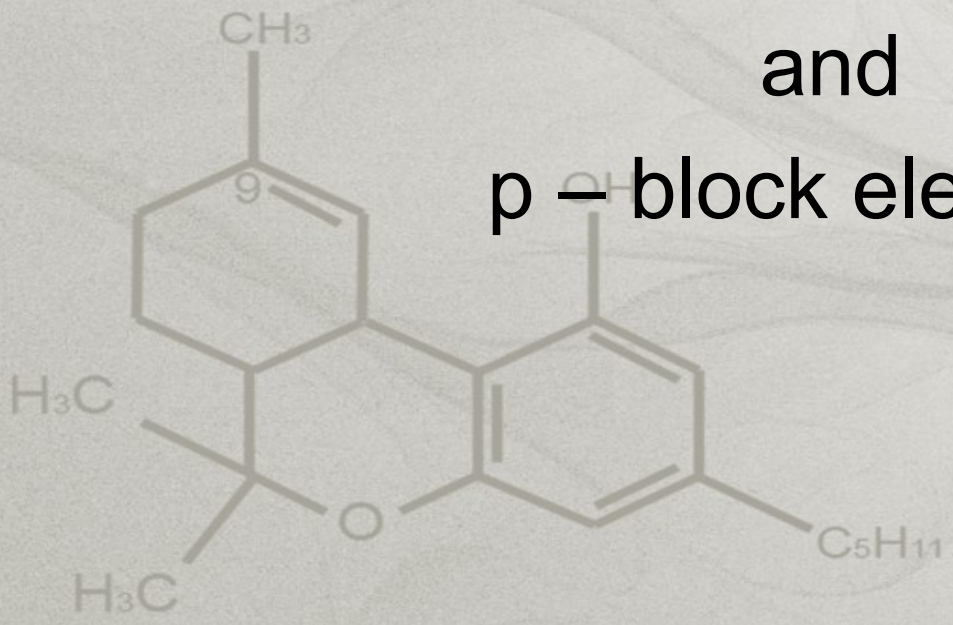
Periodic Classifications of Elements

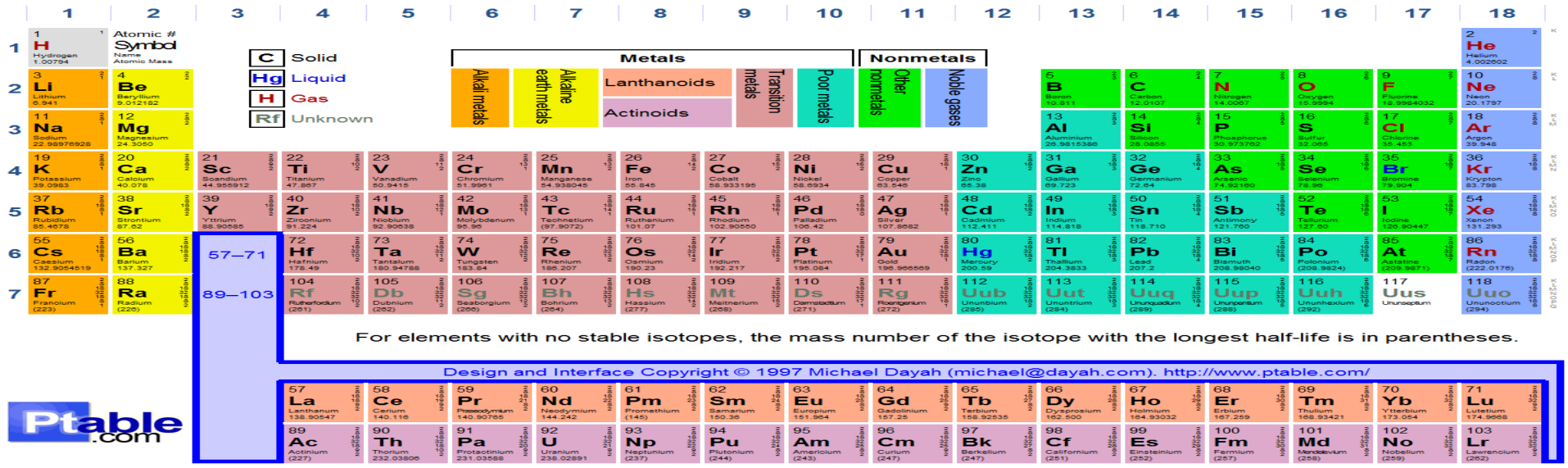
s – block elements

and

p – block elements



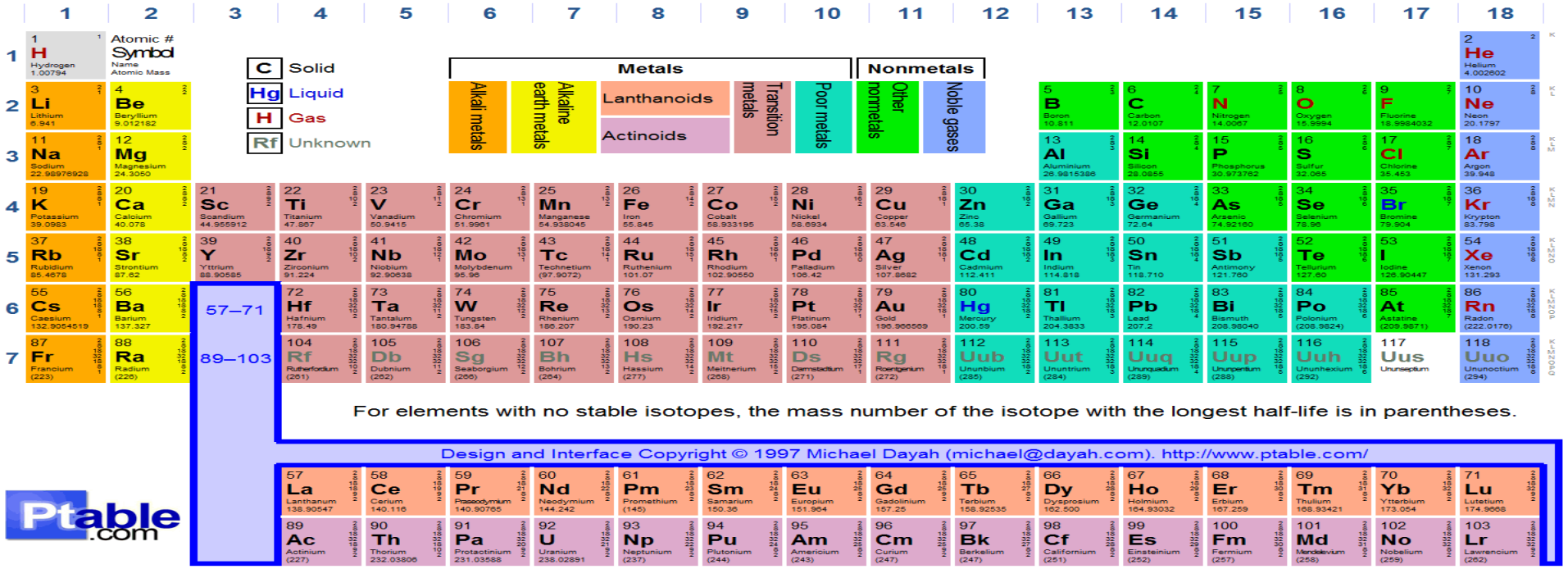
Periodic Table of Elements



Periodic Law : Properties of the elements are a periodic function of their atomic number.

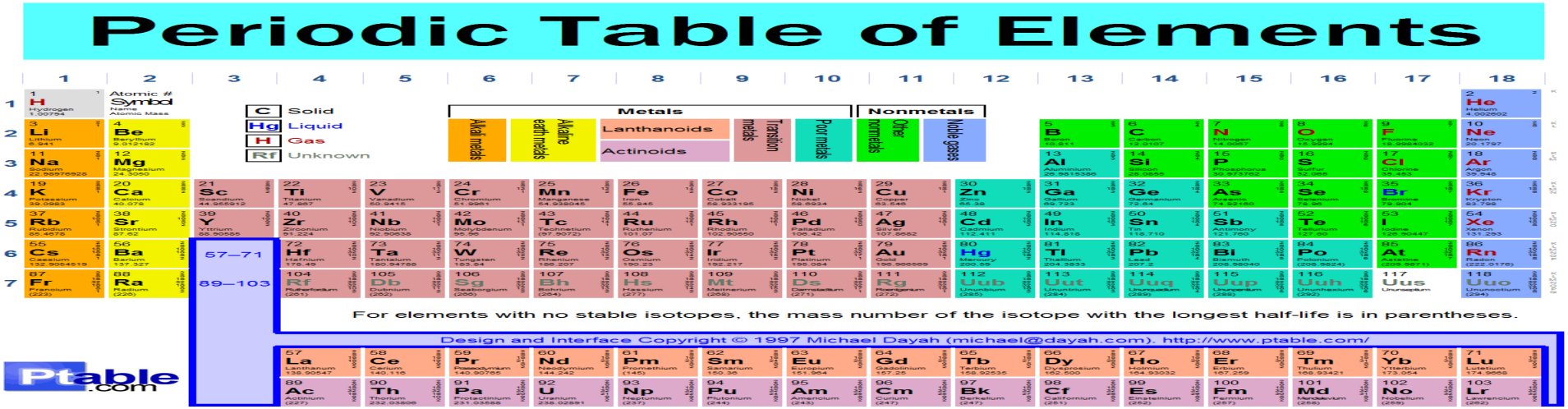
In the long form of **periodic table** elements are arranged in the increasing order of atomic no.

Periodic Table of Elements



Elements with similar properties fall in the same vertical columns known as **Groups**.

Periods are horizontal rows of elements



It is divided into four blocks

s-block –last electron enters s-subshell

p-block –last electron enters p-subshell

d-block- last electron enters d-subshell of penultimate shell.

f-block- last electron enters f-subshell of antipenultimate shell.

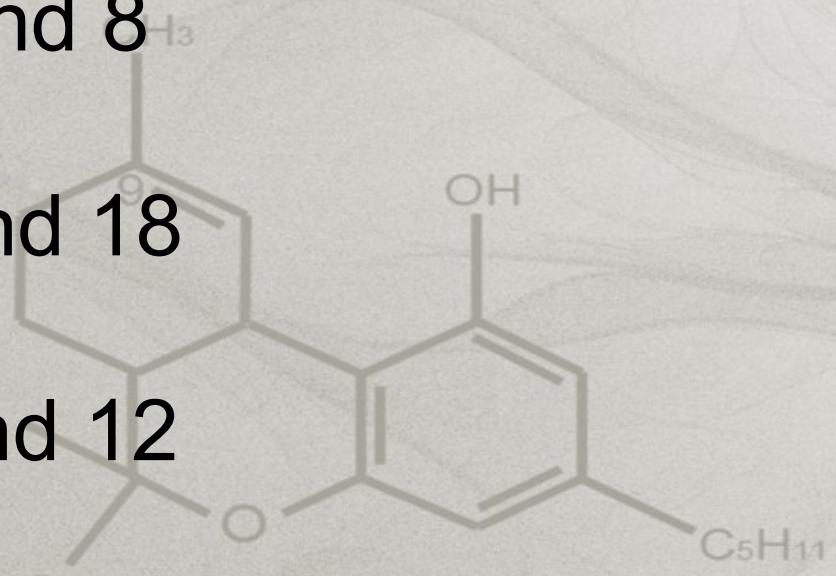
1. The long form of periodic table has --------- periods and --------- groups.

a. 6 and 8

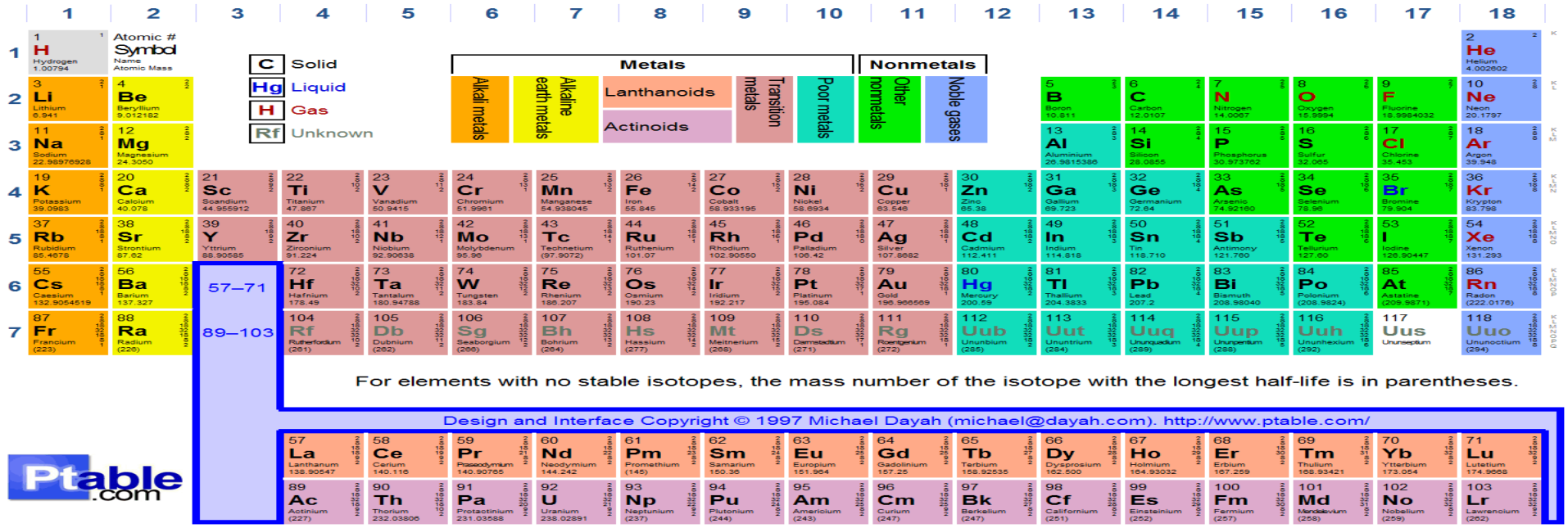
b. 6 and 18

c. 7 and 12

d. 7 and 18



Periodic Table of Elements

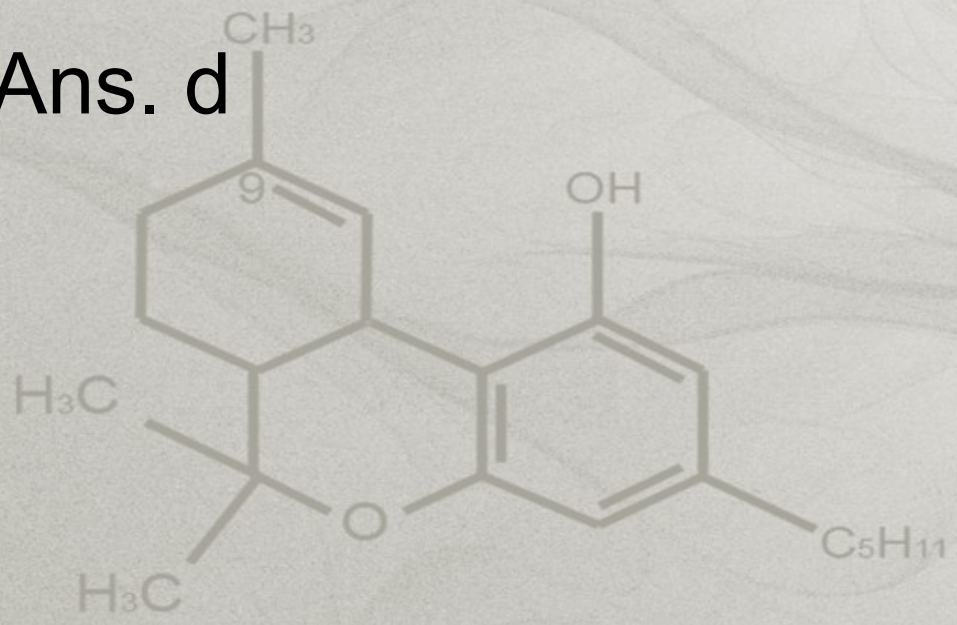


Groups contain elements with similar properties in vertical columns.

Periods – Principal Quantum number (n) of valence shell .

The long form of periodic table has 7 periods (horizontal rows) and 18 groups (vertical columns)

Ans. d



2. The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$, identify the correct period , block and group of the given element in the periodic table .

a. 3rd period , p – block , 6th group

b. 3rd period , s – block , 6th group

c. 5th period , p – block , 12th group

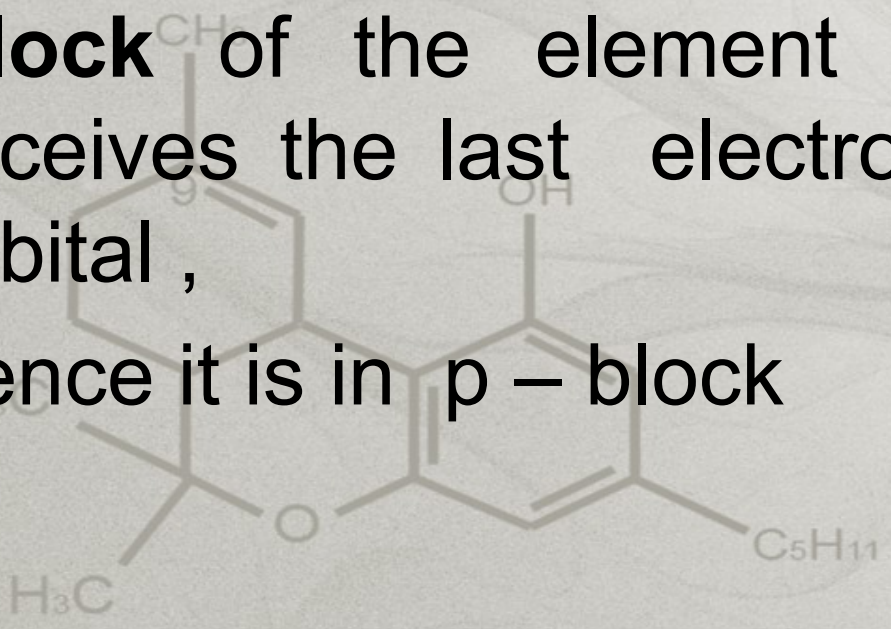
d. 3rd period , p – block ,16th group

Period of the element = Principal Quantum number (n) of valence shell

In this it is 3

Block of the element = Orbital which receives the last electrons. In this it is p orbital ,

hence it is in p – block



Group of the element -

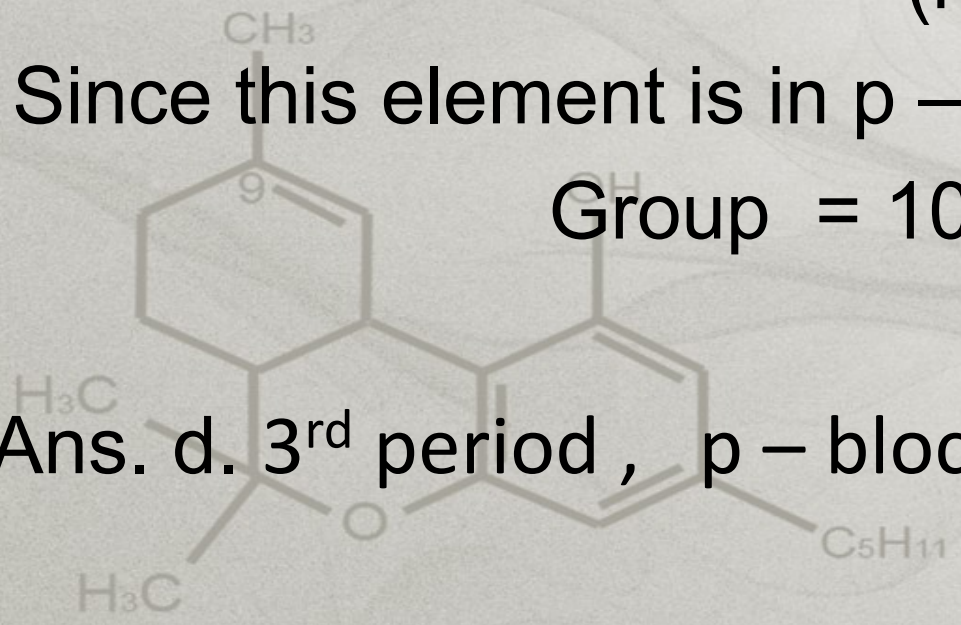
For s- block element – No of valence electrons

For p – block element - 10 + No. of V electrons

For d – block element - No of electrons in (n-1) d and ns orbital

Since this element is in p – block,

Group = 10 + 6 = 16



Ans. d. 3rd period , p – block ,16th group

3. The set of quantum numbers for the last electron in an element are n = 3,l=2, m =+2 and s = +1/2 .The period , block and group of the element will be ;

a. 4^{th} period , p – block , 3^{rd} group

b. 4^{th} period , d – block , 5^{th} group

c. 3^{rd} period , d – block , 5^{th} group

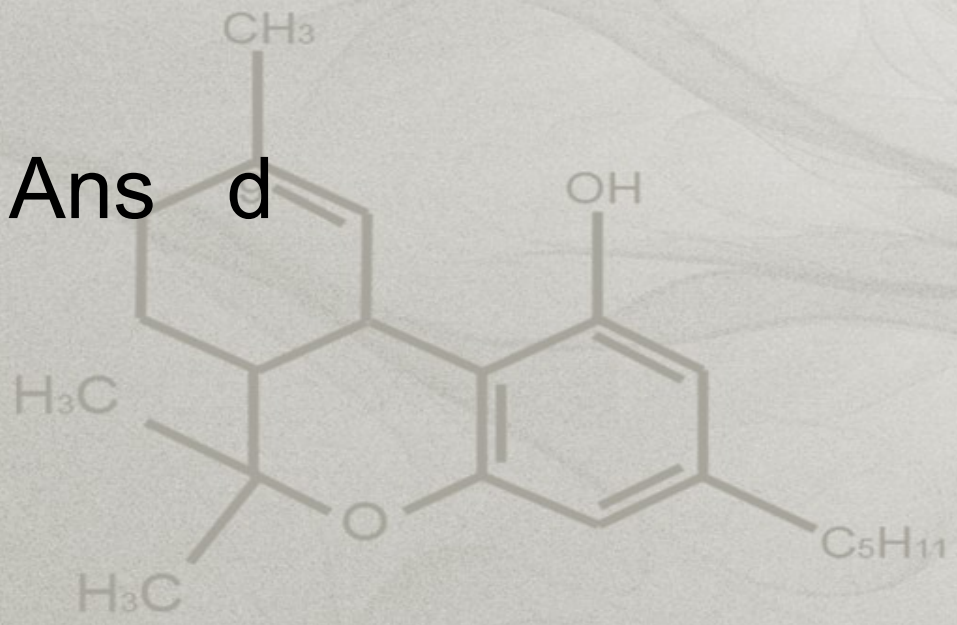
d. 4^{th} period , d – block , 3^{rd} group

Since n = 3 and l = 2 and m = + 2

outer electronic configuration is $3d^1\ 4s^2$

i.e 4^{th} period , d- block, 3^{rd} group.

