text{ kJ mol}^{-1}$ ; hence the energy of fourth Bohr orbit would be-UPTU/U-82 kJ mol^{-1}-82 kJ mol^{-1}	PSEE-2007
The wavelength of the radiation emitted, when in a hydrogen atom electron falls from infinity to stationary state, would be (Rydberg constant = $1.097 \times 10^7 \text{ m}^{-1}$ )-	PSEE-2007
91 nm	
The radius of hydrogen atom in the ground state is $0.53$ Å. The radius of Li <sup>2+</sup> ion (atomic number = 3) in a similar state is:-UPTU/UPSEE0.176Å	-2014, 2005
For a Bohr atom angular momentum M of the electron is : $(n=0,1,2,)-\frac{nh}{2\pi}$ UPTU/U	PSEE-2005
	PSEE-2013
that between the second and third Bohr orbit is- $\frac{27}{5}$	
	PSEE-2008
For the Paschen series the values of $n_1$ and $n_2$ in the expressionWE	B-JEE-2009
$\Delta E = R_{\rm H} c \left( \frac{1}{n_1^2} - \frac{1}{n_2^2} \right) - \mathbf{n_1} = 3, n_2 = 4, 5, 6, \dots$	
In Sommerfeld's modification of Bohr's theory, the trajectory of an electron in a hydrogen atom is- <b>a perfect ellipse</b>	B-JEE-2010
The electronic transitions from $n = 2$ to $n = 1$ will produce shortest wavelength in (Where $n = principal quantum state)$ – <b>Li</b> <sup>2+</sup>	B-JEE-2011
	B-JEE-2011
	B-JEE-2014

The time taken for an electron to complete one revolution in Bohr orbit of	WB-JEE-2016
hydrogen atom is- $\frac{4\pi^2 \mathrm{mr}^2}{\mathrm{mr}^2}$	
nh	
The ratio of the shortest wavelength of two spectral series of hydrogen spectrum is found to be about 9. The spectral series are- Lyman and Paschen	[JEE Main 2019, 10 April Shift-II]
The shortest wavelength of H atom in the Lyman series is $\lambda_{1}.$ The longest	[JEE Main 2020, Sep Shift-
wavelength in the Balmer series of He <sup>+</sup> is $\frac{9\lambda_1}{5}$	11]
The values of $n_1$ and $n_2$ respectively for $H_\beta$ line in the Lyman series of hydrogen atomic spectrum 44 are- 1 and 3	JIPMER-2009
X-rays are electromagnetic radiation whose wavelengths are of the order of: $10^{-10}$ metre	NDA (II)-2015
The shortest wavelength in hydrogen spectrum of Lyman series when $R_{\rm H} = 109678 \text{ cm}^{-1}$ , is-	Kerala-CEE-2010
The longest wavelength line in Balmer series of spectrum is- 656 nm	NEET-1996
The wave number of hydrogen atom in Lymen series is 82200 cm <sup>-1</sup> . The electron goes from- $n_2 \rightarrow n_1$	UPTU/UPSEE-2013
Splitting of spectrum lines in magnetic field is- Zeeman effect	UPTU/UPSEE-2008
In hydrogen spectrum, the series of lines appearing in ultra violet region of electromagnetic spectrum are called :- Lyman lines	Manipal-2017
Towards quantum mechanical model of th	ie atom.
The electronic configuration of Pt (atomic number 78) is $[Xe] 4f^{14} 5d^9 6s^1$	JEE Main-29.06.2022, Shift-I
The number of nodal planes present in *s antibonding orbitals is- 1	Karnataka-CET, 2008
Mg <sup>2+</sup> is isoelectronic with– Na <sup>+</sup>	Karnataka-CET-2007
How many electrons are present in the M shell of the atom of an element with atomic number 24–	AP-EAMCET (Med.)-1999
The symbol of the element 'Tungeston' is- W	NDA (II)-2015
Electronic configuration of potassium is- $ls^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$	<b>AP EAMCET- 1992</b>
Chlorine atom, in its third excited state, reacts with fluorine to form a compound X. The formula and shape of $\overline{X}$ are- CIF <sub>7</sub> , pentagonal bipyramidal	AP EAMCET- 2003
The electronic configuration of curium (Z = 96) is- [Rn] $5f^7 6d^1 7s^2$	JHARKHAND – 2019
The number of unpaired electrons in carbon atom is- <b>Two</b>	MPPET- 2009
In the change of NO <sup>+</sup> to NO, the electron is added to a- $\pi^*$ orbital	SCRA 2010
The maximum number of electrons that can be accommodated in all the orbitals for $l = 3$ , is— 14	AP-EAMCET-1991
The rule that explains the reason for chromium to have $[Ar] 3d^5$ , $4s^1$ configuration instead of $[Ar] 3d^4$ , $4s^2$ , is- Hund's rule	AP-EAMCET-1996
The electronic configuration of sodium is— [Ne] $3s^1$	AP-EAMCET-1999
