

Lesson 3- Structure of matter

1. The building unit of matter is
2. The subatomic particles are.....
3. and are inside the
4. Therefore and are called
5. move rapidly around the in specific energy levels.
6. are positively charged.
7. are negatively charged.
8. are neutral.
9. Since the nucleus contains and, the nucleus is charged.
10. In an the number of and the number of are equal in number.
11. Therefore are neutral.

Charge	Positive	negative	neutral
Mass (a. m. u)			
Location			
Found by			
Symbol			

12. The 'plum-pudding model' of atom was introduced by.....
13. The 'planetary model' of atom is introduced by.....
14. The scientist who mentioned that the electrons move in definite paths.....
15. The energy levels from inside to outside are named as
16. The maximum number of electrons in the 1st energy level.....
17. The maximum number of electrons in the 2nd energy level.....
18. The maximum number of electrons in the 3rd energy level.....
19. The maximum number of electrons in the 4th energy level.....
20. The maximum number of electrons in the 5th energy level.....
21. Maximum of electrons can be found in the last energy level.
22. is how the electrons are arranged in energy levels.
23. Mention how 2e are arranged in energy levels.....
24. Mention how 3e are arranged in energy levels.....
25. Mention how 9e are arranged in energy levels.....
26. Mention how 10e are arranged in energy levels.....
27. Mention how 11e are arranged in energy levels.....
28. Mention how 17e are arranged in energy levels.....
29. Mention how 18e are arranged in energy levels.....
30. Mention how 19e are arranged in energy levels.....
31. The number of protons found in the nucleus is called the
32. It is written at

-
33. It is symbolised as.....
34. The sum of protons and neutrons in the nucleus is called the
35. It is written at
36. It is symbolised as.....
37. The number of of an atom belonging to a certain element is unique for that element
38. Therefore, theof an element is unique for that element.
39. But the number of of an atom belonging to a certain element can vary in different atoms of the same element.
40. = p
41. = p + n
42. - p = n
43. - = n
44. is how the electrons are arranged in energy levels.

Periodic table

I		II	III	IV	V	VI	VII	VIII / O
H 2.1								He -
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0		Ne -
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0		Ar -
K 0.8	Ca 1.0							

45. A to classify elements was first introduced in 1869 by a Russian scientist named Dmitri Mendeliev.
46. The modern is based on the and the
47. The vertical columns are called and they are named in Roman numbers.
48. The horizontal rows are called and named in Arabic numbers.
49. The number of electrons found in the last energy level (valency electrons) of an atom will decide the of its element.
50. The number of energy levels found in an atom will decide the of its element.

39

K

19

51. Atomic number =

52. Mass number =

53. Number of protons=.....

54. Number of electrons=.....

55. Number of neutrons=.....

56. Electronic configuration=.....

57. Group number=.....

58. Period number=.....

18

O

8

59. Atomic number =

60. Mass number =

61. Number of protons=.....

62. Number of electrons=.....

63. Number of neutrons=.....

64. Electronic configuration=.....

65. Group number=.....

66. Period number=.....

	Mass (A)	Atomic (Z)	p	e	n	electronic configuration	group	Period	symbol
67.	14	6							
68.			8		8				
69.	35		17						
70.		10			10				
71.					14	2,8,3			
72.					20		VII	2	
73.	23						I	3	
74.	14				7				
75.	13					2,4			

76. The atoms having the same with different are called

77. The atoms having the same number of with different number of are called.....

	Element	Atomic number	Mass number	p	n
78.		1	1		
79.				1	1
80.			3		2
81.		6	12		
82.				6	7
83.			14		8
84.		8	16		
85.				8	10
86.		17	35		
87.				17	20

88. The most common isotope of hydrogen is.....

89. The most common isotope of carbon is.....

90. The most common isotope of oxygen is.....

91. The most common isotope of chlorine is.....

92. Electrons are charged.

93. Protons are charged.

94. In an atom, the number of charged are equal to the charged

95. Therefore the atoms are.....

96. Neutrons are
97. The nucleus of an atom contains, charged
and charged
98. Therefore the nucleus of an atom is charged.
99. Therefore charged get attracted towards
the charged
100. Therefore to remove a charged
from a atom, some energy should be supplied to
overcome the attraction between a charged
..... and the charged nucleus.
101. After removing a charged, the neutral
..... will now become a (.....)
102. First ionization energy – the minimum necessary to remove
a charged from a neutral
which is in a state and form a
(.....) which is in a gaseous.
103. Eg. $\text{Na}_{(g)} \rightarrow \dots + \dots$
104. The distance between the mid point of the nucleus of an atom to the last energy
level is called the
105. In a given period, the reduces from to
106. When the reduces the attraction between the
..... charged and charged
..... will
107. Therefore, in a given period, the first ionization energy will increase from group
..... to group