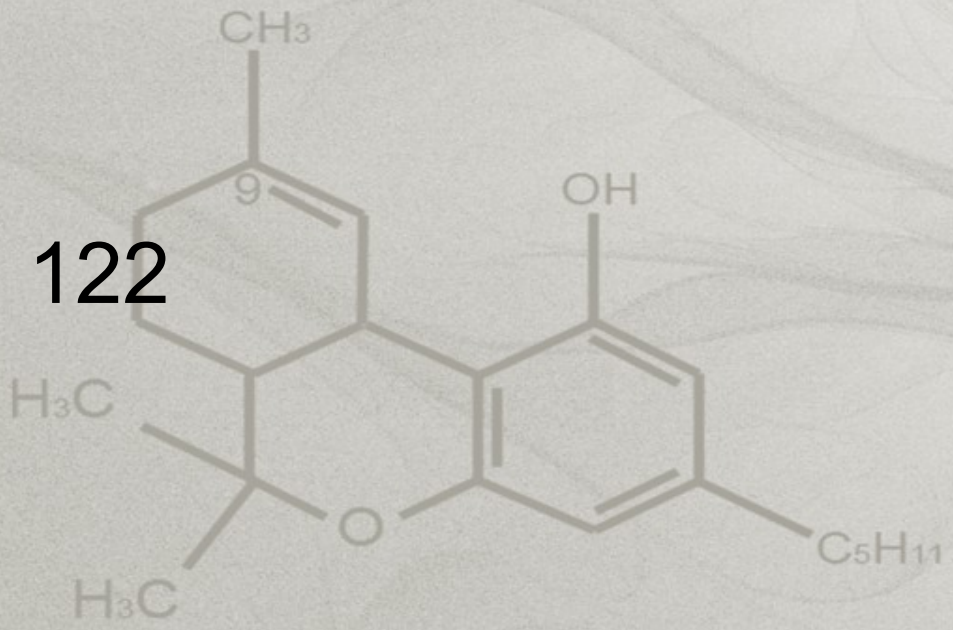
Ans d



4. What is the atomic number of the last element in the 7th period of the periodic table?

a. 116

b. 120



c. 122

d. 118

Periodic Table of Elements

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H Hydrogen 1.00794	Atomic # Symbol Name Atomic Mass																2 He Helium 4.002602
2	3 Li Lithium 6.941	4 Be Beryllium 9.012182											5 B Boron 10.811	6 C Carbon 12.0107	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
3	11 Na Sodium 22.98976928	12 Mg Magnesium 24.3050											13 Al Aluminum 26.9815386	14 Si Silicon 28.0855	15 P Phosphorus 30.973762	16 S Sulfur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948
4	19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955912	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938045	26 Fe Iron 55.845	27 Co Cobalt 58.933195	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.64	33 As Arsenic 74.92160	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.798
5	37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.96	43 Tc Technetium (97.9072)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.293
6	55 Cs Caesium 132.9054519	56 Ba Barium 137.327	57–71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.94788	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.084	79 Au Gold 196.966569	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.98040	84 Po Polonium (208.9824)	85 At Astatine (209.9871)	86 Rn Radon (222.0176)
7	87 Fr Francium (223)	88 Ra Radium (226)	89–103	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (277)	109 Mt Meitnerium (268)	110 Ds Darmstadtium (271)	111 Rg Roentgenium (272)	112 Uub Ununbium (285)	113 Uut Ununtrium (284)	114 Uuq Ununquadium (289)	115 Uup Ununpentium (288)	116 Uuh Ununhexium (292)	117 Uus Ununseptium	118 Uuo Ununoctium (294)

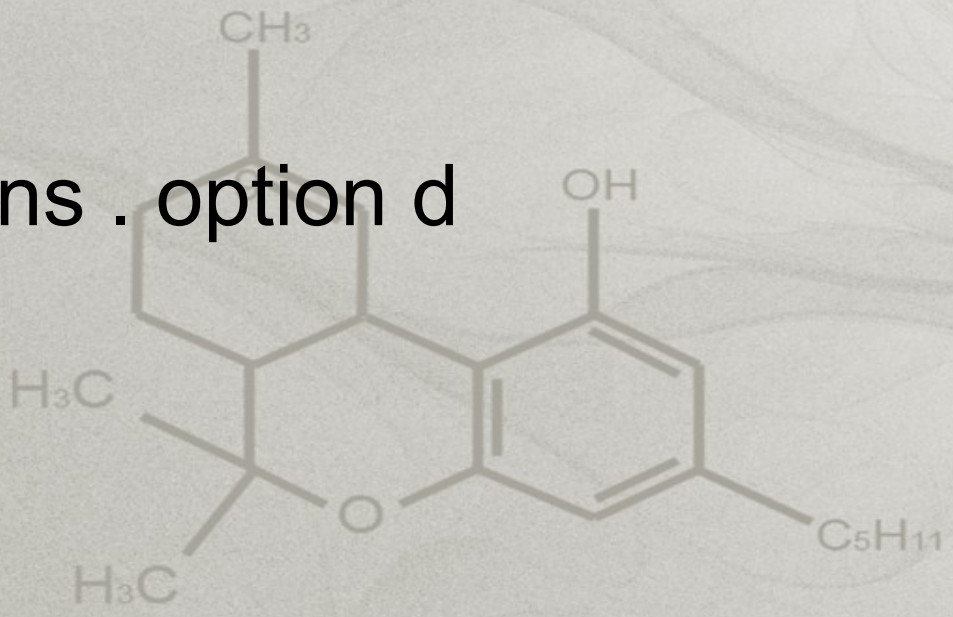
57 La Lanthanum 138.90547	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90765	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.500	67 Ho Holmium 164.93032	68 Er Erbium 167.259	69 Tm Thulium 168.93421	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.9668
89 Ac Actinium (227)	90 Th Thorium 232.03806	91 Pa Protactinium 231.03588	92 U Uranium 238.02891	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)

C Solid
Hg Liquid
H Gas
Rf Unknown

Metals: Alkali metals; Alkaline earth metals; Lanthanoids; Actinoids; Transition metals; Poor metals
Nonmetals: Other nonmetals; Noble gases

For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.

In the long form of periodic table 7th period is the last period , This period can take max. 32 elements. The last element will be in p – block with atomic no.118.



Ans . option d

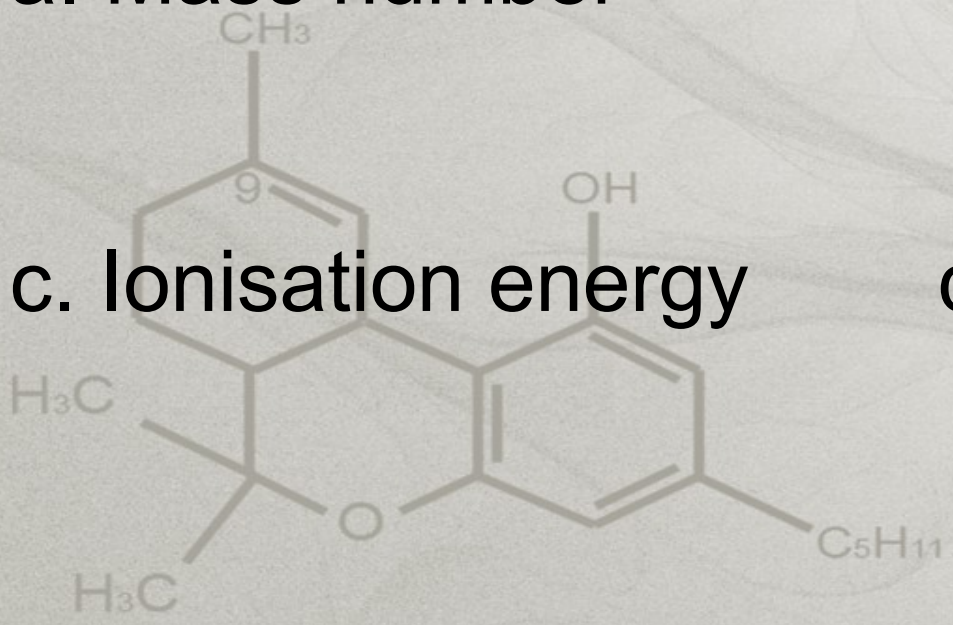
5. Which of the following is not a periodic property ?

a. Mass number

b. Electron affinity

c. Ionisation energy

d. Electronegativity

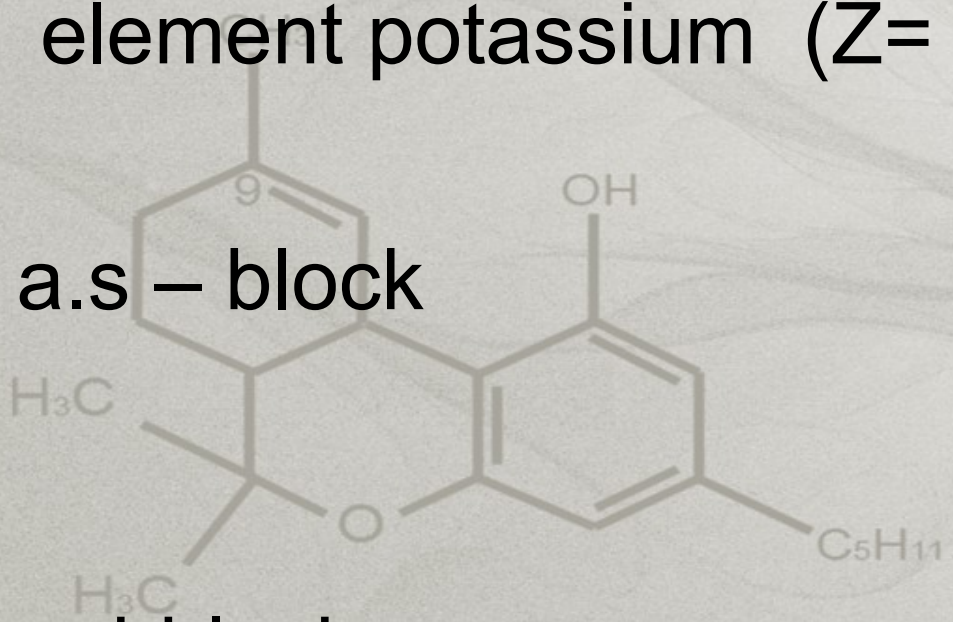


Ionisation energy, electronegativity and electron affinity are the properties that depends on the arrangement of electrons in an atom. (i.e electronic configuration). Hence they show periodicity.

Mass number is the sum of no. of protons and neutrons present in the nucleus of an atom. It is not a periodic property.

Ans. Option a.

6. If the energies of the orbital increase with the increase in " n" values ,[violating (n+l) rule] then name the block to which the element potassium (Z= 19) belongs;



a.s – block

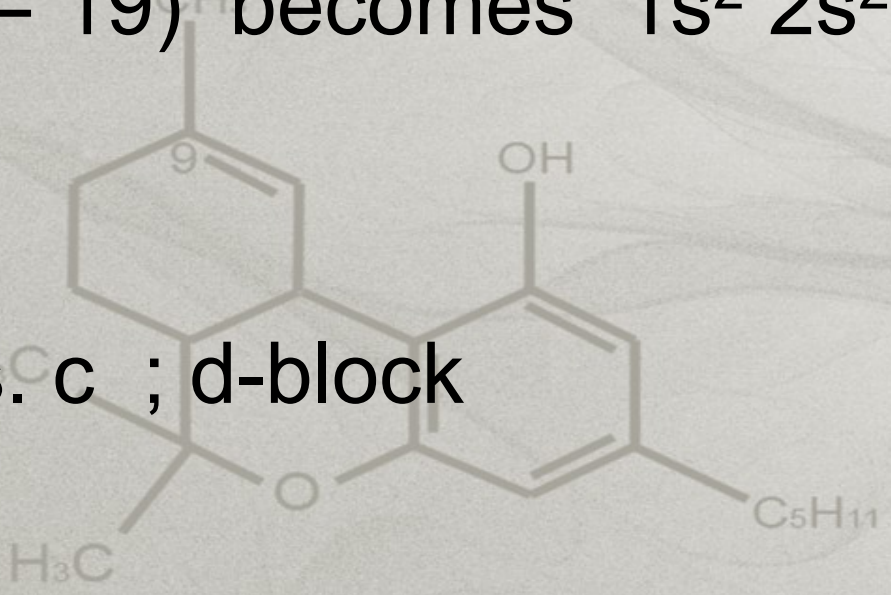
b. p - block

c.d-block

d. f-block

If the energy of orbitals increase with the increase in " n" values, then the electronic configuration of the element potassium

(Z= 19) becomes $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^1$



Ans. c ; d-block

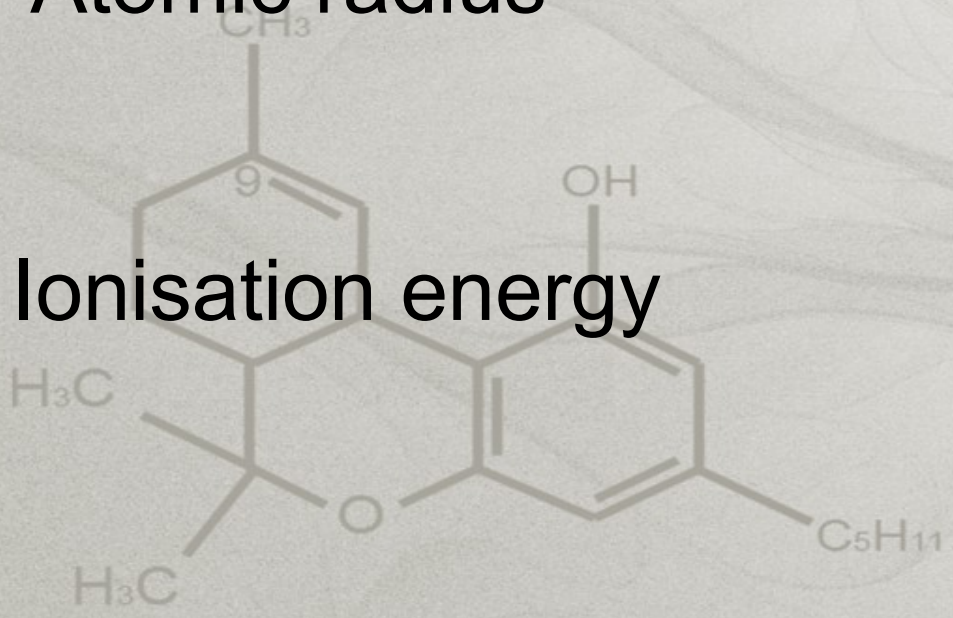
7. Which one of the following is not a property of an isolated atom?