In the ground state, an element has 13 electrons in M shell. The element is- Chromium	AP-EAMCET-2001
If the electron of a hydrogen atom is present in the first orbit, the total energy of	AP-EAMCET-2003
the electron is- $\frac{-e^2}{2r}$	
Elements have least number of electrons in its M shell- K	AP-EAMCET-2004
The atomic numbers of elements X, Y and Z are 19, 21 and 25 respectively. The number of electrons present in the M shell of these elements, the order is– Z > Y > X	AP-EAMCET-2005
The maximum number of sub-levels, orbitals and electrons in N shell of an atom are respectively- 4, 16, 32	AP-EAMCET-2007
Orbital has zero radial nodes and 2 angular nodes– 3d	AP EAPCET 23-08-2021 Shift-I

Pair are the ions isoelectronic–	$Na^{-}, O^{2-}$	NDA (I)-2019
The element with the electronic configuration $1s^22s^22p^63s^23p^63d^{10}4s^1$		TS-EAMCET-2016
The number of unpaired electrons in Co <sup>2+</sup> , is-	3	TS-EAMCET (Engg.), 07.08.2021 Shift-II
[Ar]3d <sup>10</sup> 4s <sup>1</sup> electronic configuration belongs to–	Cu	MPPET-2008
The electronic configuration of Cs is –	[Xe]6s <sup>1</sup>	AP EAMCET (Engg.) 21.09.2020, Shift-II
The element with atomic number 12 belongs to group and	. period– II A, third	AP EAMCET (Engg.) 2001
Electronic configuration of X is 1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>1</sup> . It belongs to-		COMEDK-2017
thirteenth group and third period		
An orbital with n=3, $\ell$ =1 is designated as-	3p	COMEDK-2014
The total number of orbitals in the fifth energyis-	25	AP-EAMCET (Medical), 2006
The atomic number of an element is 35. What is the total number present in all the p-orbitals of the ground state atom of that element-	of electrons 17	AP-EAMCET (Medical), 2003
The total number of electrons present in all the 's' orbitals, all the 'p' all the 'd' orbitals of cesium ion are respectively–	orbitals and <b>10, 24, 20</b>	AP-EAMCET (Medical), 2003
An orbital with one angular node shows three maxima in its radial distribution curve, the orbital-	l probability 4p	TS EAMCET 05.08.2021, Shift-I
Spectrum of Li <sup>2+</sup> is similar to that of–	Н	AIIMS-2002
Element is represented by electronic configuration– $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$	Nitrogen	AIIMS-2001
The outermost configuration of most electronegative element is-	$ns^2 np^5$	AIIMS-2000
The configuration $1s^2$ , $2s^2 2p^5$ , $3s^1$ shows:- Excited state of	f neon atom	AIIMS-1997
Transition metal elements exhibit general electronic configuration-	$(n-1) d^{1-10}$	AP- EAPCET- 07-09- 2021, Shift-I
The atomic number of an element 'M' is 26. How many electrons ar the M-shell of the element in its $M^{3+}$ state-		AP - EAMCET (Medical) - 2007
The orbital angular momentum of an electron in 2p orbital is-	$\sqrt{2}$ h/2 $\pi$	Assam CEE-2019
The orbital angular momentum of a p-electron given as-	$\frac{h}{\sqrt{2}\pi}$	NEET-Mains 2012
Orbital having 3 angular nodes and 3 total nodes to-	4f	Odisha NEET-2019
The number of radial nodes of 3s and 2p orbitals are respectively-	2, 0	BITSAT-2017
The element whose electronic configuration is $1s^2 2s^2 2p^6 3s^2$ is a-	metal	AMU-2004
The electronic configuration of P in $H_3 PO_4$ - $1s^2 2s^2$ ,	2p <sup>6</sup> , 3s <sup>2</sup> 3p <sup>6</sup>	CG PET- 2011
The pair having the similar shape is— B	F <sub>4</sub> and NH <sup>+</sup>	CG PET- 2011
Quantum numbers $\ell = 2$ and m = 0 represent the orbital–	$d_{z^2}$	CG PET- 2016
Electronic configuration of H <sup>+</sup> is-	1s <sup>0</sup>	CG PET- 2010
The electronic configuration of bivalent europium and trivalent cerium (atomic number : $Xe = 54$ , $Ce = 58$ , $Eu = 63$ )– [Xe]4f <sup>7</sup>	m are and [Xe]4f <sup>1</sup>	(JEE Main 2020, 9 Jan Shift-I)
	and [Xe]41 5s, 4f, 5d, 6p	(JEE Main 2020, 5 Sep
Outermost electronic configuration of a group-13 element E is 4 electronic configuration of an element of p-block period-five placed to element, E is-		Shift-I) (JEE Main 2021, 20 July Shift-II)