108. Therefore in a given period, the lowest first ionization energy will be found in and the highest first ionization energy will be found in the

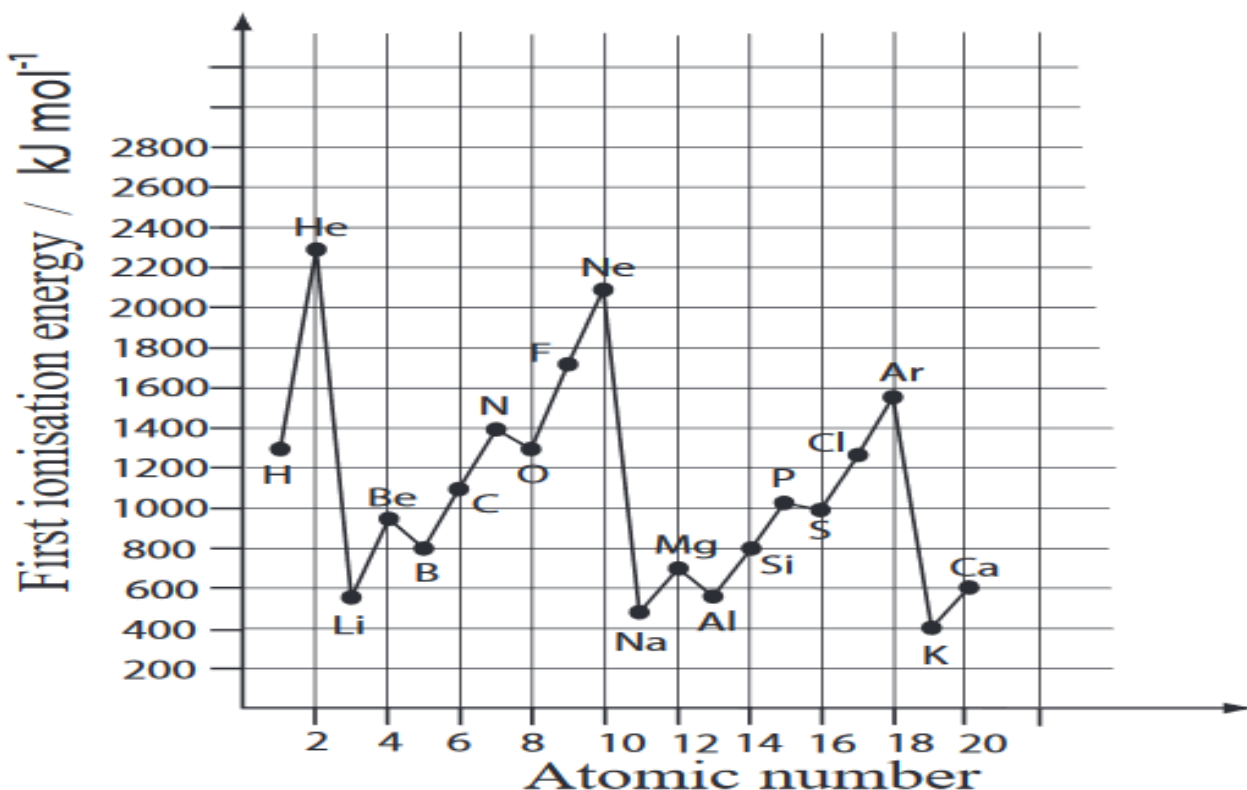
109. The periods number depends according to the number of