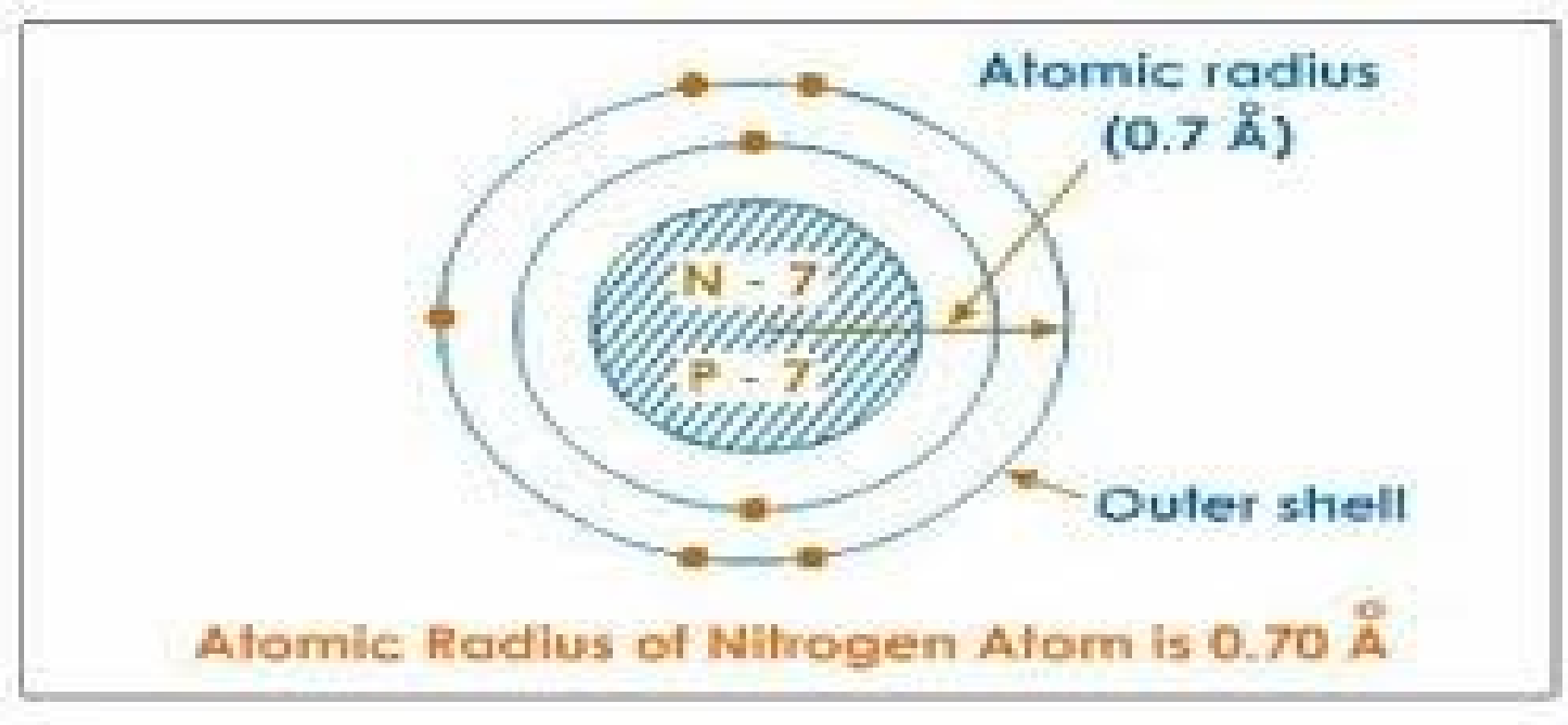
a. Atomic radius

b. Electron affinity

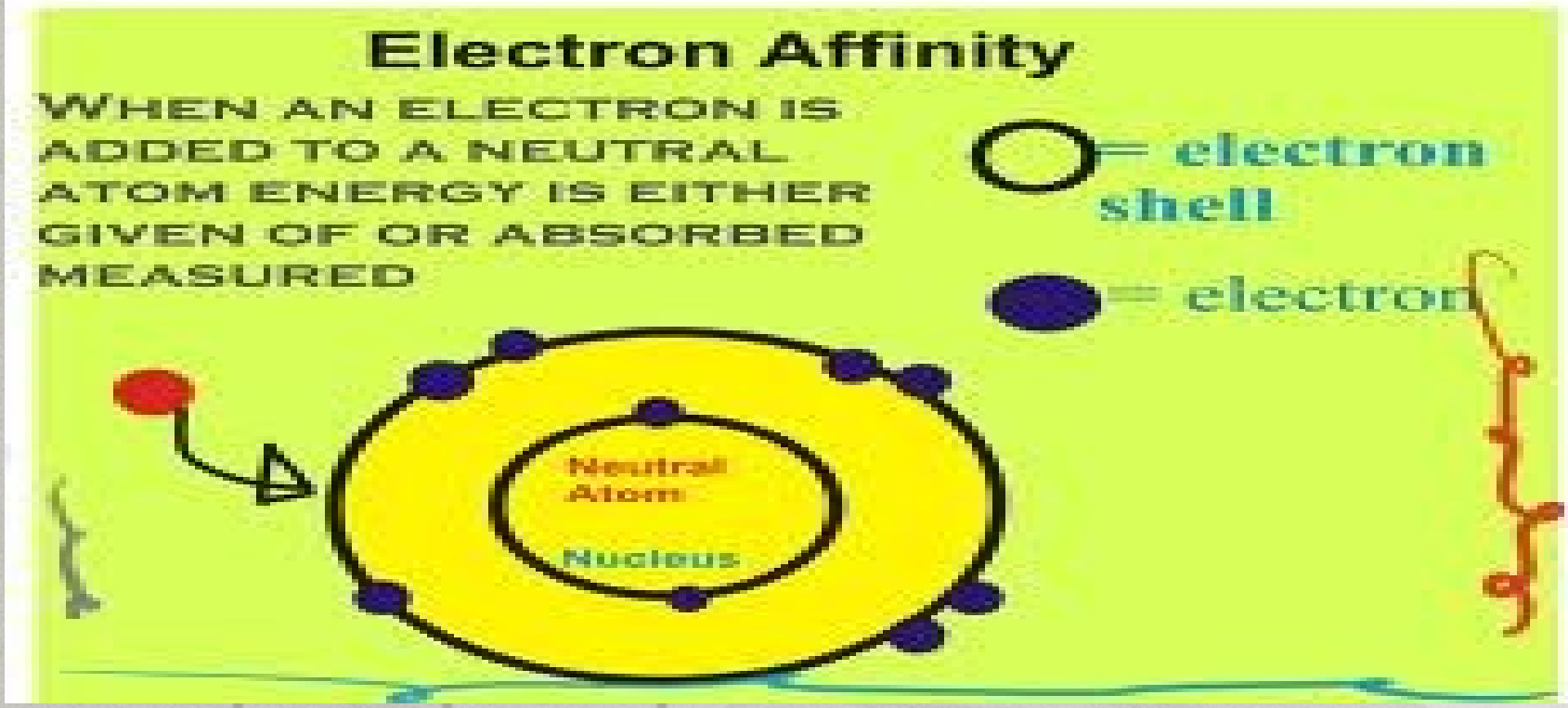
c. Ionisation energy

d. Electronegativity

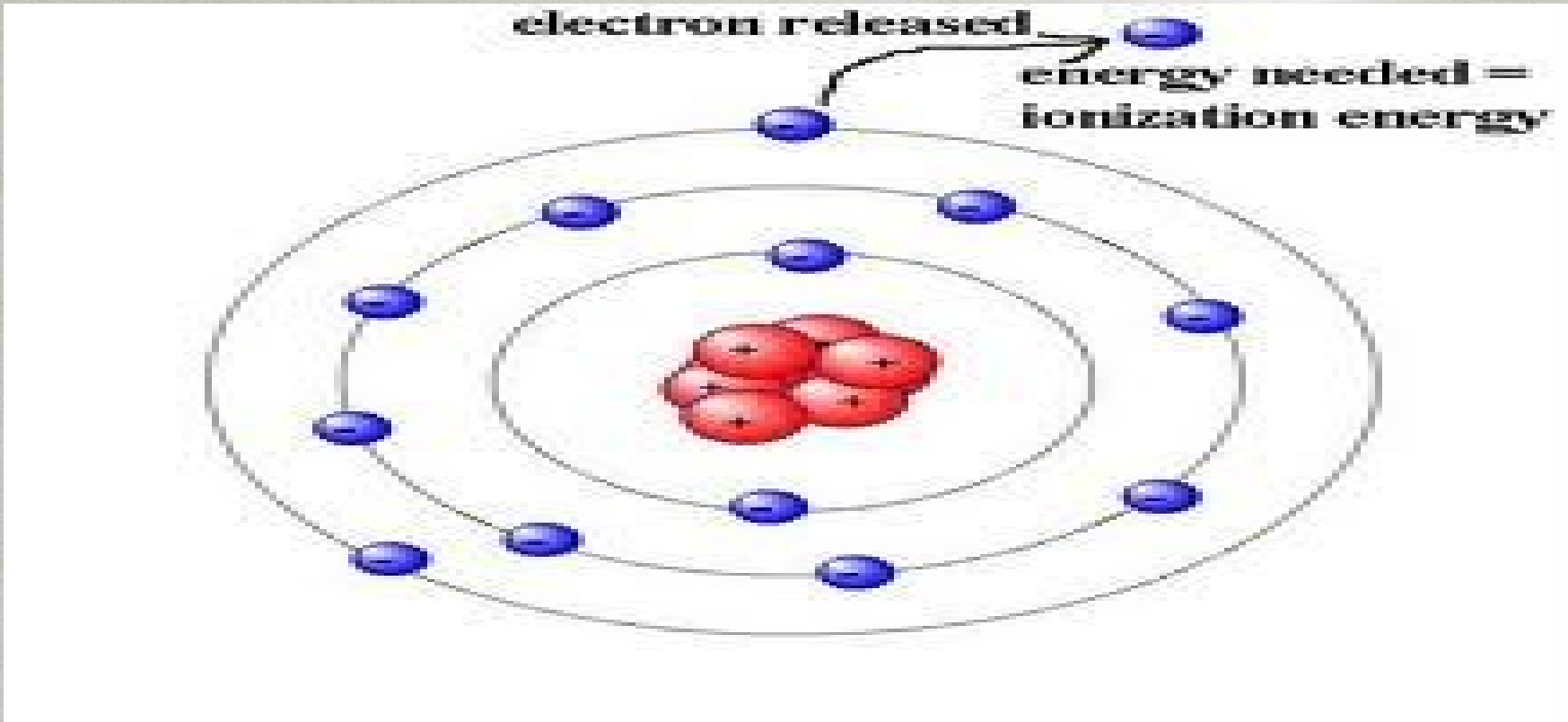




Atomic radius is the distance from the centre of the nucleus of an atom to the outermost shell electrons.



Electron affinity is the energy released when an electron is added to an isolated neutral gaseous atom .



Ionization energy is the energy required to remove the most losely bound electron from a gaseous isolated neutral atom.

Fig. 2.5. Transfer of electron pair towards more electronegative chlorine

Electronegativity is the capacity to attract the shared electron pair towards itself in a covalent bond molecule. It is the property of an **atom in a molecule.**

Ans. option d

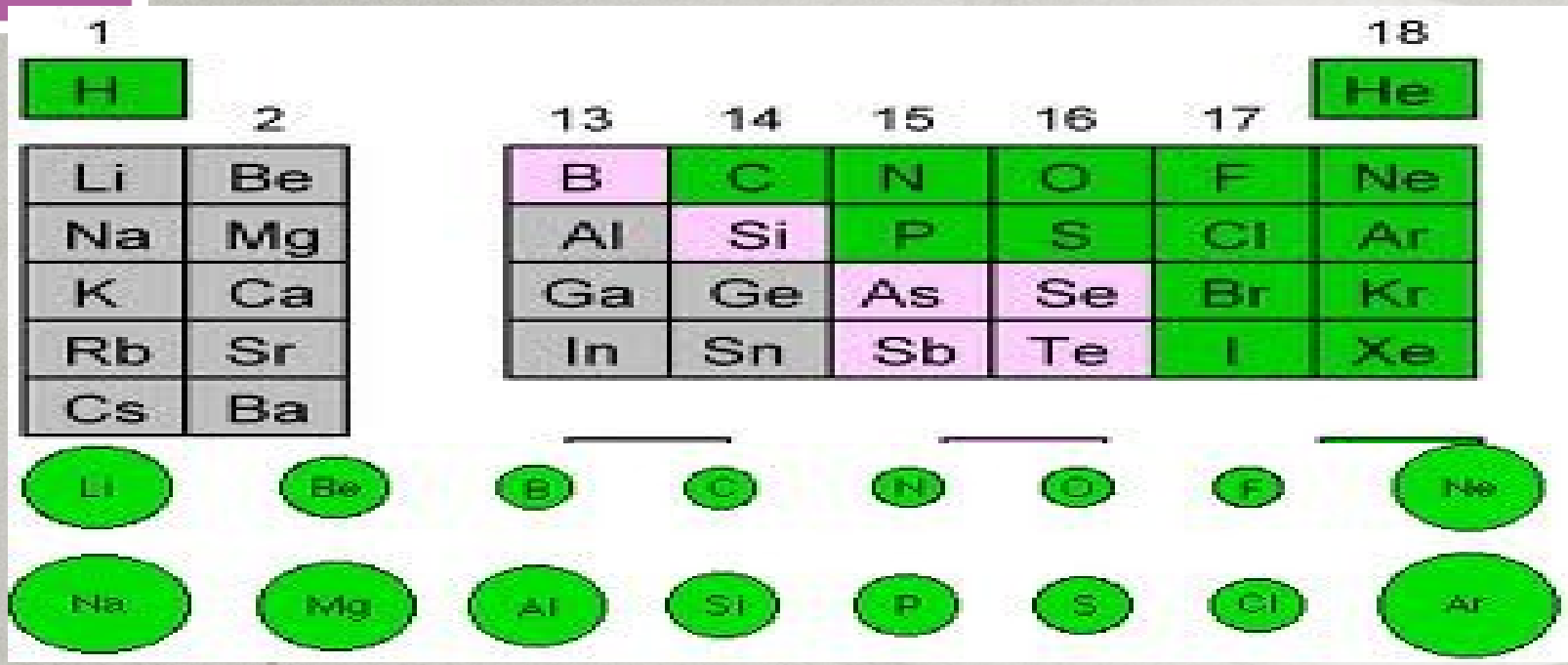
8. The correct sequence of atomic radii is

a. Al > Si > Na > Mg

b. Si > Al > Mg > Na

c. Si > Al > Na > Mg

d. Na > Mg > Al > Si



All these elements are in the same period i.e. 3rd period .

Atomic radii decreases on moving across a period.

Ans . Option d Na > Mg > Al > Si

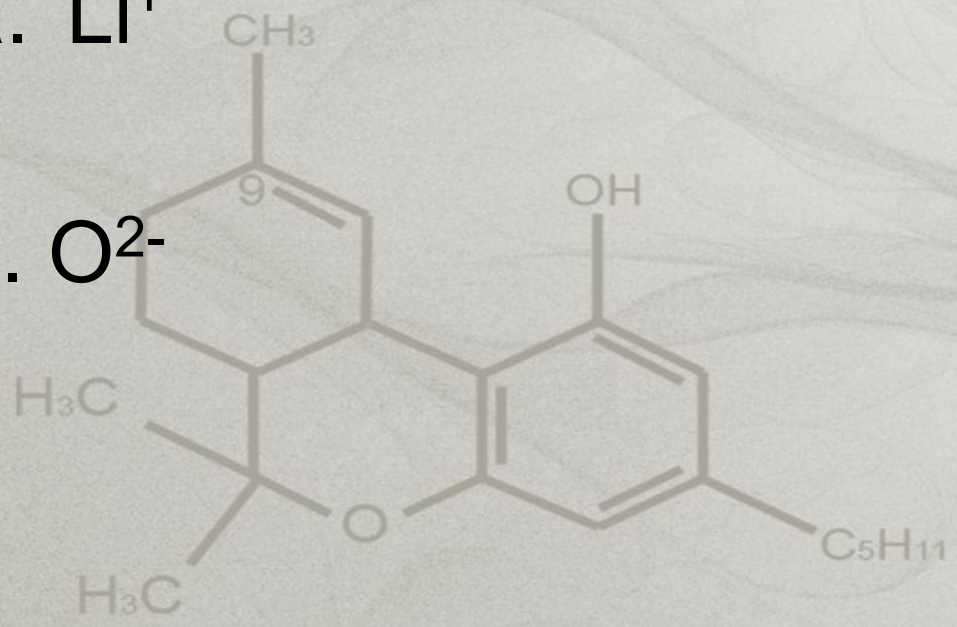
9. Which of the following ions has the highest value of ionic radius?

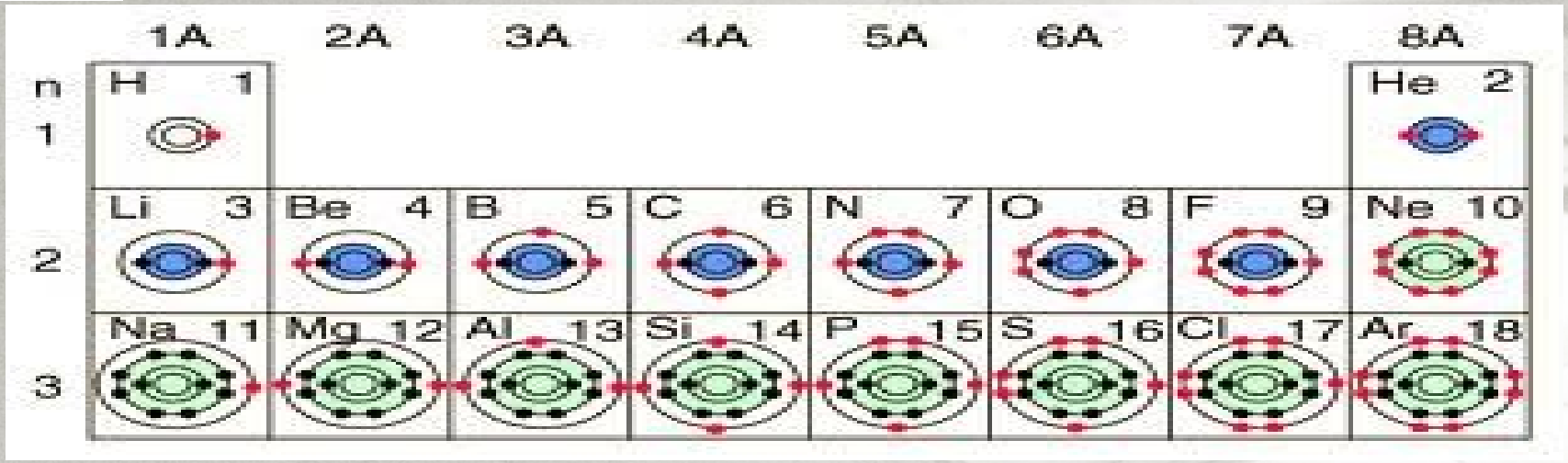
a. Li^{+}

b. F^{-}

c. O^{2-}

d. B^{3+}





These are ions of elements belong to 2nd period. The atomic radius decrease from left to right (Li, B,O,F) in the period.

Anions are bigger than the corresponding atoms.

Li^{+} and B^{3+} are cations have small radius.

F^{-} and O^{2-} are anions .

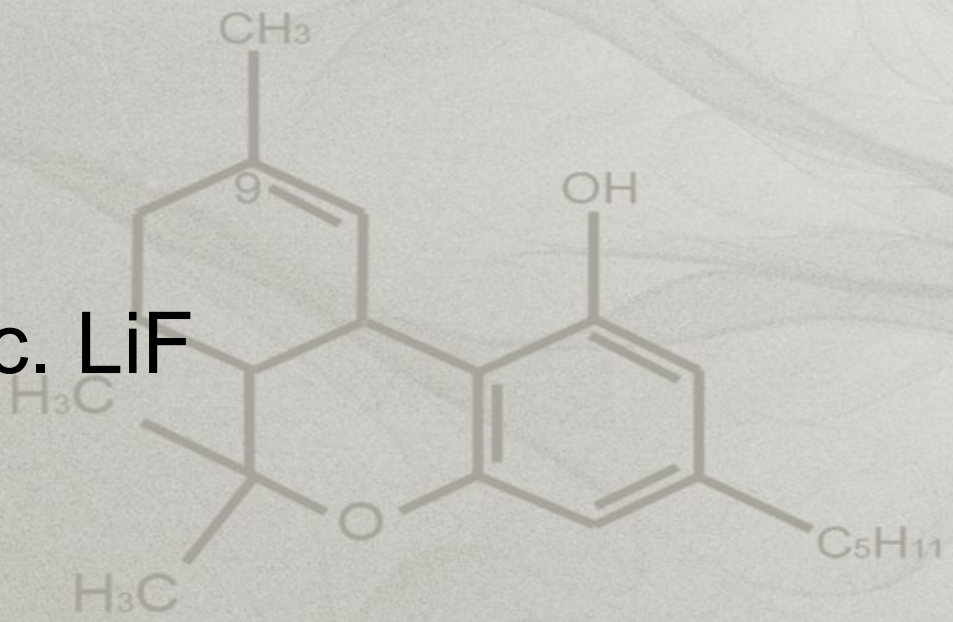
Among these two anions, the one which carry more negative charge is bigger, hence O^{2-} has the highest value of ionic radius.

Ans. Option c

10 . Which one of the following has highest cation to anion size ratio ?

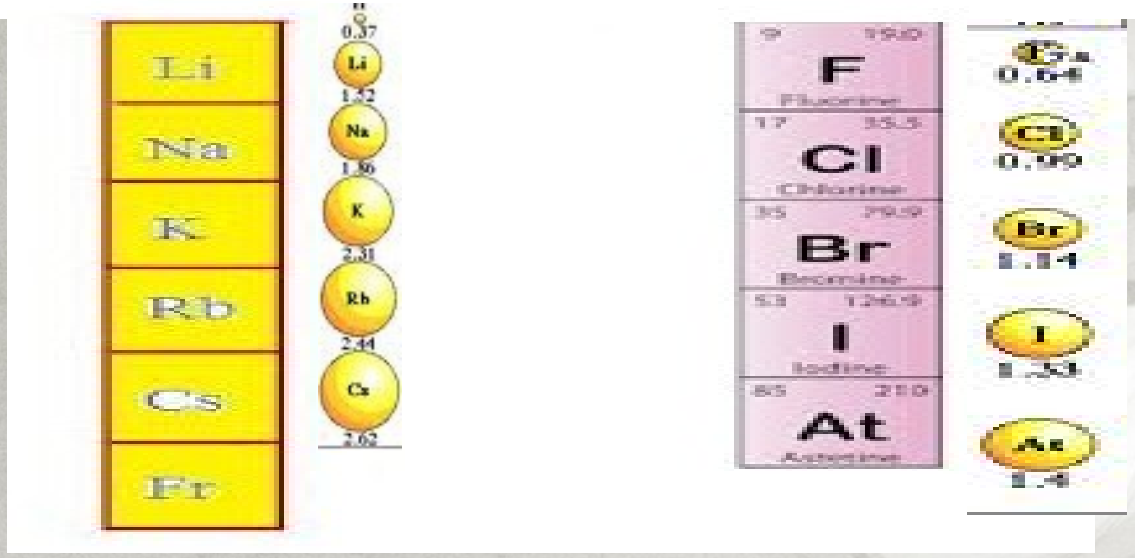
a. CsI

b. CsF



c. LiF

d. NaF



Alkali metals Halogens

Among alkali metal cations (Li^+,Na^+,Cs^+) Cs^+ has biggest size and among halogens (F^-, I^-) F^- has smallest size.

