Structure of Atom

Set – 1

Table 2.1 Properties of Fundamental Particles

Name	Symbol	Absolute charge/C	Relative charge	Mass/kg	Mass/u	Approx. mass/u
Electron	e	-1.602176×10^{-19}	−1	9.109382×10^{-31}	0.00054	0
Proton	p	$+1.602176\times10^{-19}$	+1	1.6726216×10^{-27}	1.00727	1
Neutron	n	0	0	1.674927×10^{-27}	1.00867	1

Q1. Select the correct relative charge of Proton and neutron ?

a. 1 ,1
b. 1 , 0
c. 0 , 1
d. 0 , 0

Ans. (b)

Q2. What is the approx mass/u for proton and neutron ?

a. 1 , 0
b. 0 , 1
c. 1 , 1
d. 0 , 0

Ans. (c)

Q3. What is the absolute charge/c of electron , proton and neutron respectively

a. -e , 0 and +e
b. -e , +e and +e
c. -e , +e and 0
d. -e , +e and -e

Ans. (c)

Q4. If A be the absolute charge of a neutron and B be the absolute mass of a neutron . Find A+B.

a. 0
b. 1
c. 2
d. none of the above

Ans. (b)

Set – 2

Table 2.2 Values of Work Function (W_0) for a Few Metals

Metal	Li	Na	K	Mg	Cu	Ag
W_0 /eV	2.42	2.3	2.25	3.7	4.8	4.3

Q1. Which has the highest threshold frequency from the following ?

a. Li (work function = 2.42)
b. Na(work function = 2.3)
c. k (work function = 2.25)
d. Mg (work function = 3.7)

Ans. (d)

Q2. Which has the highest threshold wavelength from the following ?

a. Li (work function = 2.42)
b. Na(work function = 2.3)
c. k (work function = 2.25)
d. Mg (work function = 3.7)

Ans. (c)

Q3. If work function of Li > Na > K , predict their values of work function

a. 2.42 , 2.3 , 2.25
b. 4.8 , 4.3 , 3.7

c. 2.3 , 2.42, 2.25
d. 4.8 , 3.7 , 2.3

Ans. (a)

Set – 3

Table 2.3 The Spectral Lines for Atomic Hydrogen

Series	n_1	n_2	Spectral Region
Lyman	1	2,3....	Ultraviolet
Balmer	2	3,4....	Visible
Paschen	3	4,5....	Infrared
Brackett	4	5,6....	Infrared
Pfund	5	6,7....	Infrared

Q1. Which of the following series falls in visible region ?

a. Lyman
b. Paschen
c. Balmer
d. Pfund

Ans. (C)

Q2. Which of the following series falls in ultra violet region ?

A. Lyman
B. Paschen
C. Balmer
D. Pfund

Ans. (A)

Q3. Which of the following series does not falls in infrared region ?

A. Balmer
B. Paschen
C. Brackett
D. Pfund

Ans. (A)

Q4. Predict the n1 and n2 for Pfund series?

A. n1 =4 ,n2 =5,6,7,8.....
B. n1= 5 ,n2 =6,7,8,9.....
C. n1= 6 ,n2 =7,8,9,10.....
D. n1= 3 ,n2 =4,5,6,7....

Ans. (B)

Q5. Which of the following series falls in the infrared region ?

A. Lyman
B. Pfund
C. Balmer
D. None of the above

Ans. (B)

Q6. Which series has n1 = 4 and n2 = 5,6,7,8.....?

A. Balmer
B. Paschen
C. Brackett
D. Pfund

Ans. (C)

Set – 4

Table 2.4 Subshell Notations

n	l	Subshell notation
1	0	$1s$
2	0	$2s$
2	1	$2p$
3	0	$3s$
3	1	$3p$
3	2	$3d$
4	0	$4s$
4	1	$4p$
4	2	$4d$
4	3	$4f$

Q1. What are the subshell notation for quantum number n=3?

A. 3s
B. 3s 3p
C. 3s 3p 3d
D. 4s 4p 4d 4f

Ans. (C)

Q2. What is range of values of number of subshell (L) for n=3

A. 1-3
B. 0-2
C. 0-3
D. 1-2

Ans. (B)

Q3. For Subshell notation 1s , value of n+L is

A. 0
B. 1
C. 2
D. 3

Ans. (B)

Q4. For Subshell notation 3p , value of n+L is

A. 1
B. 2
C. 3
D. 4

Ans. (D)

Q5. For Subshell notation 4f , value of n+L is

A. 5
B. 6
C. 7
D. 8

Ans. (C)

Q6. What is the value of the number of subshells (L) for n=1?