110. In a given group, the number of increases from to

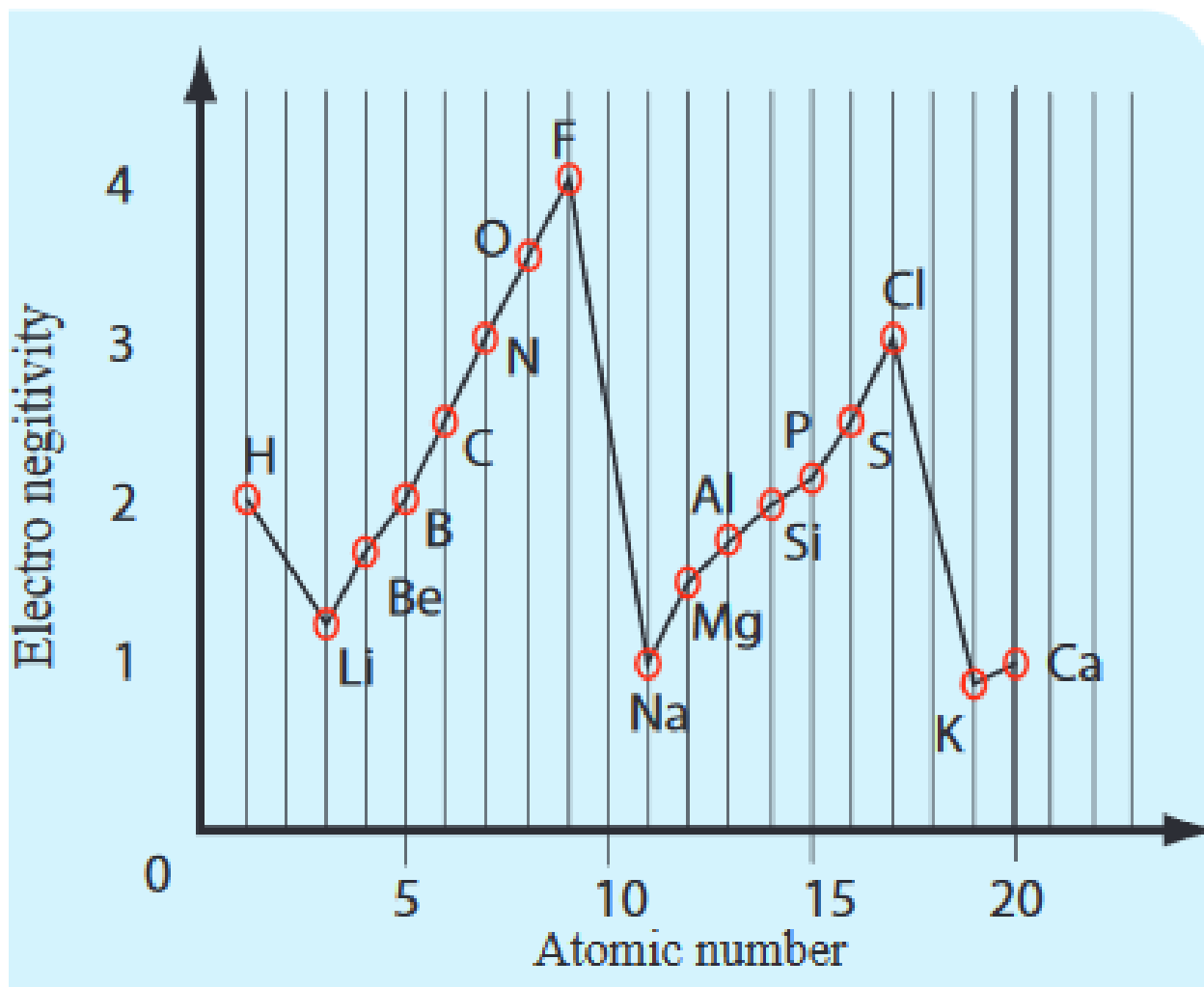
111. Therefore in a given group, the will decrease from to

112. Therefore, in a given group, the will reduce from to

113. Therefore the highest is found at group top and the lowest is found at group bottom.



114. The is the ability of an of an element to attract the sharing of a bond towards itself.
115. In a given period, the..... will increase from group to group
116. Therefore in a given group, the lowest is found in group and the highest is found in group
117. is not considered for elements in group
118. In given group, the will reduce from to
119. Therefore the highest is found at group top and the lowest is found at group bottom.
120. In an electronegativity graph, the crests are represented by the elements of group
121. In an electronegativity graph, the troughs are represented by the elements of group



122. Physical properties of metals

- (i) Lustre (.....)
- (ii) Sonorous (.....)
- (iii) Solid in room temperature (except.....)
- (iv) Malleable (.....)
- (v) Ductile (.....)

(vi) Good..... & conductors

(vii) High.....