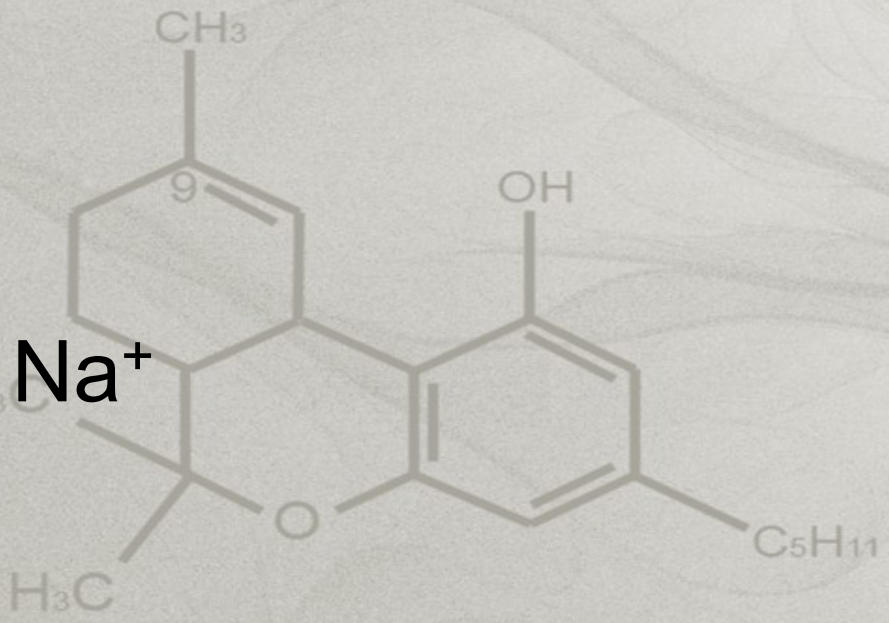
Therefore CsF has highest Cs^+ / F^- ratio.

Ans. Option b

11. The anion O^{-1} is isoelectronic with

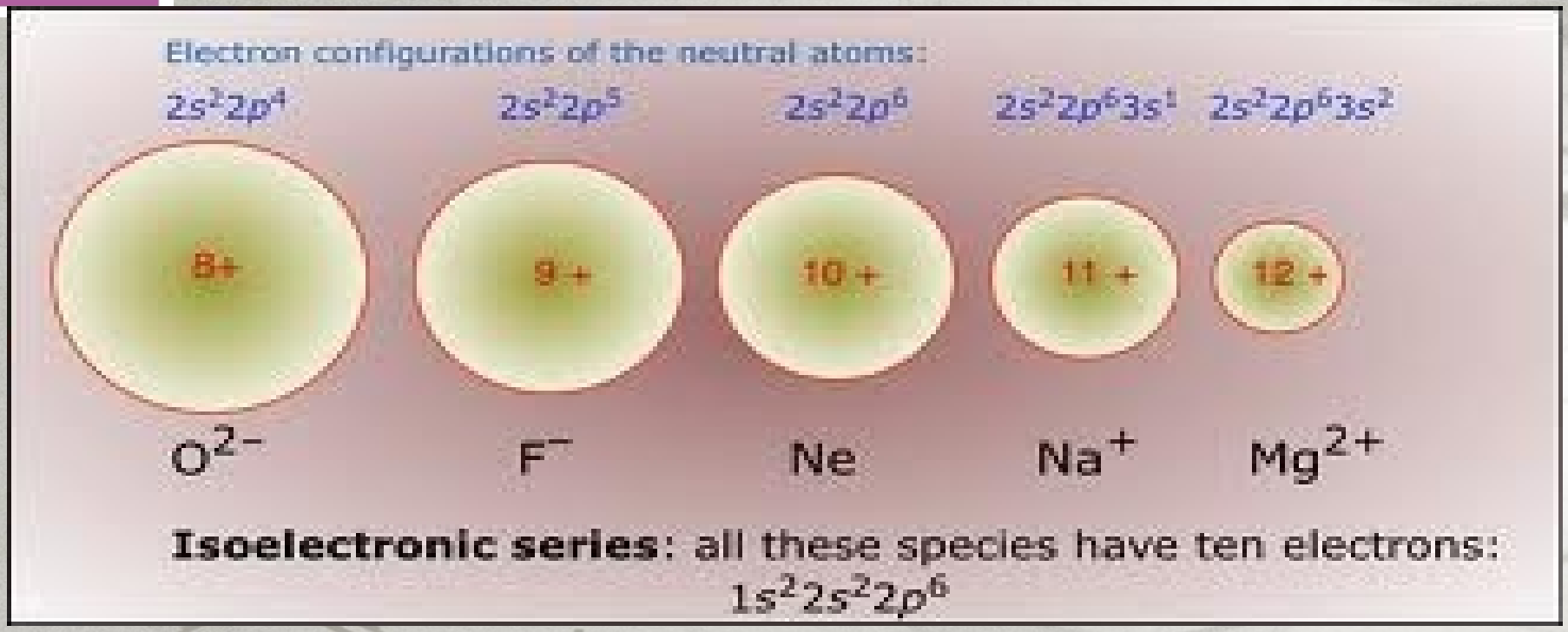
a. N^{3-}

b. F



c. Na^{+}

d. Ne



Species which have same number of electrons are known as isoelectronic species.

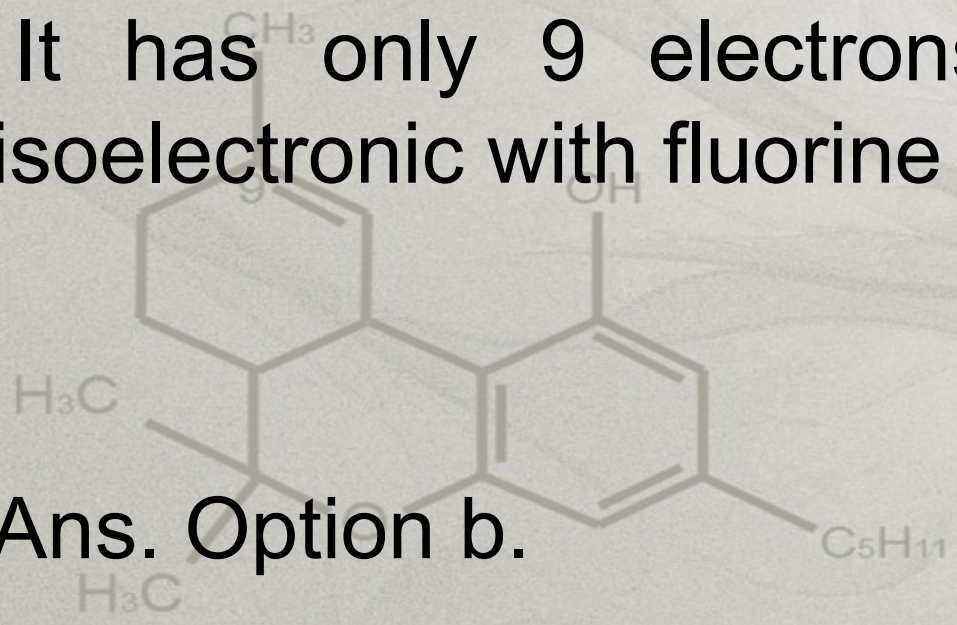
Here Na^+, N^{3-} and Ne have 10 electrons.

Oxygen gaining 1 electron become(O^{-1}) ion .

$$O + e \longrightarrow O^{-1}$$

2 2 4 2 2 5

It has only 9 electrons. Hence it is in isoelectronic with fluorine



Ans. Option b.

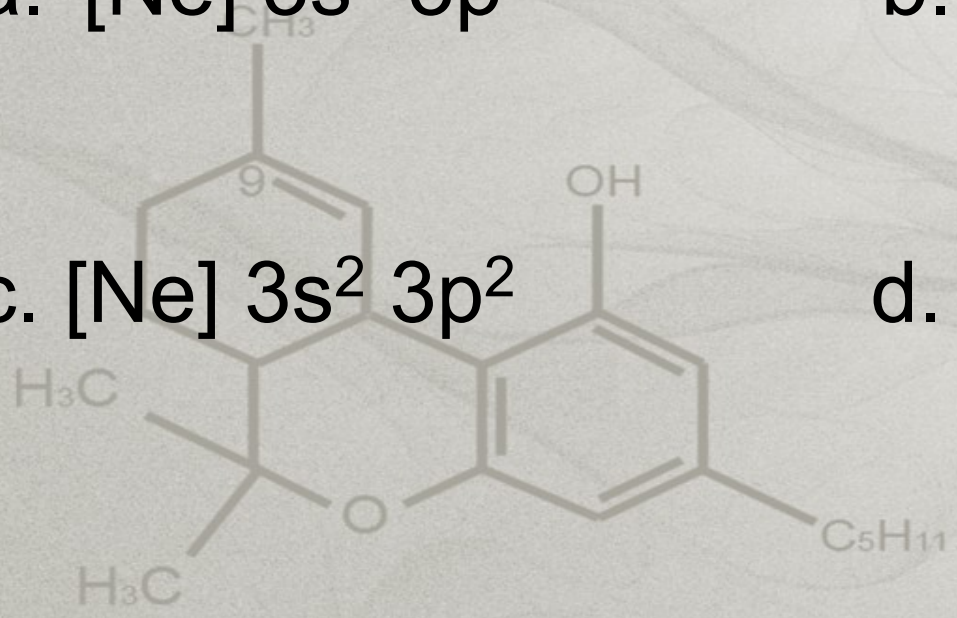
12. Which one of the following element has highest ionization energy ?

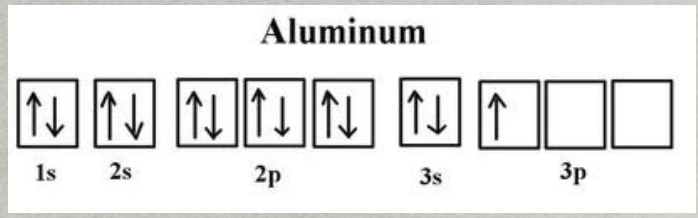
a. [Ne] $3s^2\ 3p^1$

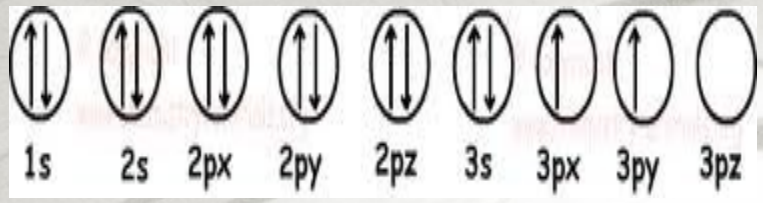
b. [Ne] $3s^2\ 3p^3$

c. [Ne] $3s^2\ 3p^2$

d. [Ar] $3d^{10}4s^2\ 4p^2$





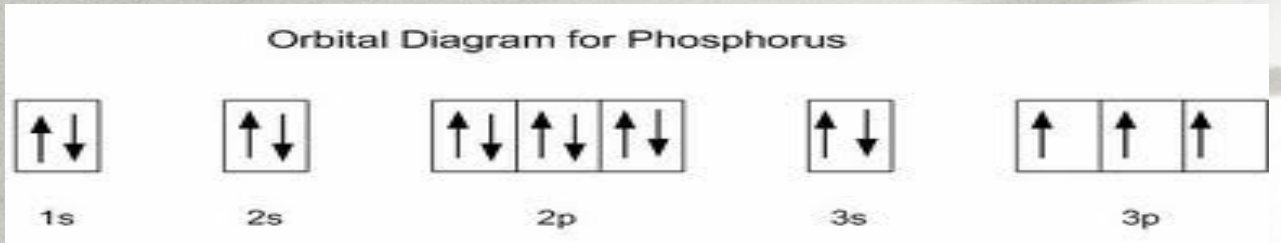


Al –13:[Ne] $3s^2\ 3p^1$ Si – 14: [Ne] $3s^2\ 3p^2$

Ge – 32: [Ar] $3d^{10}4s^2\ 4p^2$

In all these 3 elements valence shell orbital is incompletely filled - Relatively lower IE

P – 15 : [Ne] $3s^2$ $3p^3$



If the valence shell orbital of an atom is half filled or completely filled which is more stable, it has higher IE .

Ans. option b

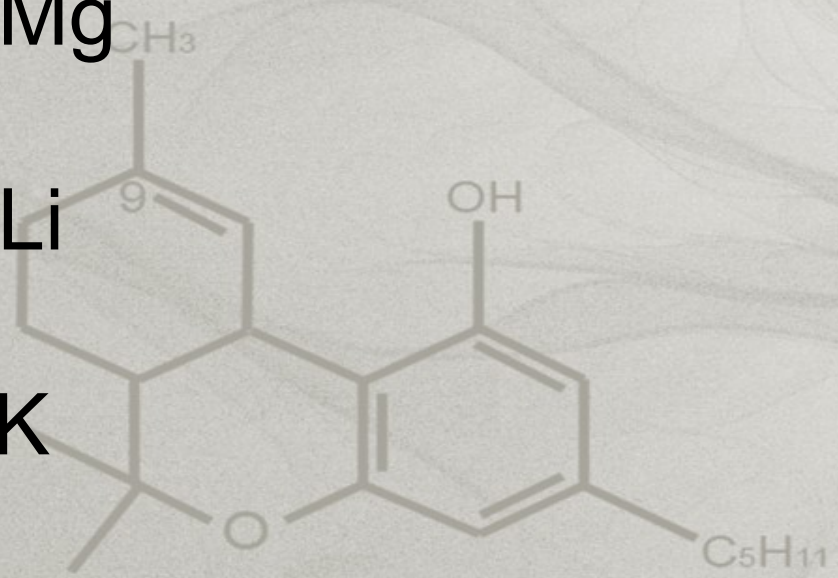
13. Which of the following element will have the lowest first ionization energy?

a. Mg

b. Li

c. K

d. Be



Li & K belong to 1st group have lowest I E.
Be & Mg belong to 2nd group higher I.E
Since I.E decrease from top to bottom in a group . Potassium has lowest first I.E

Ans. Option c

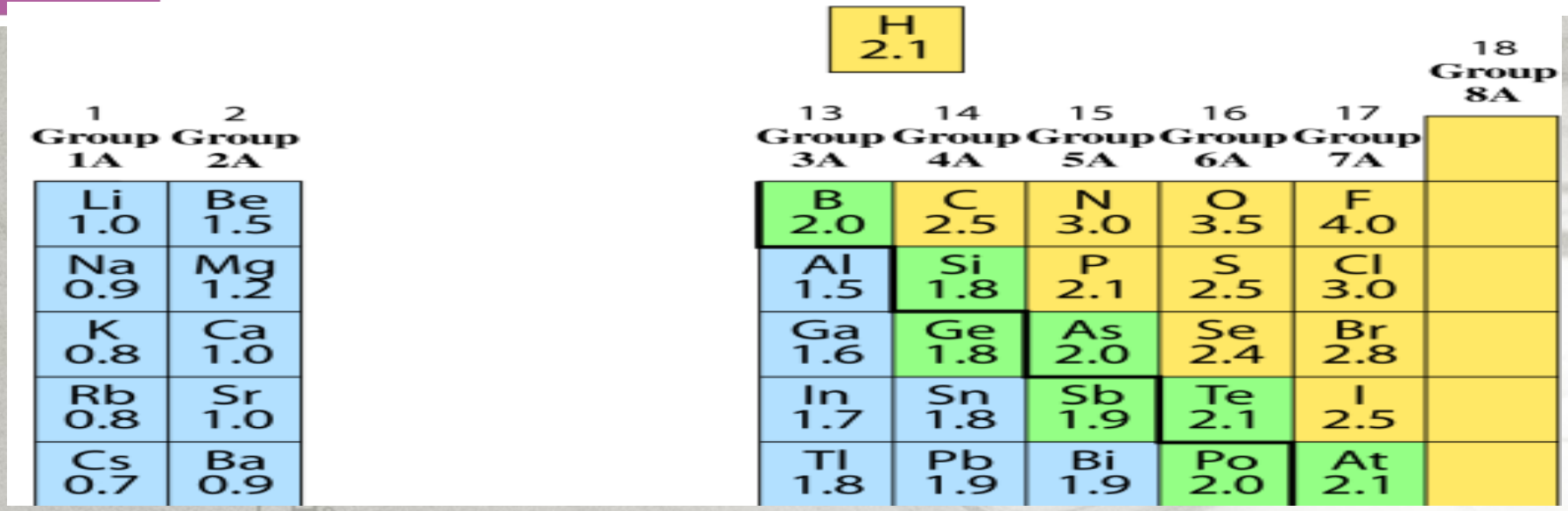
14. Which statement about bond polarity is true?

a. Oxygen is less electronegative than nitrogen.

b. Atom become more electronegative as move to the right across a period in a periodic table.

c. Atom become more electronegative as move down a group .

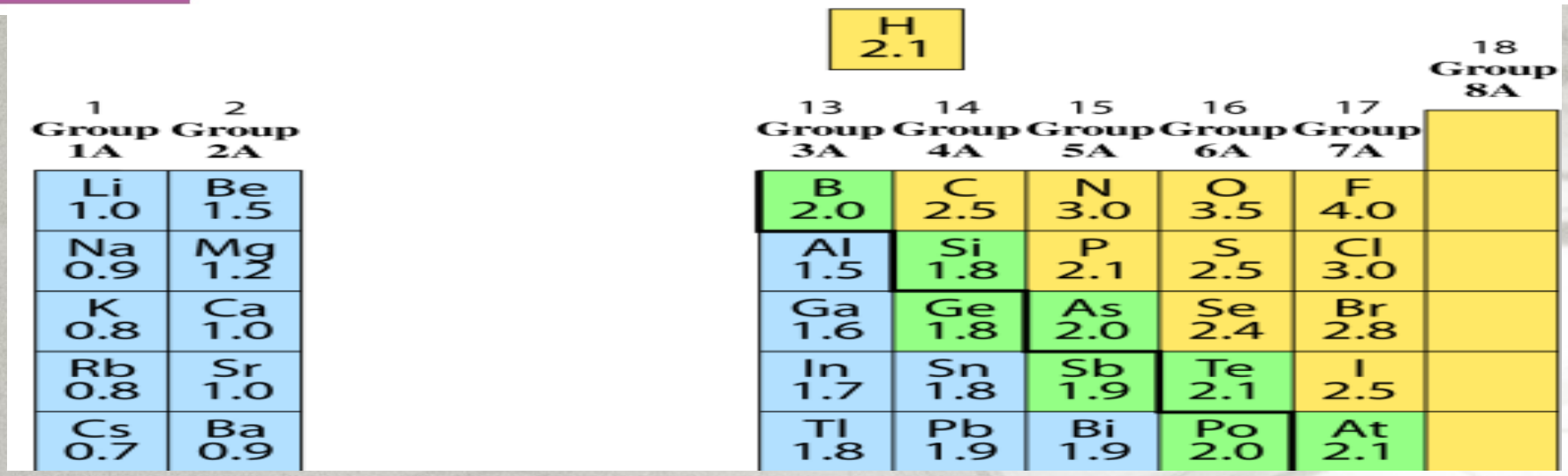
d. Chlorine is more electronegative than flourine.



1 Group 1A	2 Group 2A	13 Group 3A	14 Group 4A	15 Group 5A	16 Group 6A	17 Group 7A	18 Group 8A
		H 2.1					
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	
K 0.8	Ca 1.0	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	
Rb 0.8	Sr 1.0	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	
Cs 0.7	Ba 0.9	Tl 1.8	Pb 1.9	Bi 1.9	Po 2.0	At 2.1	

Bond polarity is obtained from . **Electronegativity, -** It indicates the attraction of an atom for shared electrons.

It increases as move to right across a period. Oxygen is more electronegative than nitrogen.



1 Group 1A	2 Group 2A	13 Group 3A	14 Group 4A	15 Group 5A	16 Group 6A	17 Group 7A	18 Group 8A
		H 2.1					
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	
K 0.8	Ca 1.0	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	
Rb 0.8	Sr 1.0	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	
Cs 0.7	Ba 0.9	Tl 1.8	Pb 1.9	Bi 1.9	Po 2.0	At 2.1	

Electronegativity decrease down the group

Hence Chlorine is less electronegative than flourine.

F is most electronegative element.

Ans.. Option b

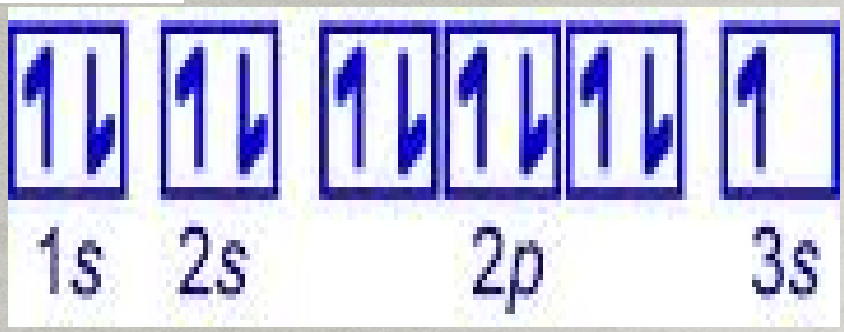
15. The electronic configuration of some elements are given below. Out of these which one has lowest chemical reactivity?

a. $1s^2\ 2s^2\ 2p^6\ 3s^1$

b. $1s^2\ 2s^2\ 2p^3$

c. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

d. $1s^2\ 2s^2\ 2p^6$



Na : $1s^2\ 2s^2\ 2p^6\ 3s^1$

N : $1s^2\ 2s^2\ 2p^3$

Cl : $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

Chemical reactivity depends on the number of valency electrons. All these elements are more reactive.

