Classification of Elements and Periodicity in Properties

Set – 1

Table 3.1 Dobereiner's Triads

Element	Atomic weight	Element	Atomic weight	Element	Atomic weight
Li	7	Ca	40	Cl	35.5
Na	23	Sr	88	Br	80
K	39	Ba	137	I	127

Q1. Given atomic weight of Li is 7 and that of K is 39, predict the atomic weight of Na

A. 22
B. 23
C. 24
D. 25

Ans. (B)

Q2. Given atomic weight of Ca is 40 and that of Ba is 137, which element satisfy the Dobereiner traids.

A. Sr
B. Rb
C. Fr
D. Pb

Ans. (A)

Q3. Given atomic weight of Cl is 35.5 and that of Iodine is 127, which element satisfy the Dobereiner traids.

A. Sr
B. Xe

C. Br
D. Pb

Ans. (C)

Q4. Given atomic weight of Ca is 40 and that of Ba is 137, predict the atomic weight of Sr

A. 86
B. 87
C. 88
D. 89

Ans. (C)

Q5. Given atomic weight of Cl is 35.5 and that of Iodine is 127, predict the atomic weight of Br

A. 80
B. 81
C. 82
D. 83

Ans. (A)

Set – 2

Table 3.2 Newlands' Octaves

Element	Li	Be	B	C	N	O	F
At. wt.	7	9	11	12	14	16	19
Element	**Na**	**Mg**	**Al**	**Si**	**P**	**S**	**Cl**
At. wt.	23	24	27	29	31	32	35.5
Element	**K**	**Ca**					
At. wt.	39	40					

Q1. Predict the atomic weight of Li , Be and B

A. 6,8,10
B. 7,9,11
C. 5,7,10
D. 7,9,10

Ans. (B)

Q2. Predict the atomic weight of C , N and O

A. 6,7,8
B. 12,14,16
C. 12,14,18
D. 12,13,16

Ans. (B)

Q3. Predict the atomic weight of P , S and Cl

A. 32,33,35.5
B. 33,34,35.5
C. 31,32,35.5
D. 32,34,35.5

Ans. (C)

Set – 3

Table 3.3 Mendeleev's Predictions for the Elements Eka-aluminium (Gallium) and Eka-silicon (Germanium)

Property	Eka-aluminium (predicted)	Gallium (found)	Eka-silicon (predicted)	Germanium (found)
Atomic weight	68	70	72	72.6
Density / (g/cm³)	5.9	5.94	5.5	5.36
Melting point /K	Low	302.93	High	1231
Formula of oxide	E_2O_3	Ga_2O_3	EO_2	GeO_2
Formula of chloride	ECl_3	$GaCl_3$	ECl_4	$GeCl_4$

Q1. Predict the atomic weight of Eka-aluminium (i) and Eka-silicon(ii)

A. i
B. i>ii
C. i=ii
D. None of above

Ans. (B)

Q2. Predict the Density of Eka-aluminium (i) and Eka-silicon(ii)

A. i
B. i>ii
C. i=ii
D. None of above

Ans. (B)

Q3. Predict the melting point of Eka-aluminium and Eka-silicon

A. Low , Low
B. Low ,High
C. High, Low
D. High , High

Ans. (B)

Q4. Predict the atomic weight of Gallium (i) and Germanium (ii)

A. i
B. i>ii
C. i=ii
D. None of above

Ans. (A)

Q5. Predict the Density of Gallium (i) and Germanium (ii)

A. i
B. i>ii
C. i=ii
D. None of above

Ans. (B)

Q6. Predict the melting point of Gallium (i) and Germanium (ii)

A. i
B. i>ii
C. i=ii
D. None of above

Ans. (A)

Set – 4

Table 3.5:

Table 3.4 Notation for IUPAC Nomenclature of Elements

Digit	Name	Abbreviation
0	nil	n
1	un	u
2	bi	b
3	tri	t
4	quad	q
5	pent	p
6	hex	h
7	sept	s
8	oct	o
9	enn	e

Q1. Predict the abbreviation and digit for un

A. u , 0
B. u ,1
C. u , 2
D. U,0

Ans. (B)

Q2. Predict the abbreviation and digit for nil

A. N , 0
B. N ,1
C. n , 0
D. n ,1

Ans. (C)

Q3. Predict the abbreviation and digit for enn

A. e ,9
B. e ,11
C. E ,9
D. E ,11

Ans. (A)

Set – 5

Table 3.5 Nomenclature of Elements with Atomic Number Above 100

Atomic Number	Name according to IUPAC nomenclature	Symbol	IUPAC Official Name	IUPAC Symbol
101	Unnilunium	Unu	Mendelevium	Md
102	Unnilbium	Unb	Nobelium	No
103	Unniltrium	Unt	Lawrencium	Lr
104	Unnilquadium	Unq	Rutherfordium	Rf
105	Unnilpentium	Unp	Dubnium	Db
106	Unnilhexium	Unh	Seaborgium	Sg
107	Unnilseptium	Uns	Bohrium	Bh
108	Unniloctium	Uno	Hassium	Hs
109	Unnilennium	Une	Meitnerium	Mt
110	Ununnillium	Uun	Darmstadtium	Ds
111	Unununnium	Uuu	Rontgenium	Rg
112	Ununbium	Uub	Copernicium	Cn
113	Ununtrium	Uut	Nihonium	Nh
114	Ununquadium	Uuq	Flerovium	Fl
115	Ununpentium	Uup	Moscovium	Mc
116	Ununhexium	Uuh	Livermorium	Lv
117	Ununseptium	Uus	Tennessine	Ts
118	Ununoctium	Uuo	Oganesson	Og

Q1. What is the name according to IUPAC nomenclature of atomic number 101.