123. Chemical properties of metals

(i) Donate electrons and form

Na →

(ii) React with O₂ and form

Na + O₂ →

(iii) Metal oxides dissolve in water and form

Na₂O + H₂O →

124. Some metals do not react with other compounds. Therefore their shine lasts for a long time. Eg

125. Some metals are reactive. They react with other elements and form compounds.

Eg.

126. Sodium floats on reacts vigorously with cold and form and gas.

127. The density of sodium is less than

128. Sodium is highly reactive. Therefore it reacts with and O₂ in To prevent sodium reacting with and in air, is stored in or

129. is a soft metal which can be cut with a knife. The cut surface will be and have aa lustre. But since sodium is a highly reactive metal, it reacts with in air and produce sodium therefore the lustre will get tarnished soon.

130. Sodium is used to produce dye to colour denims.

-
131. Sodium is used to produce street lamps with glow
132. Sodium is used to sodium cyanide which is used to extract
133. Magnesium does not react withwater but reacts with water and produce magnesium and gas.
134. Heated magnesium will react with steam and produce magnesium oxide and gas.
135. Magnesium reacts with and form magnesium. This is a strong alloy which is resist to Therefore magnesium is used in aircraft industry and in automobile industry.
136. Magnesium is used to produce medicine such as which is used to treat patients.
137. Corrosion of can be prevented by connecting a piece of to
138. The non-metals which are solid in room temperature are.....
139. The non-metal which is liquid in room temperature is.....
140. The non-metals which are gas in room temperature are.....
141. Inert gases / noble gases / mono atomic gases are.....
142. The above gases belong to thegroup.
143. Except, other non metals do not conduct
144. Except, other non metals have low
145. Non metals accept and form.....
146. Many non metals react with O_2 and formoxides.

-
147. $N_2 + O_2 \rightarrow$
148. These oxides are mostly instates.
149. These oxides dissolve in and form
150. $H_2O + CO_2 \rightarrow$
151. In air, 78.1% is
152. is lighter than air
153. is non-supportor of combustion
154. is a very low reactive gas.
155. N_2 is used to produce and other chemical fertilizers
156. Liquid nitrogen is a
157. N_2 is used when packing
158. Since N_2 is an inert gas, it is used to fill
159. is used to fill vehicle tires.
160. The elements stay in different forms in nature are known as
161. Carbon, silicon and Sulphur are
162. Carbon stays informs and amorphous forms.
163. Silicon stays in forms and amorphous forms
164. Sulphur also stays in forms and amorphous forms.
165. form of sulphur is yellow brittle solid
166. forms of sulphur is a white powder
167. is insoluble in water and very soluble in

168. is used to produce sulphuric acid, vulcanised rubber, gun powder, matches, crackers.
169. is used as a fungicide to kill fungi in beer & wine industry
170. forms of carbon are – diamonds, graphite, fullerenes
171. forms of carbon are – charcoal, coal, lamp soot.
172. Except the other forms of carbon are black in colour
173. Except the other forms of carbon have less density.
174. is a poor conductor of electricity but is a good electric conductor.
175. are expensive since they have a high refractive index and their hardness.
176. does not react with acids, bases and chlorine.
177. At high temperature, reacts with oxygen and forms and also reacts with calcium and forms
178. is used to make pencil & electrodes
179. The second most common element on earth is
180. Quartz, sand, gems are the forms of
181. Clay is the form of
182. is produced to make transistors, diodes and solar cells

Element	Na	Mg	Al	Si	P	S	Cl
Oxide	Na ₂ O	MgO	Al ₂ O ₃	SiO ₂	P ₂ O ₅	SO ₃	Cl ₂ O ₇
Nature							

183. In the 3rd period the decreases and the increases from group I to group VII

184. The number of donated or accepted or shared by an atom of an element is called the

Colours of the flames when elements are burnt

- Lithium.....
- Sodium.....
- Pottacium.....
- Magnisium.....
- Calcium.....
- Sulphur.....