Noble gas	Symbol	Atomic number	Electronic configuration K L M N O P	Valence electrons
Helium	He	2	2	2
Neon	Ne	10	2 8	8
Argon	Ar	18	2 8 18	8
Krypton	Kr	36	2 8 18 8	8
Xenon	Xe	54	2 8 18 18 8	8
Radon	Rn	86	2 8 18 32 18 8	8

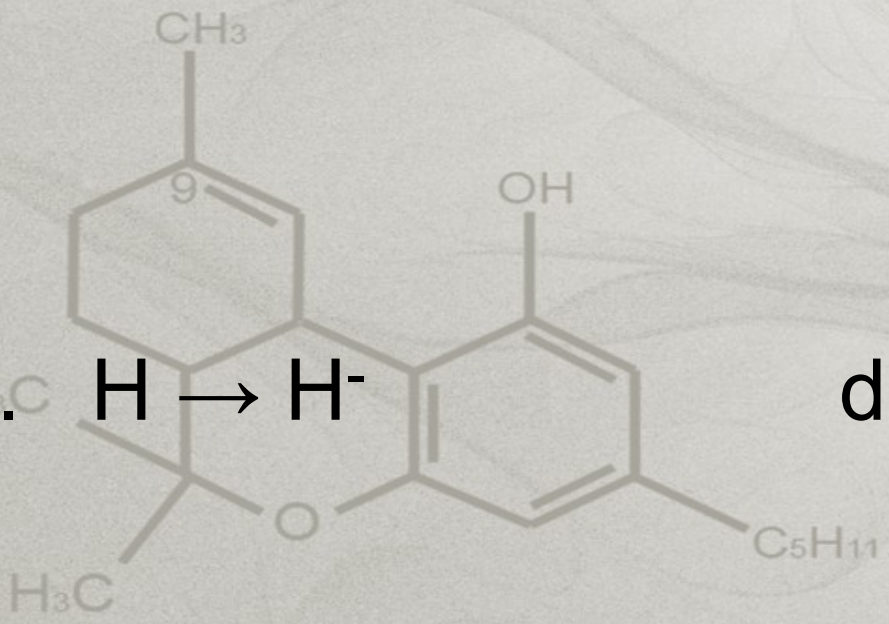
Electronic configuration of Ne (Noble gas) in which both s and p orbitals are completely filled , hence it has lowest reactivity.

Ans. Option d

16. The process which is endothermic :

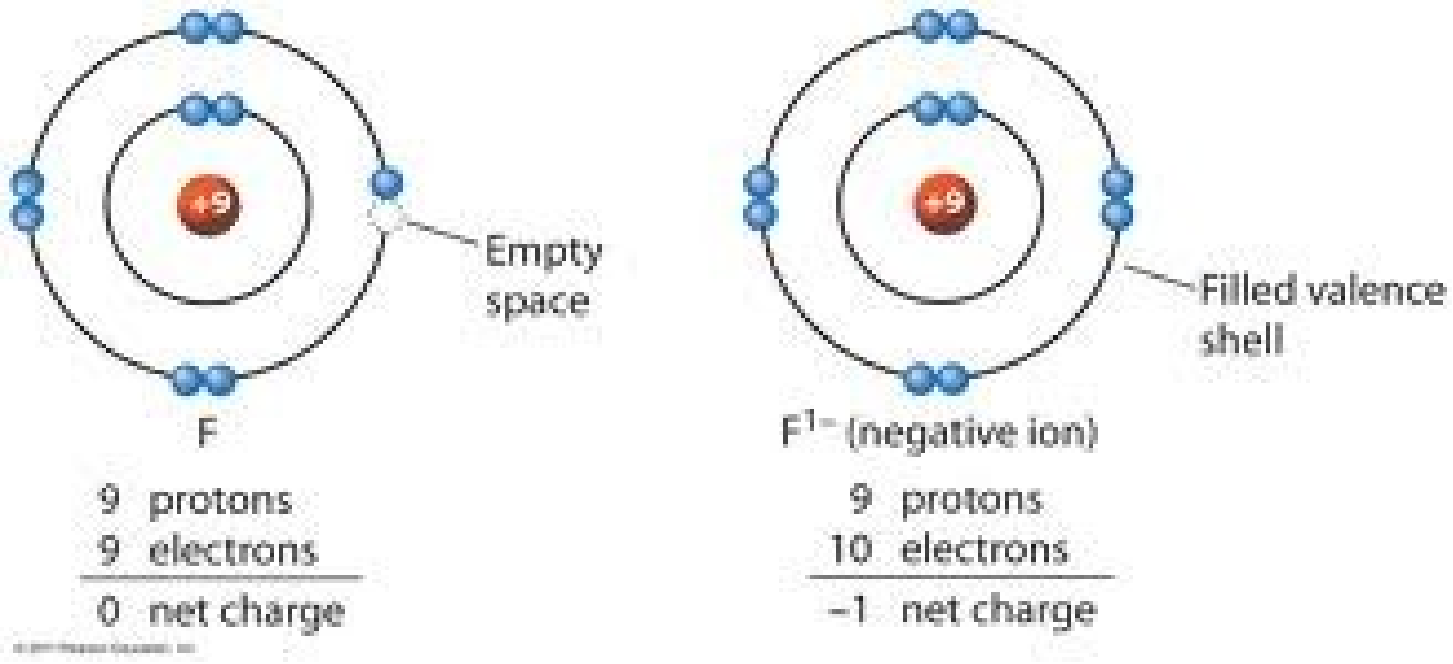
a. $F \rightarrow F^-$

b. $Cl \rightarrow Cl^-$



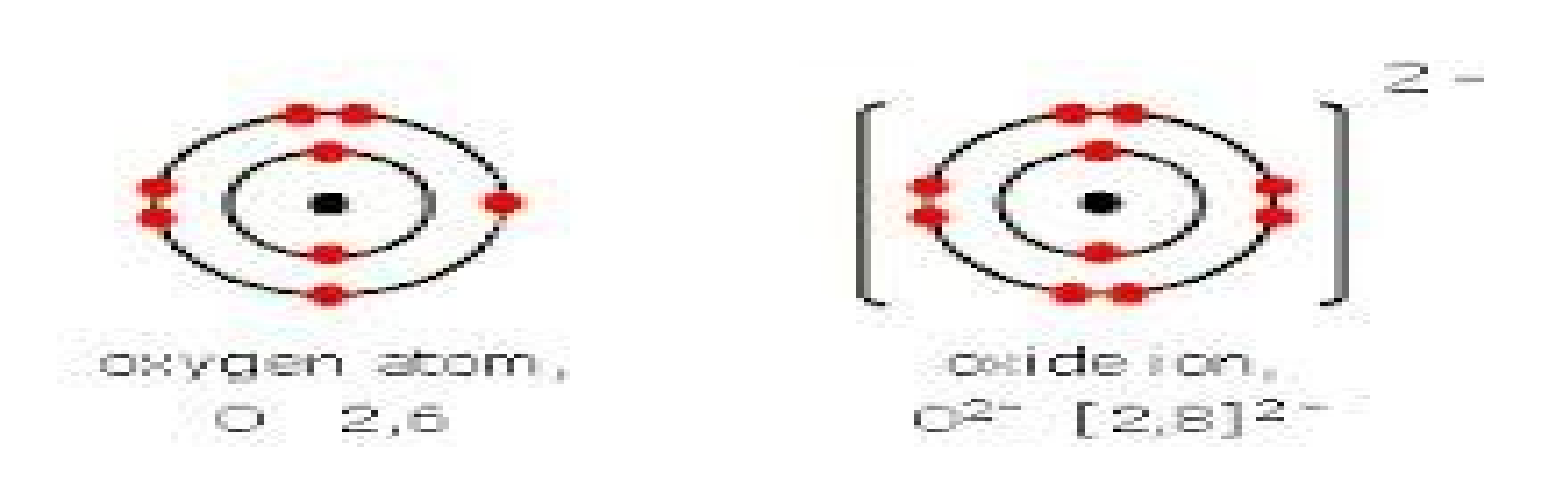
c. $H \rightarrow H^-$

d. $O^- \rightarrow O^{2-}$



Addition of electron to a neutral atom is exothermic.

Addition of 2nd electron to an anion is endothermic. $O^- \rightarrow O^{2-}$



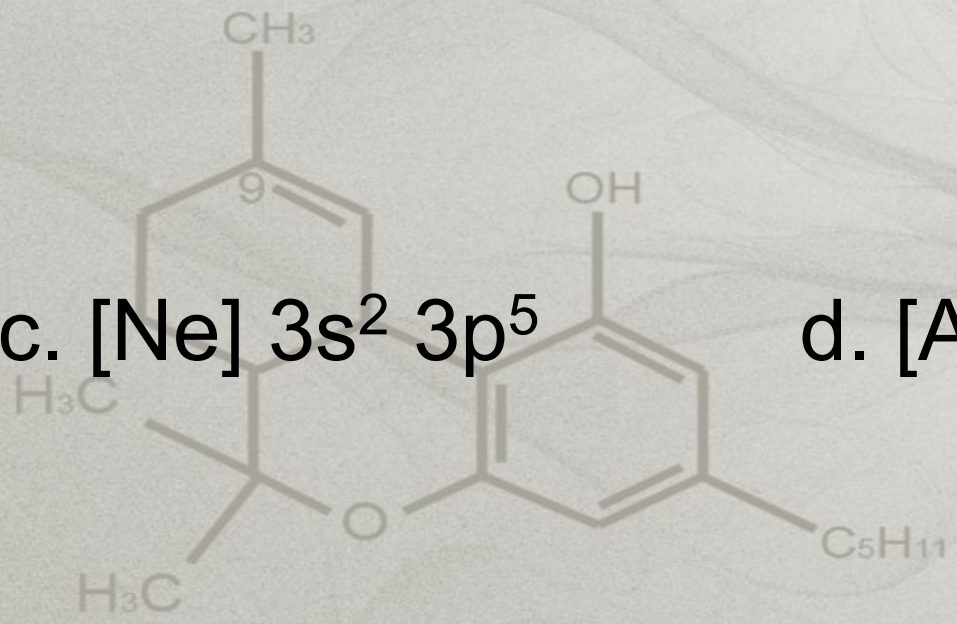
Energy is needed to overcome the repulsion between the electrons already present in the anion and the electron being added .

Ans. Option d

17. Which element has maximum electron affinity?

a. [Ne] $3s^2\ 3p^3$

b. [Ne] $3s^2\ 3p^4$



c. [Ne] $3s^2\ 3p^5$

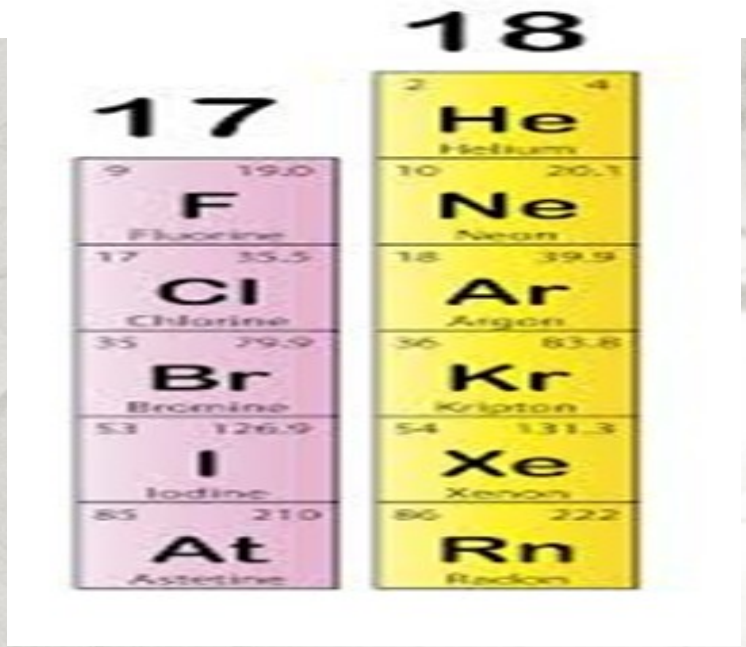
d. [Ar] $4s^1\ 3d^5$

P - 15 : [Ne] $3s^2$ $3p^3$

S - 16 : [Ne] $3s^2$ $3p^4$

Cl - 17 : [Ne] $3s^2$ $3p^5$

Cr - 24 : [Ar] $4s^1$ $3d^5$



An element which has very strong tendency to accept an electron, to aquire noble gas configuration has maximum electron affinity.

Halogens have highest E.A

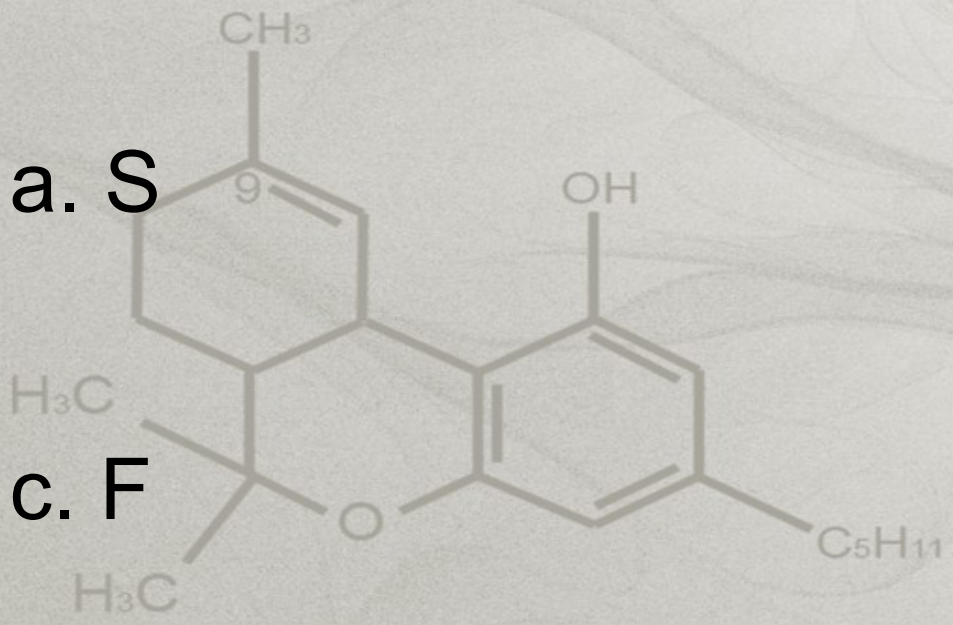
$Cl + e \longrightarrow Cl^-$

$[Ne]\ 3s^2\ 3p^5 \qquad [Ne]\ 3s^2\ 3p^6$

Only one electron gaining is sufficient to aquire noble gas configuration of Ar

Ans. Option c

18. Which one of the following element has highest electron affinity (with negative sign) ?



a. S

b. Cl

c. F

d. O

Table 12-4

Electron Affinities (in kilojoules per mole)

H 72.8							He (−21.3)
Li 59.8	Be (−241)	B 23.2	C 123	N 0	O 141	F 322	Ne (−28.9)
Na 52.9	Mg (−232)	Al 44.4	Si 120	P 74.3	S 200	Cl 349	Ar (−34.7)
K 49.0							

( ) indicates a calculated rather than an experimental value.

Electron affinity (with negative sign) increase along a period and decrease down the group.

Exception, electron affinity of O < S and F < Cl , due to interelectronic repulsion in the compact 2p – orbital of O and F

Ans . option b.

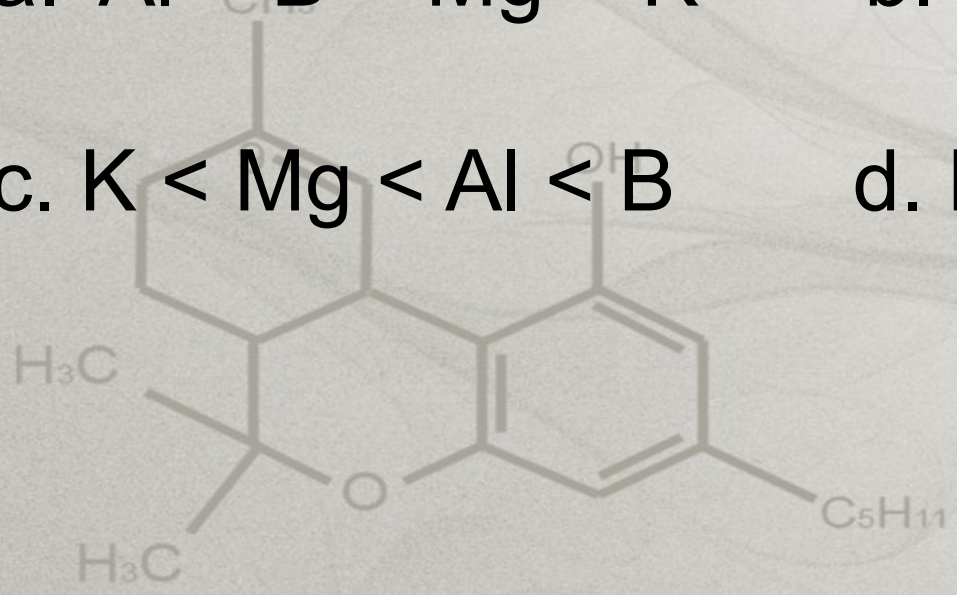
19. Arrange the following elements in the increasing order of metallic character: B, K, Mg, Al.

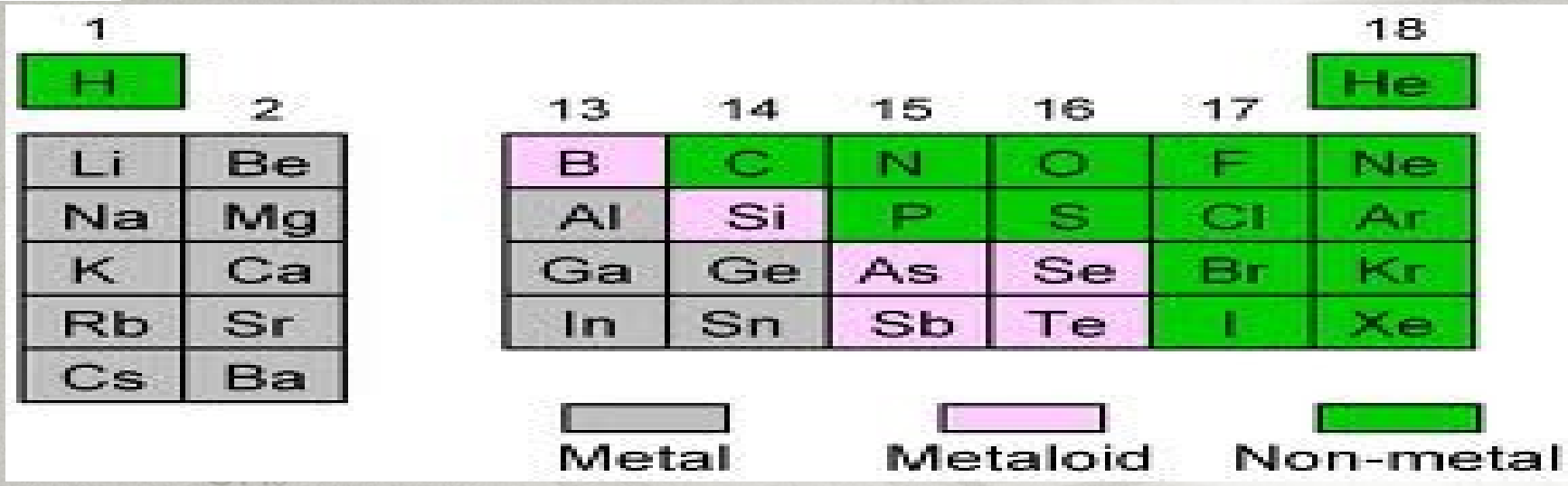
a. Al < B < Mg < K

b. B < Mg < Al < K.

c. K < Mg < Al < B

d. B < Al < Mg < K





Metallic character increases on moving down the group and decreases on moving across a period from left to right.