A. 0
B. 1
C. 2
D. 3

Ans. (A)

Set – 5

Table 2.5 Arrangement of Orbitals with Increasing Energy on the Basis of (n+l) Rule

Orbital	Value of n	Value of l	Value of $(n + l)$	
1s	1	0	1 + 0 = 1	
2s	2	0	2 + 0 = 2	
2p	2	1	2 + 1 = 3	2p (n=2) has lower energy than
3s	3	0	3 + 0 = 3	3s (n=3)
3p	3	1	3 + 1 = 4	3p (n =3) has lower energy than
4s	4	0	4 + 0 = 4	4s (n =4)
3d	3	2	3 + 2 = 5	3d (n =3) has lower energy than
4p	4	1	4 + 1 =5	4p (n =4)

Q1. Value of n+ l for 4p is

A. 2
B. 4
C. 5
D. 6

Ans. (C)

Q2. Value of n+ l for 4s is

A. 2
B. 4
C. 5
D. 6

Ans. (B)

Q3. Value of n+ l for 3d is

A. 2
B. 4
C. 5
D. 6

Ans. (C)

Q4. Which of the following is the orbital for l =2

A. 3s
B. 3p
C. 3d
D. none of the above

Ans. (C)

Q5. Which of the following statements is/are true ?

A. 2p has lower energy than 3s
B. 3p has lower energy than 4s
C. 3d has lower energy than 4p
D. All of the above

Ans. (D)

Q6. Which of the following statements is/are wrong ?

A. 2p has lower energy than 3s
B. 3p has lower energy than 4s
C. 4p has lower energy than 3d
D. None of the above

Ans. (C)

Set – 6

Element	Z	1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	7s
H	1	1																	
He	2	2																	
Li	3	2	1																
Be	4	2	2																
B	5	2	2	1															
C	6	2	2	2															
N	7	2	2	3															
O	8	2	2	4															
F	9	2	2	5															
Ne	10	2	2	6															
Na	11	2	2	6	1														
Mg	12	2	2	6	2														
Al	13	2	2	6	2	1													
Si	14	2	2	6	2	2													
P	15	2	2	6	2	3													
S	16	2	2	6	2	4													
Cl	17	2	2	6	2	5													
Ar	18	2	2	6	2	6													
K	19	2	2	6	2	6		1											
Ca	20	2	2	6	2	6		2											
Sc	21	2	2	6	2	6	1	2											
Ti	22	2	2	6	2	6	2	2											
V	23	2	2	6	2	6	3	2											
Cr*	24	2	2	6	2	6	5	1											
Mn	25	2	2	6	2	6	5	2											
Fe	26	2	2	6	2	6	6	2											
Co	27	2	2	6	2	6	7	2											
Ni	28	2	2	6	2	6	8	2											
Cu*	29	2	2	6	2	6	10	1											
Zn	30	2	2	6	2	6	10	2											
Ga	31	2	2	6	2	6	10	2	1										
Ge	32	2	2	6	2	6	10	2	2										
As	33	2	2	6	2	6	10	2	3										
Se	34	2	2	6	2	6	10	2	4										
Br	35	2	2	6	2	6	10	2	5										
Kr	36	2	2	6	2	6	10	2	6										
Rb	37	2	2	6	2	6	10	2	6			1							
Sr	38	2	2	6	2	6	10	2	6			2							
Y	39	2	2	6	2	6	10	2	6	1		2							
Zr	40	2	2	6	2	6	10	2	6	2		2							
Nb*	41	2	2	6	2	6	10	2	6	4		1							
Mo*	42	2	2	6	2	6	10	2	6	5		1							
Tc	43	2	2	6	2	6	10	2	6	5		2							
Ru*	44	2	2	6	2	6	10	2	6	7		1							
Rh*	45	2	2	6	2	6	10	2	6	8		1							
Pd*	46	2	2	6	2	6	10	2	6	10									
Ag*	47	2	2	6	2	6	10	2	6	10		1							
Cd	48	2	2	6	2	6	10	2	6	10		2							
In	49	2	2	6	2	6	10	2	6	10		2	1						
Sn	50	2	2	6	2	6	10	2	6	10		2	2						
Sb	51	2	2	6	2	6	10	2	6	10		2	3						
Te	52	2	2	6	2	6	10	2	6	10		2	4						
I	53	2	2	6	2	6	10	2	6	10		2	5						
Xe	54	2	2	6	2	6	10	2	6	10		2	6						

* *Elements with exceptional electronic configurations*

Q1. Which of the following elements has electronic configuration [Ne] 3s ?

A. Na
B. k
C. Mg
D. Ar

Ans. (A)

Q2. What is the principal Quantum number for the outer electron of Xe ?

A. 3
B. 4
C. 5
D. 6

Ans. (B)

Q3. How many electrons are there in the outer shell of Xenon?

A. 4
B. 5
C. 6
D. 7

Ans. (C)

Q4. Which of the following elements has electronic configuration [xe] 6s ?

A. Indium
B. barium
C. cesium
D. Lead

Ans. (D)

Q5. Outer electron quantum number for Fr is ?

A. 4
B. 5
C. 6
D. 7

Ans. (D)

Q6. Outer electron quantum number for Antimony is ?

A. 4
B. 5
C. 6
D. 7

Ans. (B)