Rules when writing chemical formulae

Rule 1 – Write the elements and exchange the valencies and write on the over right side of the elements

Eg. Aluminium oxide

Ferric oxide

Rule 2 – Don't write 1, If the valency is 1

Eg. Sodium oxide

Pottacium chloride

Rule 3 – Before writing a valency to a radical, write a bracket to the radical

Eg. Ammonium sulphate

Magnesium phosphate

Rule 4 – Simplify the valencies if possible

Eg. Plumbic oxide

Magnesium oxide

Write the chemical formula of the following

1. Potassium oxide -
2. Calcium chloride -
3. Magnesium hydroxide -
4. Calcium phosphate -
5. Ferrous oxide -
6. Cuprous oxide -
7. Copper oxide -
8. Potassium manganite -
9. Potassium permanganate -
10. Sodium hydroxide -
11. Plumbic oxide -
12. Potassium nitrite -
13. Zinc oxide -
14. Aluminium Sulphate -

15. Calcium carbonate -

16. Magnesium bicarbonate -

Channa Asela

Valency 1	Valency 2	Valency 3	Valency 4
H-Hydrogen	Be-Berilium	B-Boron	C-Carbon
Li-Lithium	Mg-Magnisium	Al-Aluminium	Si-Silicon
Na-Sodium	Ca-Calcium	Fe-Ferric	Pb-Plumbic
K-Potacium	Zn-Zinc	<u>PO₄-Phospate</u>	
Ag-Silver	Cu-Cupric		
<u>Cu-Cuprous</u>	Fe-Ferrous		
<u>NH₄-Ammonium</u>	Pb-Plumbous		
<u>OH-Hydroxide</u>	<u>CO₃-Carbonate</u>		
<u>H₃O-(Hydronium)</u>	<u>SO₄-Sulphate</u>		
<u>MnO₄-Permanganate</u>	<u>SO₃-Sulphite</u>		
<u>NO₃-Nitrate</u>	<u>MnO₄-Manganate</u>		
<u>NO₂-Nitrite</u>	<u>CrO₄-Chromate</u>		
<u>HCO₃-Bicarbonate</u> (Hydrogen Carbonate)	<u>Cr₂O₇-Dichromate</u>		
<u>HSO₄-Bisulphate</u> (Hygrogen Sulphate)			
<u>HSO₃-Bisulphite</u>			
<u>ClO₃-clorate</u>			
<u>OCl-Oxychloride</u>			

A							D
			G	J	L	N	Q
R		T			X	Y	
Z							

- 1) Halogens
- 2) Noble gases.....
- 3) The element which forms the most acidic oxide.....
- 4) The element which forms the most basic oxide.....
- 5) The element having the highest electronegativity.....
- 6) The element having the lowest electronegativity.....
- 7) The element having the highest 1st ionization energy.....
- 8) The element having the lowest 1st ionization energy.....
- 9) The element which is least reactive.....
- 10)The element which burns in air with a blue flame.....
- 11)The elements found in all the biological molecules.....
- 12)The chemical formula of an amphoteric oxide.....
- 13)The element use to fill filament bulbs.....
- 14)The element use in beer industry to kill fungi.....
- 15)The element which burns in air with a purple flame.....

16) The non-metal which conducts electricity.....

17) The formula of the compound formed by L and T.....

18) The gas used to combust fuel in rockets.....

19) The gas used in rockets has a fuel.....

20) The formula of compound formed between G & L.....

Element	A	D	E	G	J	L	Q	R	T
Atomic number	X-2	X-1	X	X+1	X+2	X+3	X+4	X+5	X+6

	I	Groups						VIII	
	II	III	IV	V	VI	VII			
	2	3	4	3	2	1	0 ←	Valence	
1									

These elements belong to period 2 and 3. Element J has the highest 1st ionization energy.