A. unnilunium
B. unnilbium

C. unniltrium
D. unnilquadium

Ans. (A)

Q2. What is the name according to IUPAC nomenclature of atomic number 102.

A. unnilunium
B. unnilbium
C. unniltrium
D. unnilquadium

Ans. (B)

Q3. What is the name according to IUPAC nomenclature of atomic number 103.

A. unnilunium
B. unnilbium
C. unniltrium
D. unnilquadium

Ans. (C)

Q4. What is the name according to IUPAC nomenclature of atomic number 104.

A. unnilunium
B. unnilbium
C. unniltrium
D. unnilquadium

Ans. (D)

Q5. What is the atomic number of unnilpentium?

A. 102
B. 103
C. 104
D. 105

Ans. (D)

Q6. What is the atomic number of ununseptium?

A. 115
B. 116
C. 117
D. 118

Ans. (C)

Q7. What is the symbol for atomic number 110?

A. uun
B. uuu
C. uub
D. uut

Ans. (A)

Q8. What is the symbol for atomic number 111?

A. uun
B. uuu
C. uub
D. uut

Ans. (B)

Set – 6

Table 3.6(a) Atomic Radii/pm Across the Periods

Atom (Period II)	Li	Be	B	C	N	O	F
Atomic radius	152	111	88	77	74	66	64
Atom (Period III)	Na	Mg	Al	Si	P	S	Cl
Atomic radius	186	160	143	117	110	104	99

Q1. Choose the correct order of Atomic radii

A. Li
B. Li>Be>C>B
C. Li>Be>B>C
D. Li

Ans. (C)

Q2. Choose the correct order of Atomic radii

A. N>O>F
B. N
C. N>F>O
D. N

Ans. (A)

Q3. Choose the correct order of Atomic radii

A. Na
B. Na>Mg>Al>Si
C. Na
D. Na

Ans. (B)

Q4. Choose the correct order of Atomic radii

A. P>S>Cl
B. P
C. P>Cl>S
D. P

Ans. (A)

Set – 7

Group 1	$\Delta_{eg}H$	Group 16	$\Delta_{eg}H$	Group 17	$\Delta_{eg}H$	Group 0	$\Delta_{eg}H$
H	– 73					He	+ 48
Li	– 60	O	– 141	F	– 328	Ne	+ 116
Na	– 53	S	– 200	Cl	– 349	Ar	+ 96
K	– 48	Se	– 195	Br	– 325	Kr	+ 96
Rb	– 47	Te	– 190	I	– 295	Xe	+ 77
Cs	– 46	Po	– 174	At	– 270	Rn	+ 68

Q1. Choose the correct order of electron gain enthalpy

A. O>S>Se>Te>Po
B. O
C. S>Se>Te>Po>O
D. STe>Po>O

Ans. (C)

Q2. Choose the correct order of electron gain enthalpy

A. F>Cl>Br
B. F
C. Br
D. Cl

Ans. (C)

Q3. Choose the correct order of electron gain enthalpy

A. He>Ne>Ar
B. He
C. Ar
D. He

Ans. (D)

Q4. Choose the correct order of electron gain enthalpy

A. Kr>Xe>Rn
B. Kr
C. Kr>Xe
D. KrRn

Ans. (A)

Q5. Choose the correct order of electron gain enthalpy

A. O>S>Se
B. O
C. S>O>Se
D. S>Se>O

Ans. (D)

Q6. Which element has highest electron gain enthalpy

A. F
B. Cl
C. Br
D. I

Ans. (B)

Set – 8

Table 3.8(a) Electronegativity Values (on Pauling scale) Across the Periods

Atom (Period II)	Li	Be	B	C	N	O	F
Electronegativity	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Atom (Period III)	Na	Mg	Al	Si	P	S	Cl
Electronegativity	0.9	1.2	1.5	1.8	2.1	2.5	3.0

Q1. Which of the following hydride have banana bonds?

A. CaH_2
B. B_2H_6
C. Na H
D. SiH_4

Ans. (C)

Q2. Which hydride of group 2 exist

A. BeH_2
B. MgH_2
C. CaH_2
D. SrH_2

Ans. (C)

Q3. Predict the order of bond angle

A. $NH_3 > PH_3 > AsH_3 > SbH_3$
B. $NH_3 33$
C. $NH_3 3 > AsH_3 3$
D. $NH_3 3 > SbH_3$

Ans. (A)

Q4. What is the geometry of group 14 elements in their hydride

A. Sew saw
B. Tetrahedral
C. pyramidal
D. planar

Ans. (B)

Q5. How many hydride are formed by group 1 elements

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

Ans. (C)

6. How many hydride are formed by group 13 elements

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

Ans. (B)