Ans. Option d. B < Al < Mg < K

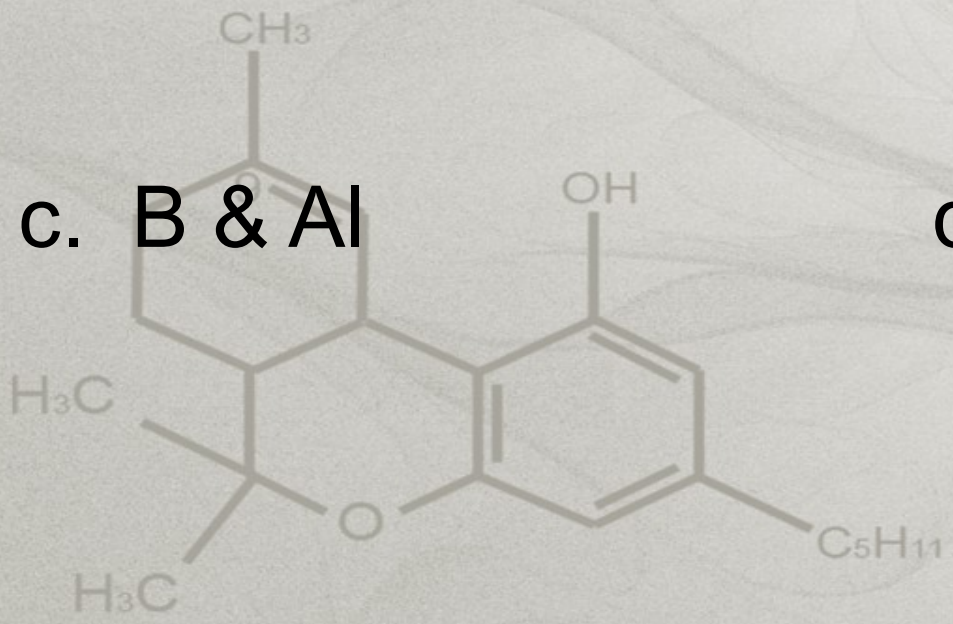
20. Which elements are non metals?

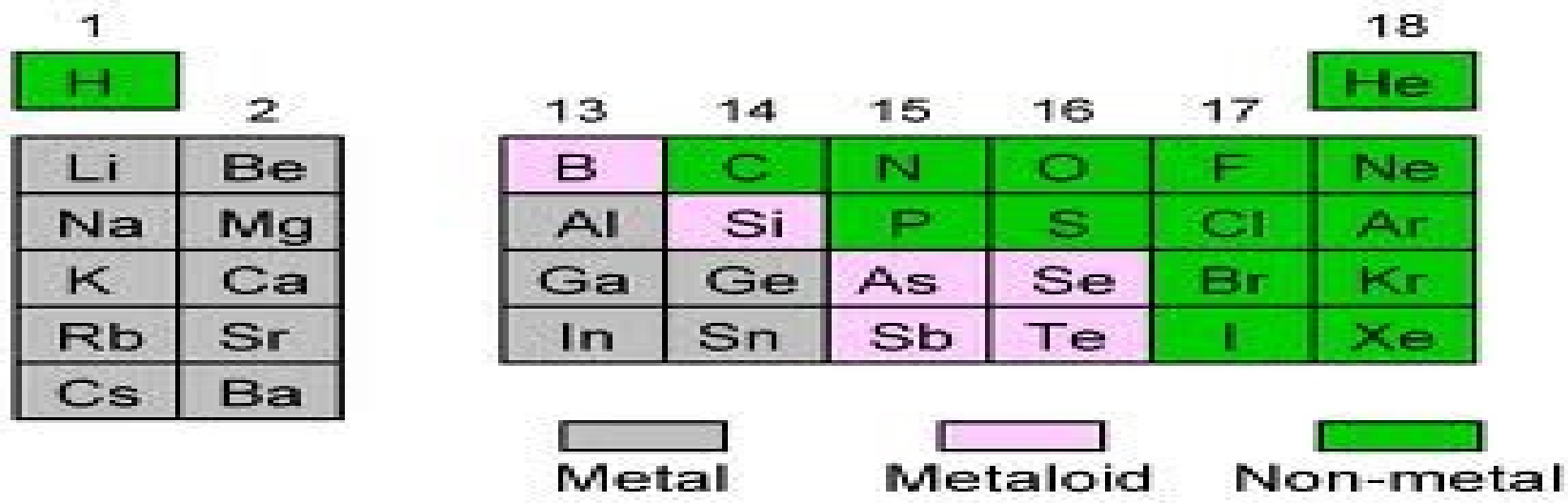
a. Na & K

b. Be & Mg

c. B & Al

d. N & P





Metallic character decreases from left to right in the periodic table.

Metals on the left of periodic table.

Non metals appear to the right of the periodic table.

Ans. Option d , N & P

21. Group I elements do not occur free (native state) in the nature because.

a. They are unstable

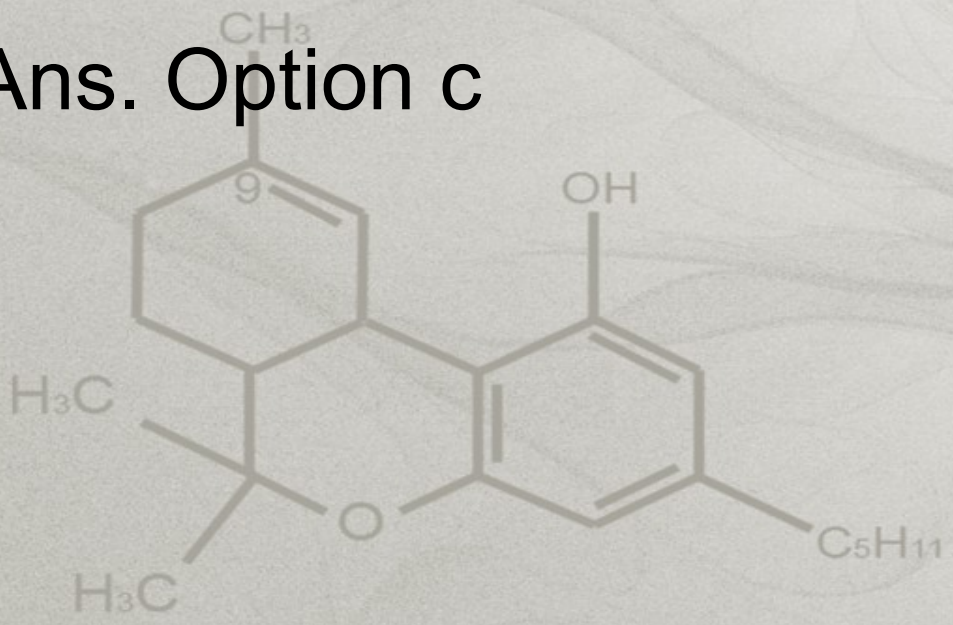
b. Their compounds with other elements are highly stable

c. Their chemical reactivity is very high

d. None of these

I group elements (alkali metals) are highly reactive, hence they do not occur in free state.

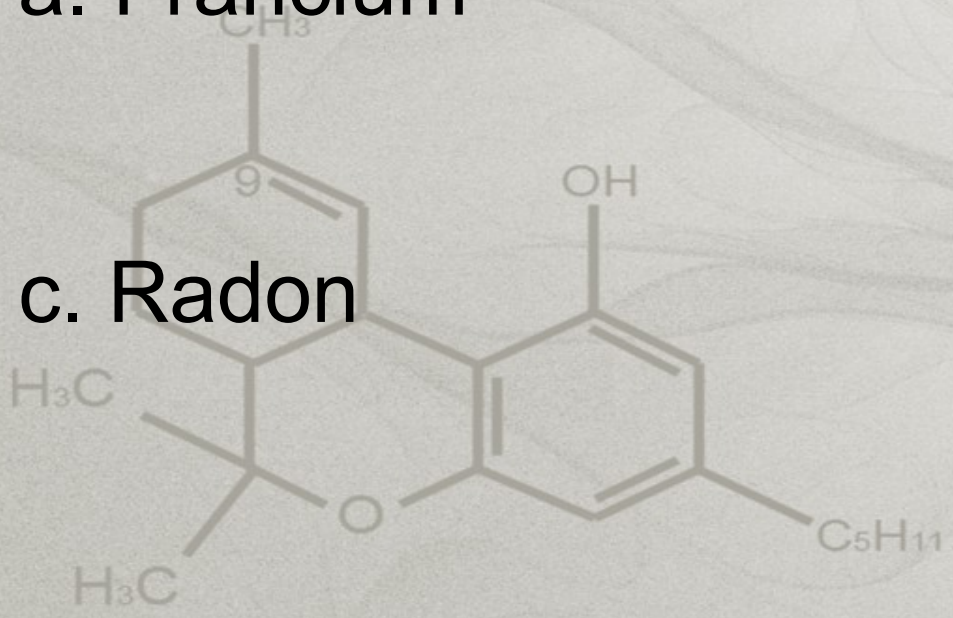
Ans. Option c



22. ------- is a radioactive alkaline earth metal

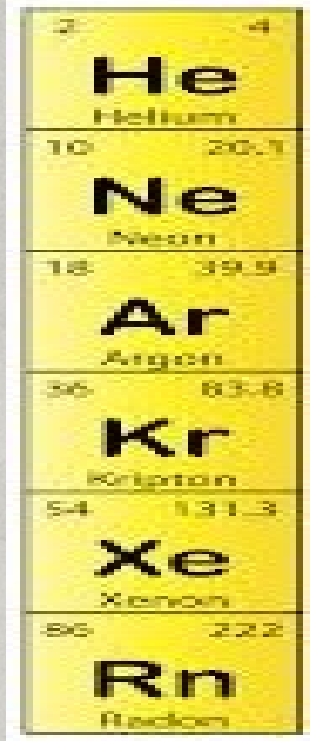
a. Francium

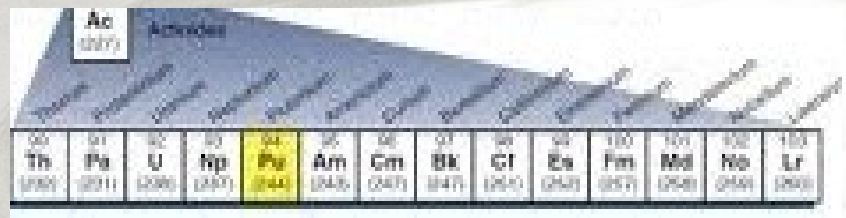
b. Radium



c. Radon

d. Uranium





Francium (Fr) is a radioactive alkali metal.

Radon (Rn) is a radioactive rare gas.

Uranium is a radioactive inner transition element.

Ans. Option b i.e. Radium

23. Which statement is characteristic of metals?

A: They are shining

B: They are poor conductor of electricity

C: They melt at high temperature

a. Statement A only

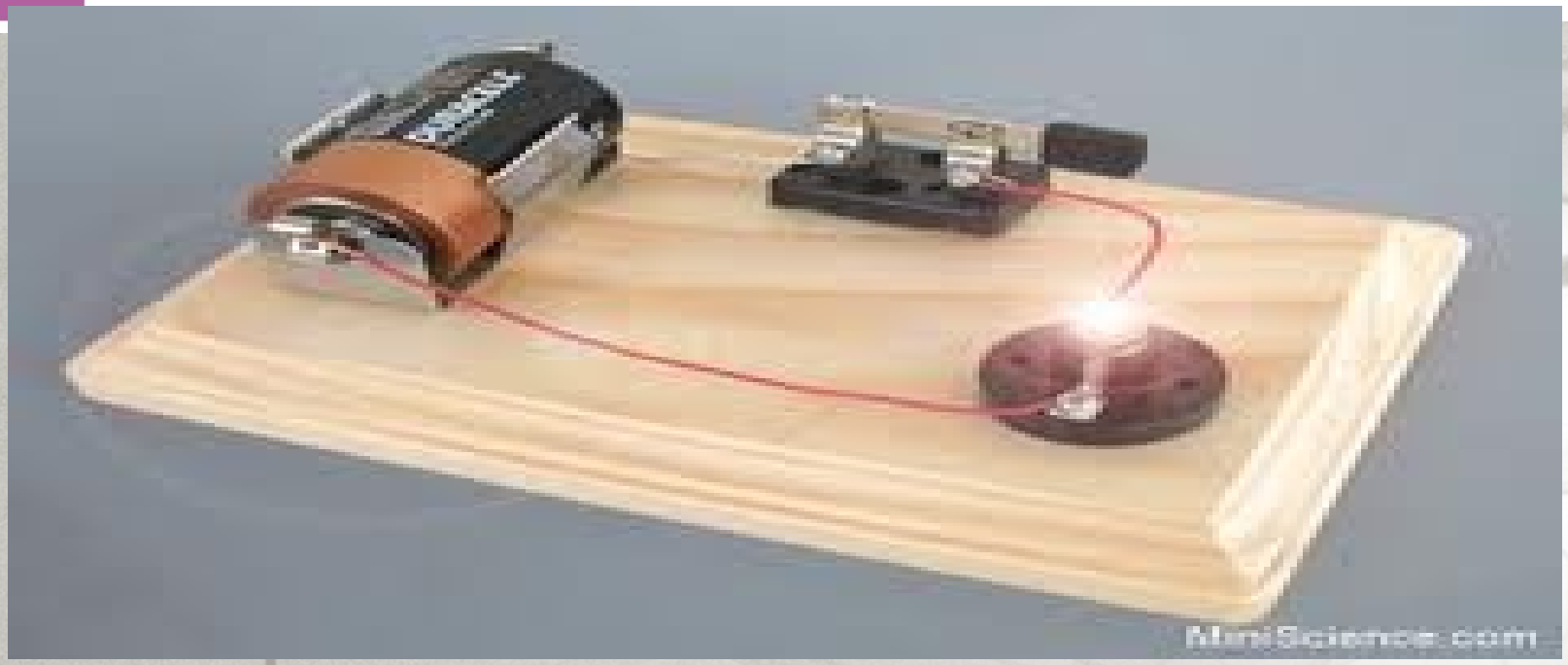
b. Statement A & B only

c. Statement A & C

d. Statement A,B,C

Metals are shining – metallic lustre

Metals melt at high temperature



They are good conductor of electricity

Ans.Optionc. Statement A & C are correct

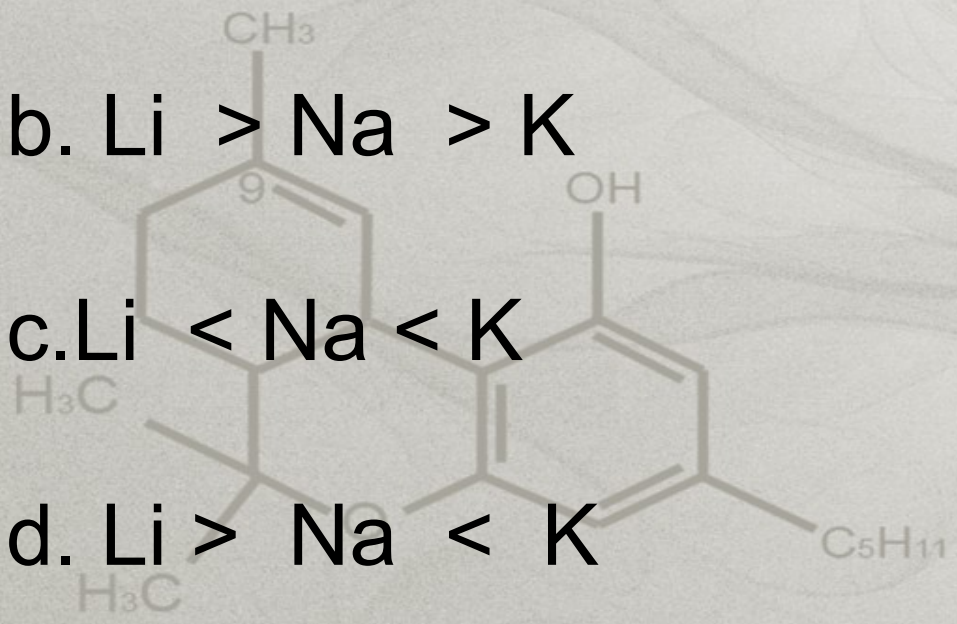
24. The correct order of density of the following metals is

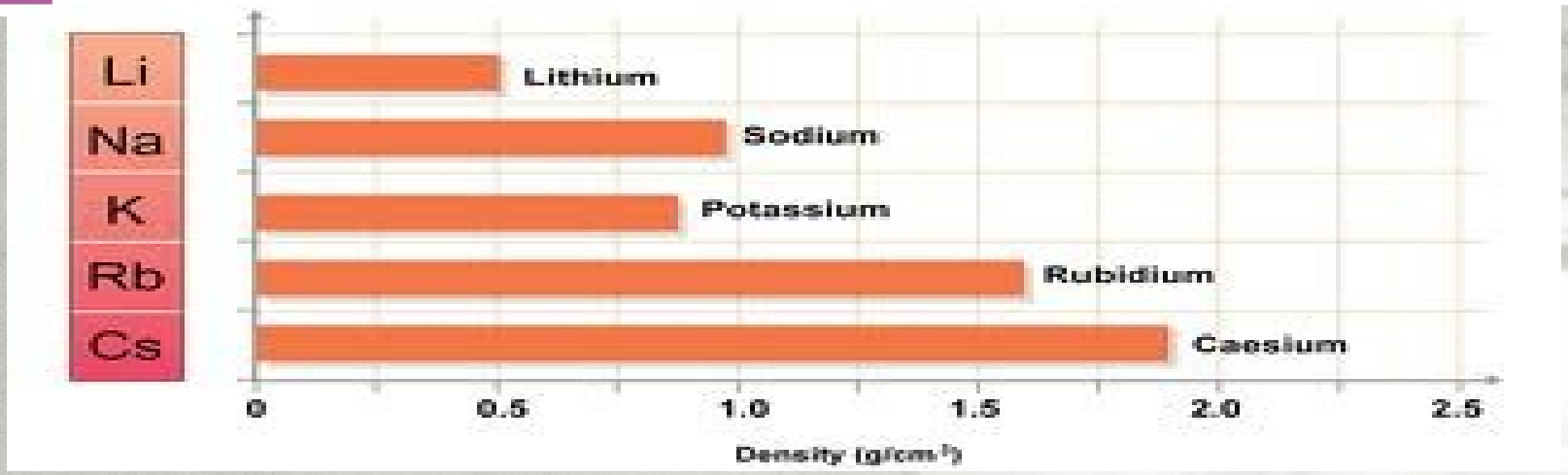
a. Li < Na > K

b. Li > Na > K

c. Li < Na < K

d. Li > Na < K





Density of alkali metals increases down the group . Lithium is the lightest metal.

Exception, density of potassium is less than that of sodium.

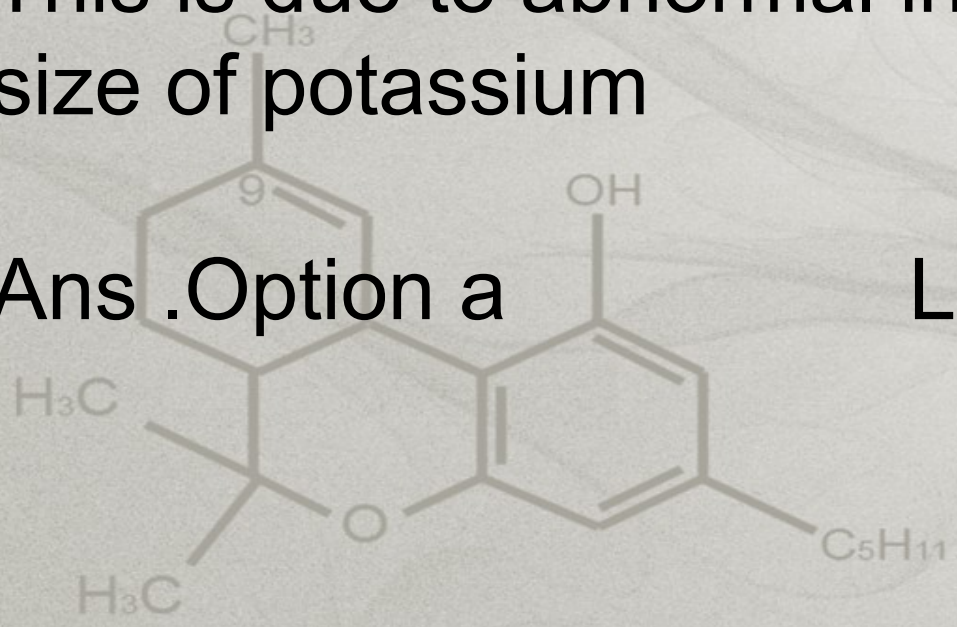
Density of Li – 0.534 g /cm

Na - 0.972 g /cm^3 (At. radius – 186 pm)

K - 0.869 g / cm^3 (At. radius - 227 pm)

This is due to abnormal increase in atomic size of potassium

Ans .Option a Li < Na > K



25. Compared to alkali metals , alkalline earth metals

a. are more metallic

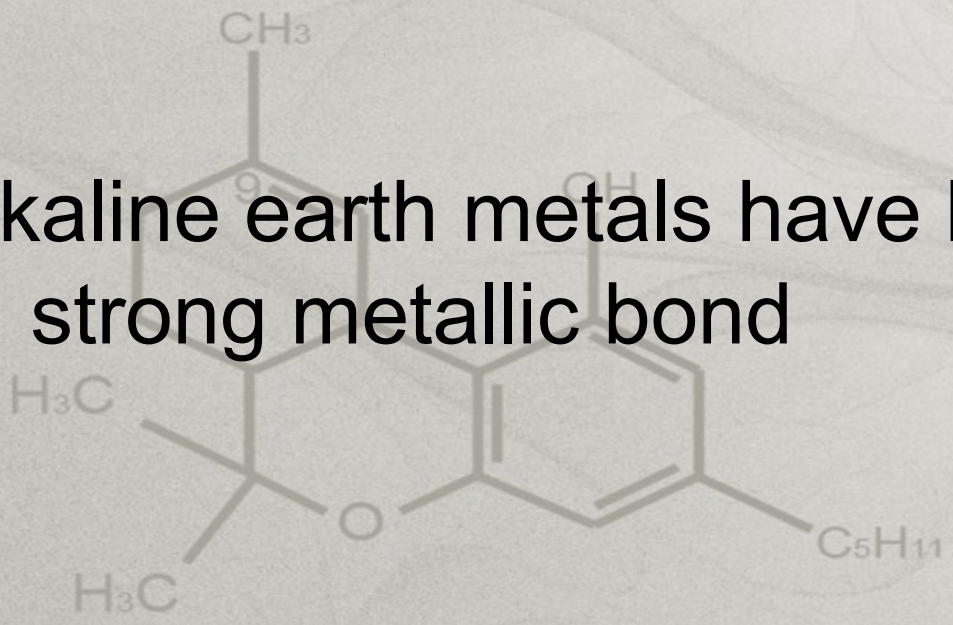
b. have lower m.p.