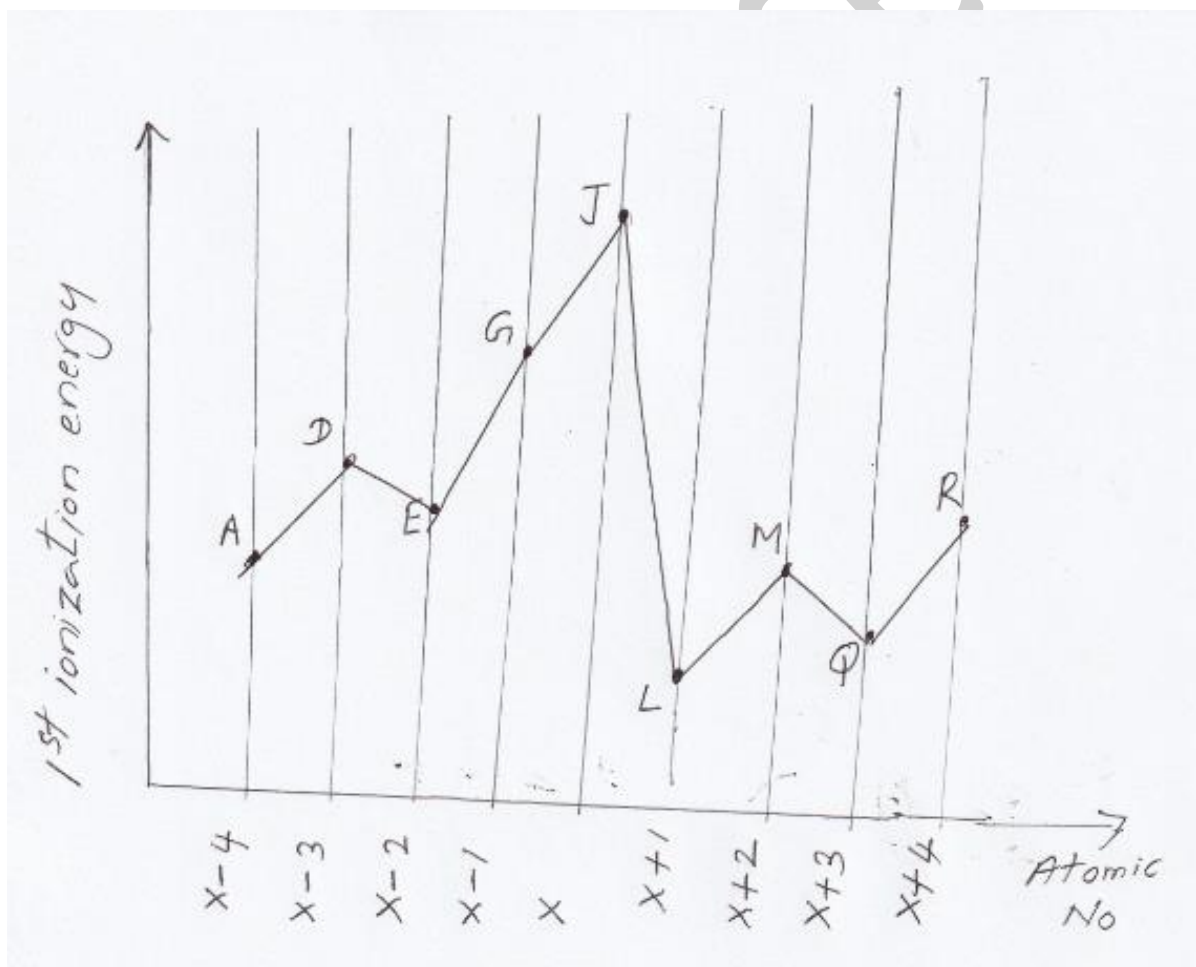
1) Value of X.....

2) The element having the highest 1st ionization energy.....

3) The element having the lowest 1st ionization energy.....

4) The element having highest electronegativity.....

- 5) The element which forms the most basic oxide.....
- 6) Write the formula of the above compound.....
- 7) The element which forms the most acidic oxide.....
- 8) Write the formula of the above compound.....
- 9) The inert gas.....
- 10) The electronic configuration of R.....
- 11) The formula of the compound formed by G & Q.....



The above elements belong to period 2 and 3. Answer the following questions

I	Groups						VIII
	II	III	IV	V	VI	VII	
	2	3	4	3	2	1	0 ← Valence
1							

- 1) Most electronegative element.....
- 2) Least electronegative element.....
- 3) Mono atomic gas.....
- 4) Forms the most acidic oxide.....
- 5) Forms the most basic oxide.....
- 6) Forms the amphoteric oxide.....
- 7) Burns in air with a bright white flame.....
- 8) Fill milk powder packets.....
- 9) Least reactive metal.....
- 10) Non metal which conducts electricity.....
- 11) Colour of the flame when L burns in air.....
- 12) The metal which floats on water.....
- 13) The metal which reacts with cold water vigorously.....
- 14) The metal which does not react with cold water but reacts with hot water

- 15) Name allotropes.....
- 16) A supporter of combustion.....
- 17) Formula of the compound formed between E & Q.....
- 18) Electronic configuration of Q.....
- 19) Group and period of M.....
- 20) Elements belong to the same group.....

Channa Asela