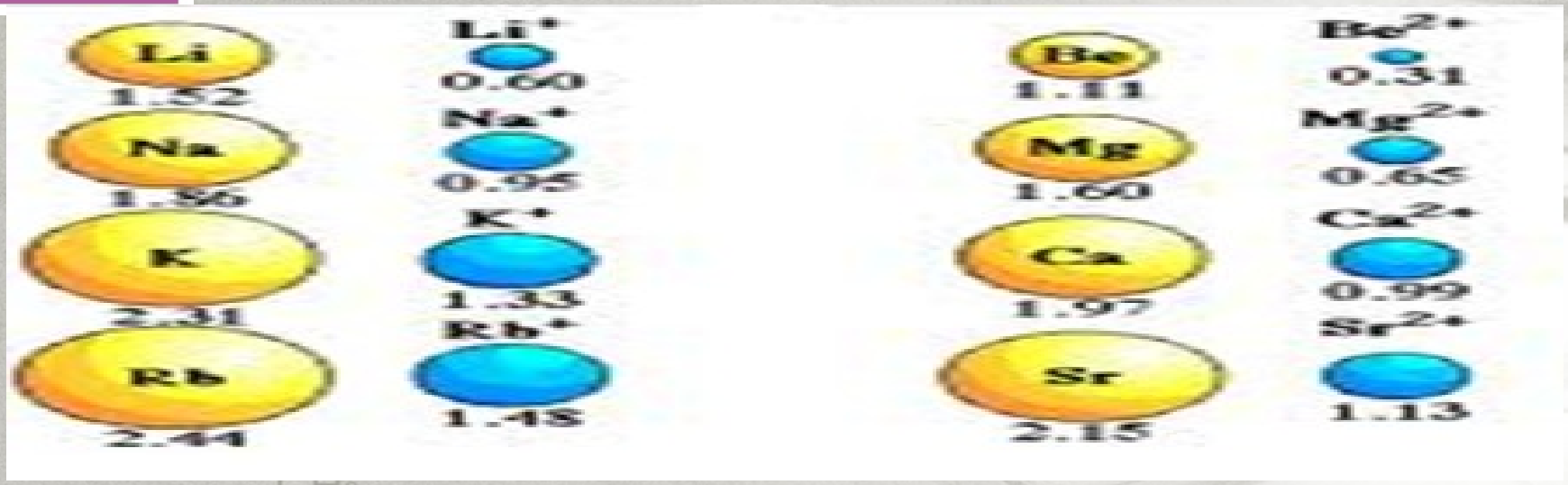
c. have larger atomic radii

d. have higher densities

Alkaline earth metals are less metallic, due low electropositivity.

Alkaline earth metals have higher m.p , due to strong metallic bond





Alkalline earth metals have higher densities due to smaller atomic size (d = m/v) and stronger metallic bond than alkali metals.

Ans. Option d

26. Sodium reacts with water more vigorously than lithium because

a. It has higher atomic weight

b. It is more electronegative

c. It is more electropositive

d. It has higher ionization energy

In alkali metals are highly electropositive due to low ionisation energy .

Electropositive nature increases from Li to Cs.

Hence reactivity with water also increases.

Ans. Option c

27. Which one is true for a salt Na_2Co_3 ?

a. It gives voilet colour to bunsen flame & its aqueous solution turns red litmus blue

b. It gives voilet colour to bunsen flame its aqueous solution turns blue litmus red

c. It gives golden yellow colour to bunsen flame & its aqueous solution turns red litmus blue

d. It gives golden yellow colour to bunsen flame & its aqueous solution turns blue litmus red

Sodium flame

Potasium flame

Sodium salts gives golden yellow color flame.
Potassium salts gives violet color flame
Sodium carbonate aqueous solution is alkaline due hydrolysis , hence it turns red litmus paper turns blue.

Ans. Option c

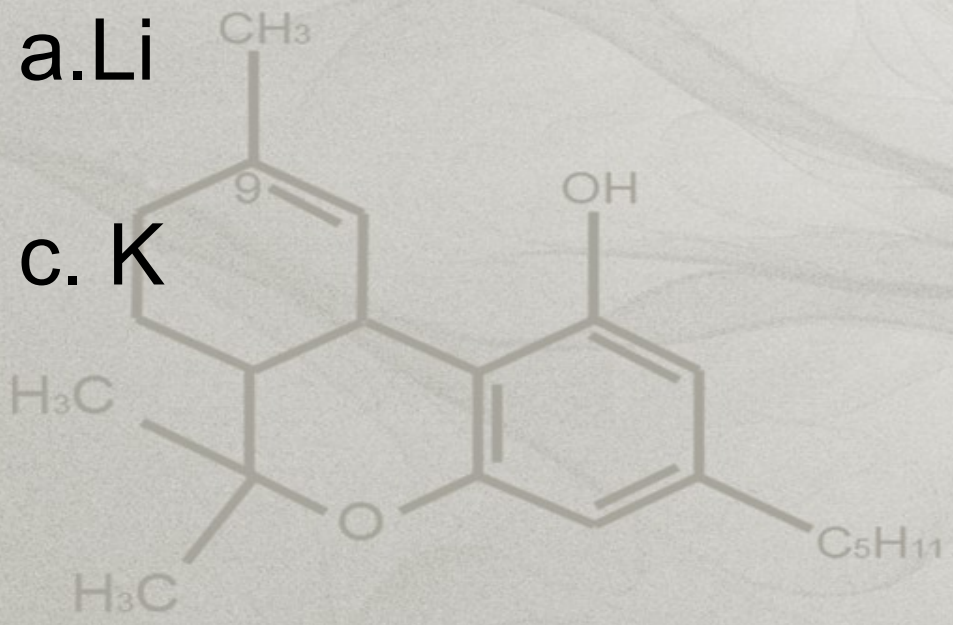
28. Which one of the alkali metal forms only normal oxide M_2O ?

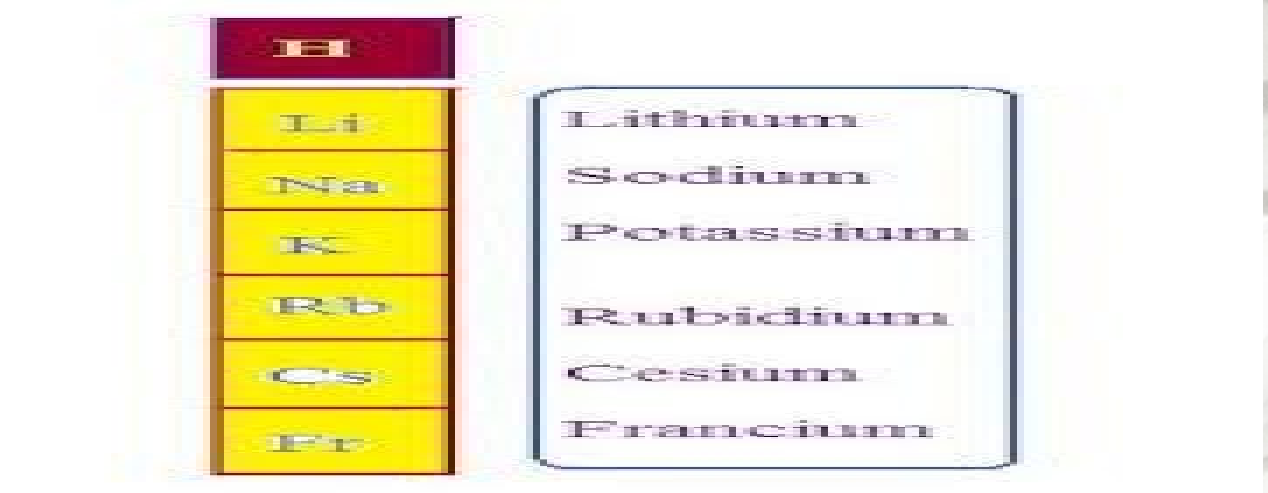
a.Li

b. Na

c. K

d. Rb



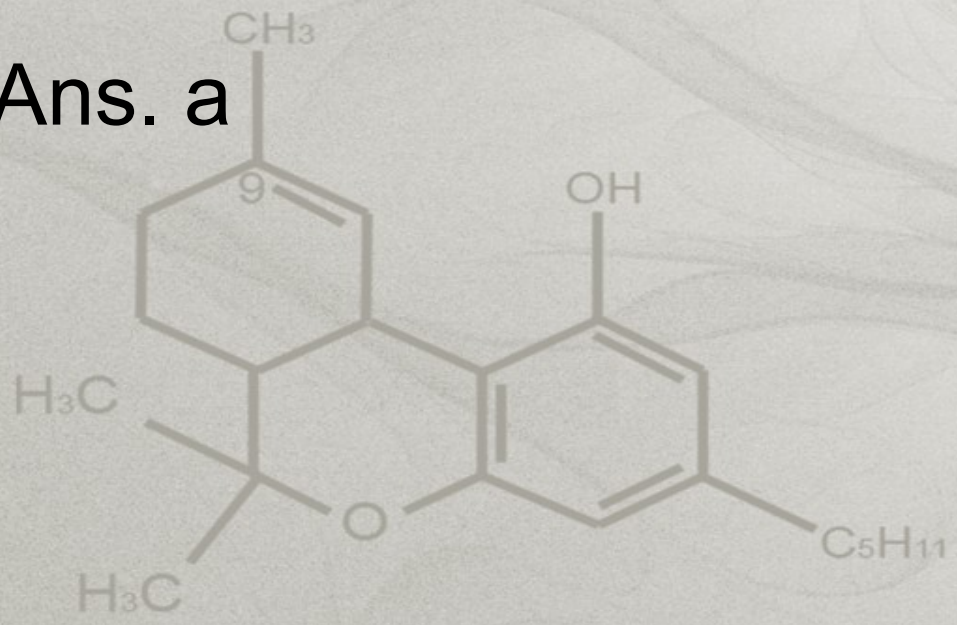


Sodium forms peroxide (Na_2O_2) ,

whereas potassium , rhubidium and caesium forms superoxides (KO_2 , RbO_2 and CsO_2) when these metals are burnt in air.

Only lithium form normal oxide (Li_2O) when this metal is burnt in air.

Ans. a



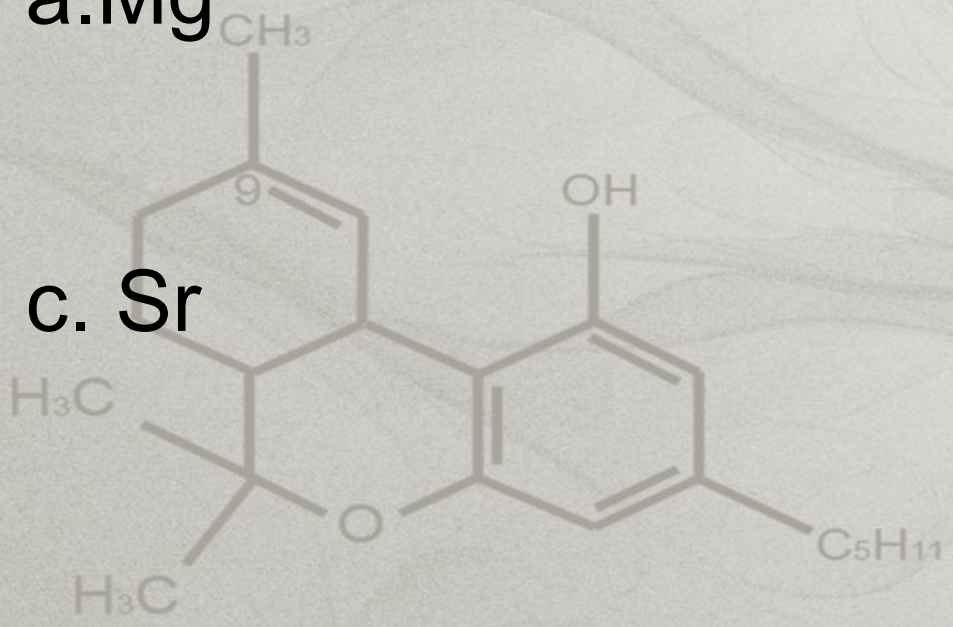
29. Lithium resembles -------- of group 2 in its properties.

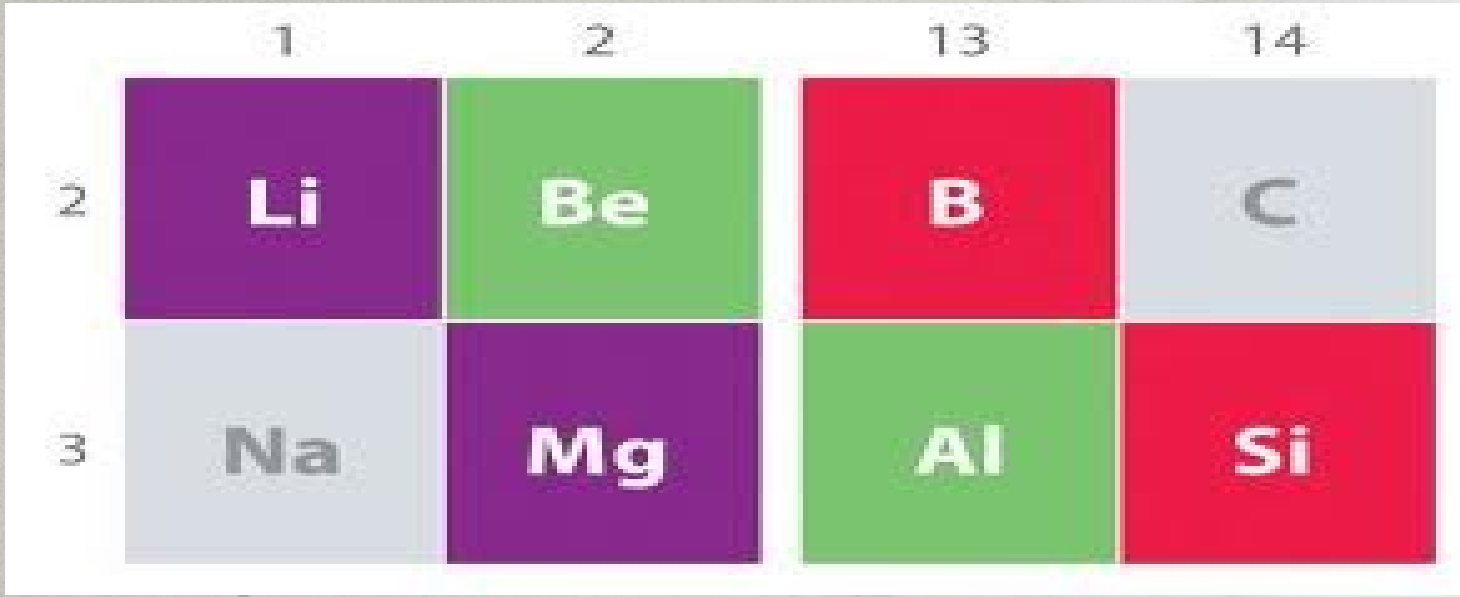
a.Mg

b. Ca

c. Sr

d. Ba





Elements of s- and p- block exhibit diagonal relationship . i.e. Similarities in properties with 2nd element of next group. E.g Li - Mg , Be – Al and B – Si show diagonal relationship

Ans. a

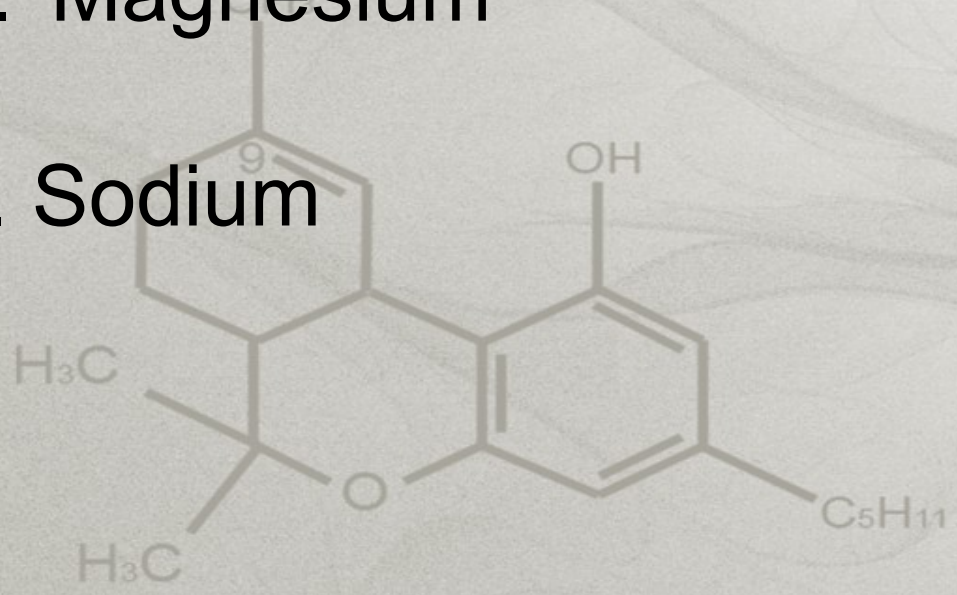
30. Which among the following element has the higher value of second ionisation energy?

a. Magnesium

b. Calcium

c. Sodium

d. Stroncium



Na^+ has stable noble gas configuration

Na -----→ Na^+

2 8 1 2 8

1st IE of Na– 495.8kJ 1st IE of Mg – 737.7kJ

2nd IE of Na – 4562kJ 2nd IE of Mg –1450.6 kJ

Ans. Option c

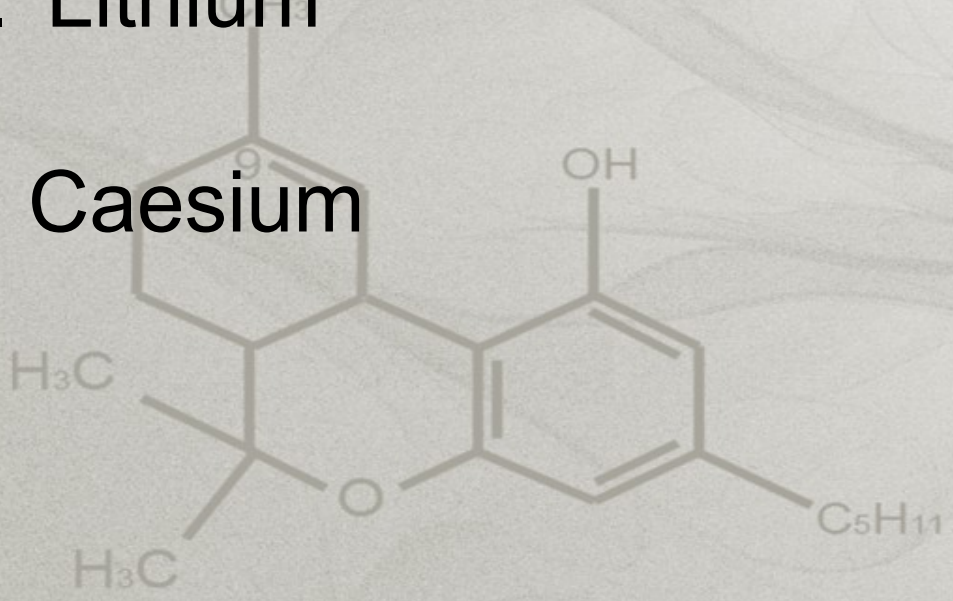
31. Which of the following metal is most commonly used in photochemical cells?

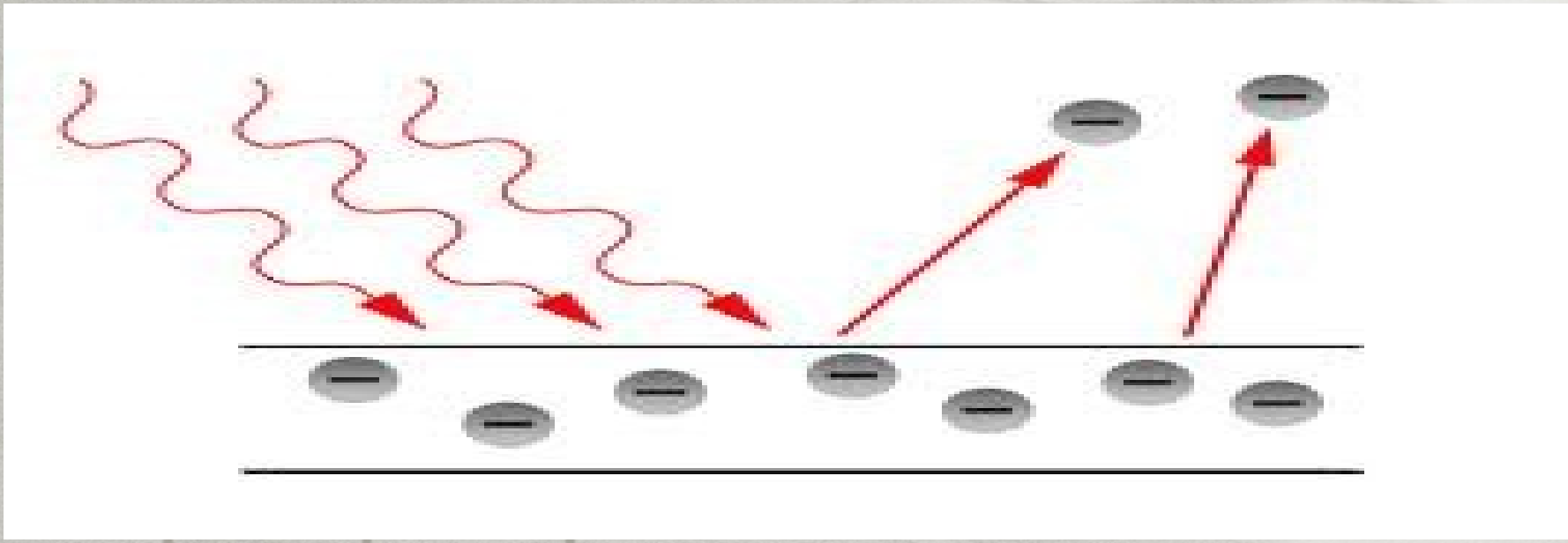
a. Lithium

b. Calcium

c. Caesium

d. Francium





Phenomenon of emission of electrons when metal surface is exposed to light is known as photoelectric effect

Alkali metals have low I.E . Hence they emit electrons even when exposed to light.

I.E in alkali metals decreases down the group ,

Cs has lowest I.E. It shows maximum photo electric effect , hence used in photochemical cells.

Ans. Option c

.

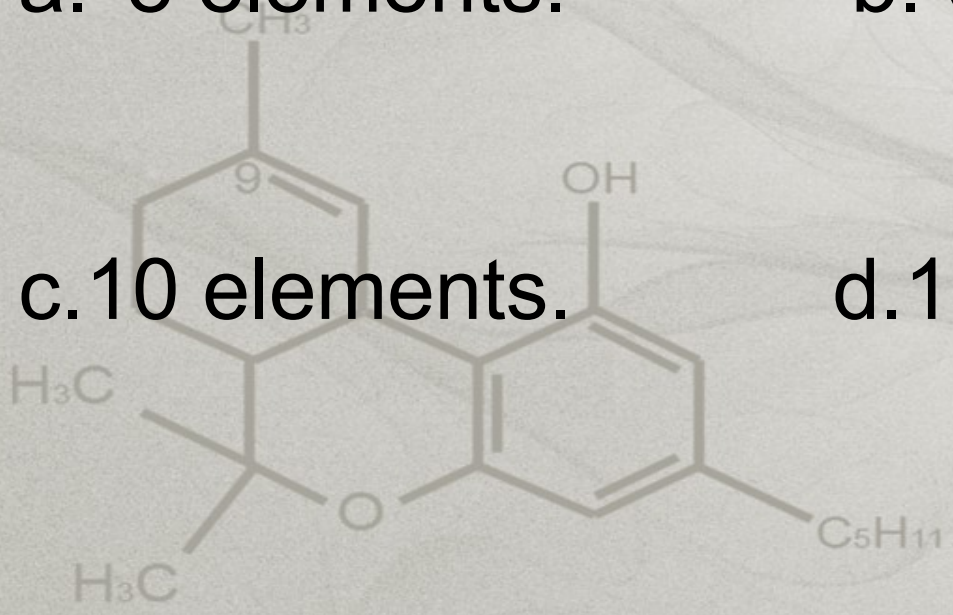
32. The fourth period of the p – block element contains

a. 8 elements.

b. 6 elements.

c.10 elements.

d.18 elements.



P – block elements

					2 He
5 B	6 C	7 N	8 O	9 F	10 Ne
13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn

The elements from group 13 to group 18 are known as p – block elements.

P – block elements

					2 He
5 B	6 C	7 N	8 O	9 F	10 Ne
13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn

Each period in p – block elements contains only 6 elements

p – orbital can take max. 6 electrons.

Ans. b.

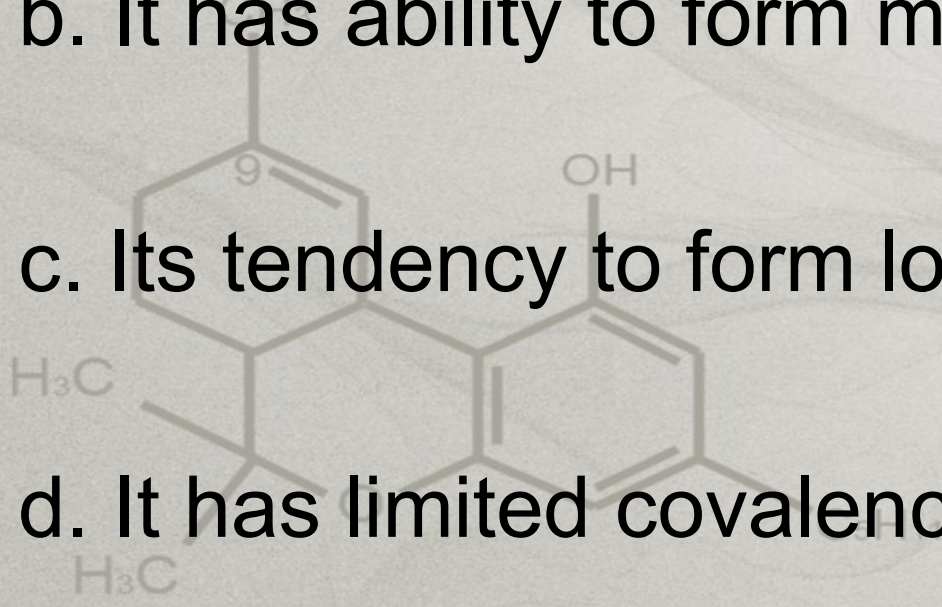
33. Which of the following statement is not true about carbon ?

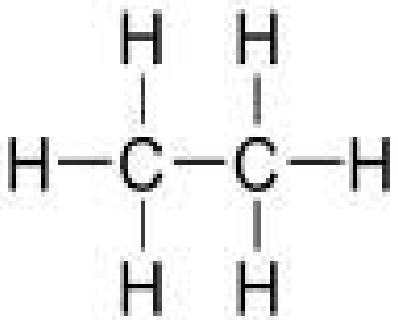
a. It is the main constituent of inorganic matter.

b. It has ability to form multiple bond

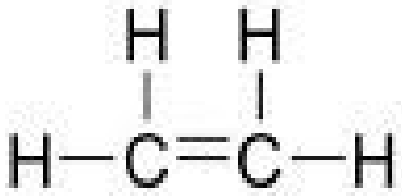
c. Its tendency to form long chain

d. It has limited covalence of four





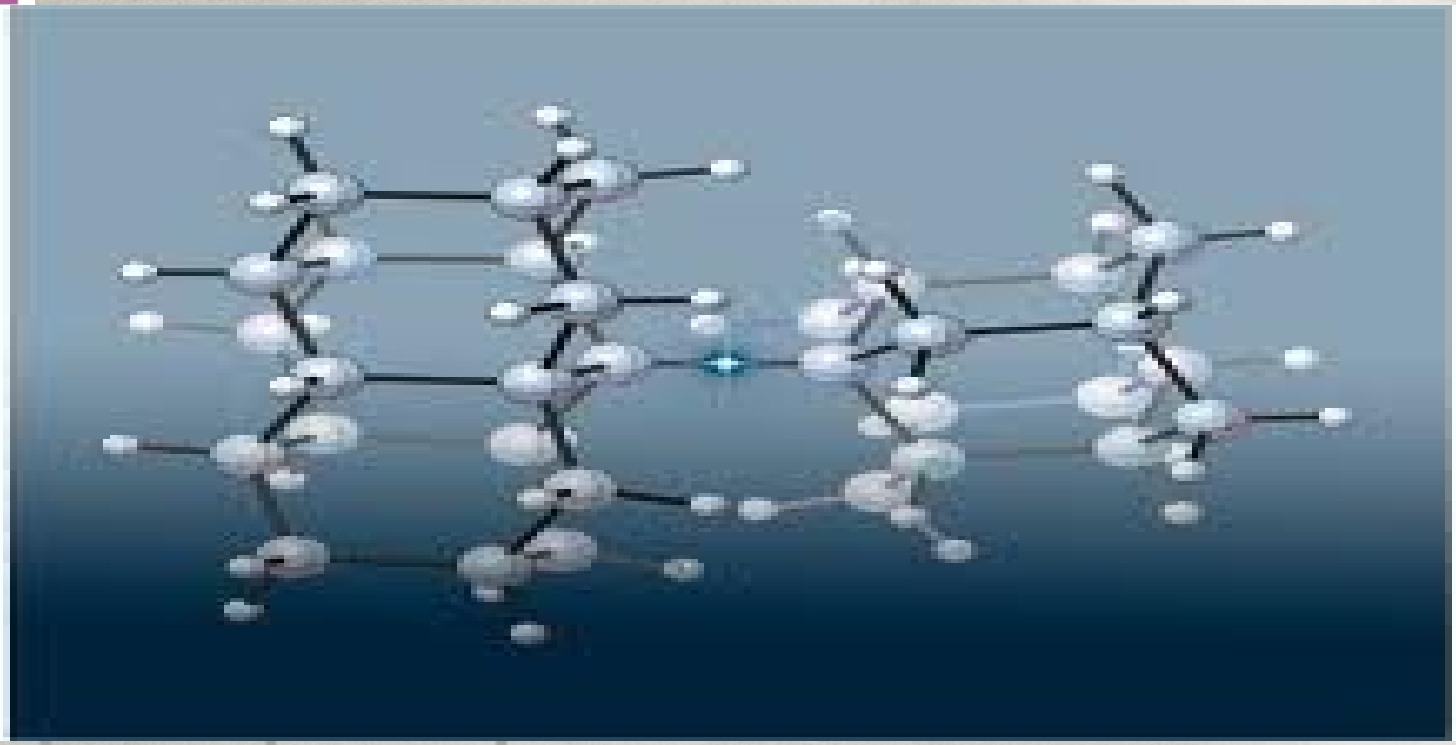
ethane
(an alkane)



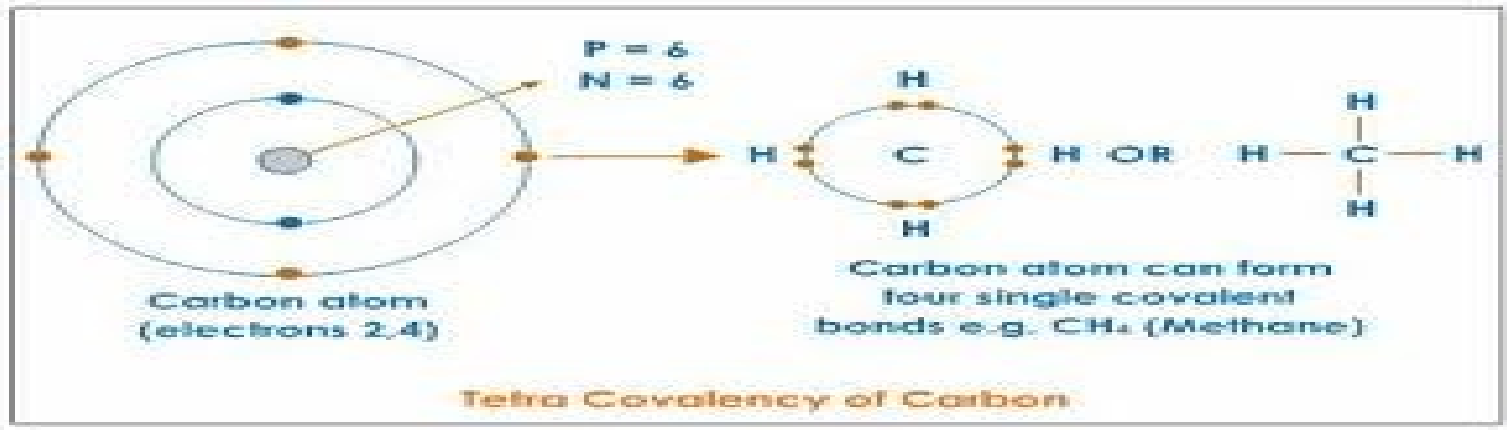
ethene
(an alkene)

ethyne
(an alkyne)

Carbon forms double bond , triple bond with carbon and other elements



Its tendency of forming long chain is a catenation property. (self linking property)



Carbon has limited covalence of four because of non availability of d- orbital electrons

It is the main constituent of organic

Matter

Ans. Option a

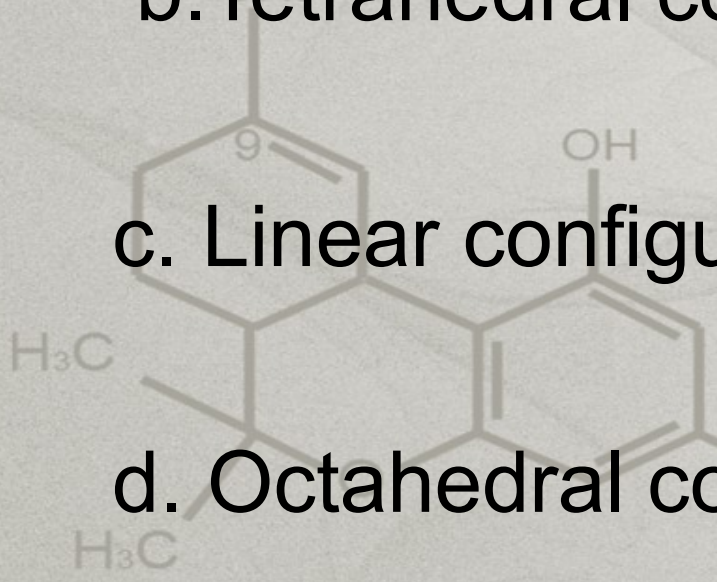
34. Carbon atom in diamond are arranged in

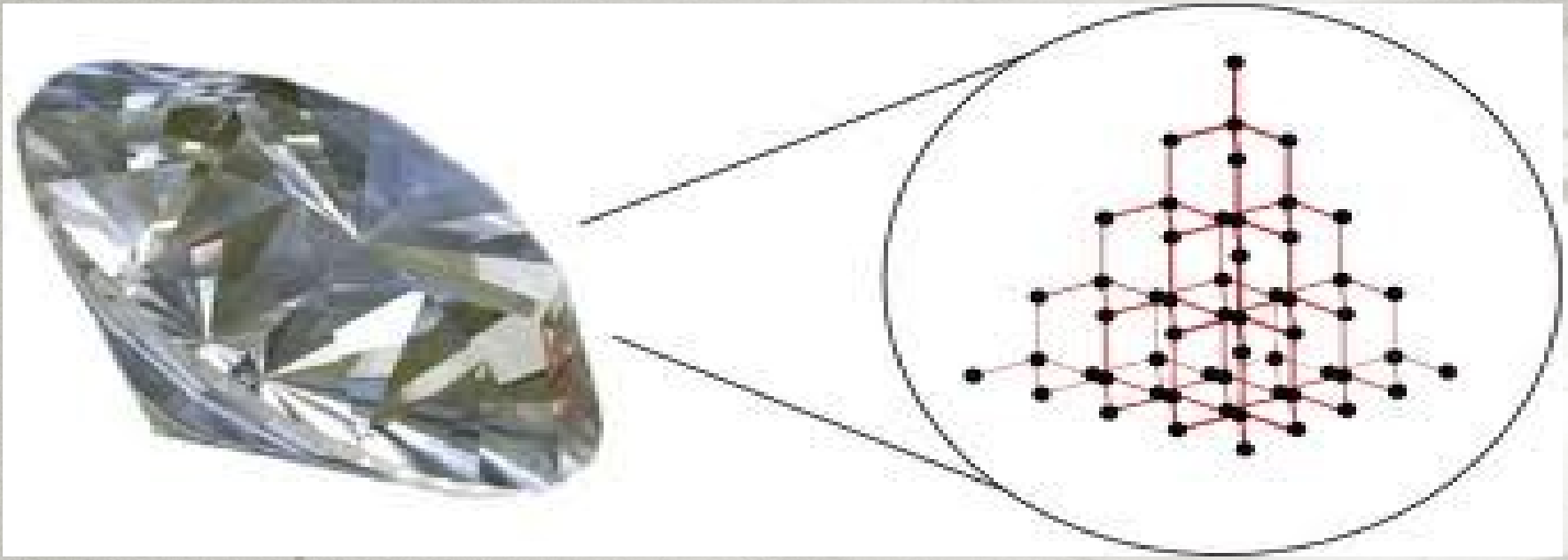
a.Planar configuration

b.Tetrahedral configuration

c. Linear configuration

d. Octahedral configuration





Carbon atoms in diamond are in a state of sp^3 hybridization and are arranged in tetrahedral configuration.

Ans. Option b

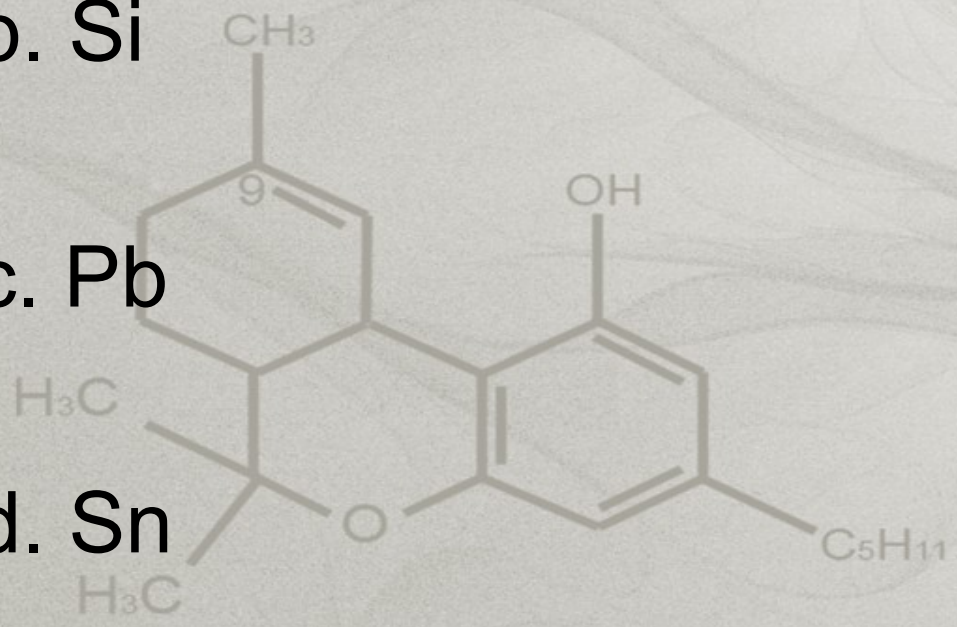
35. Except ---------- all the 14th group elements exhibit allotropy

a. C

b. Si

c. Pb

d. Sn

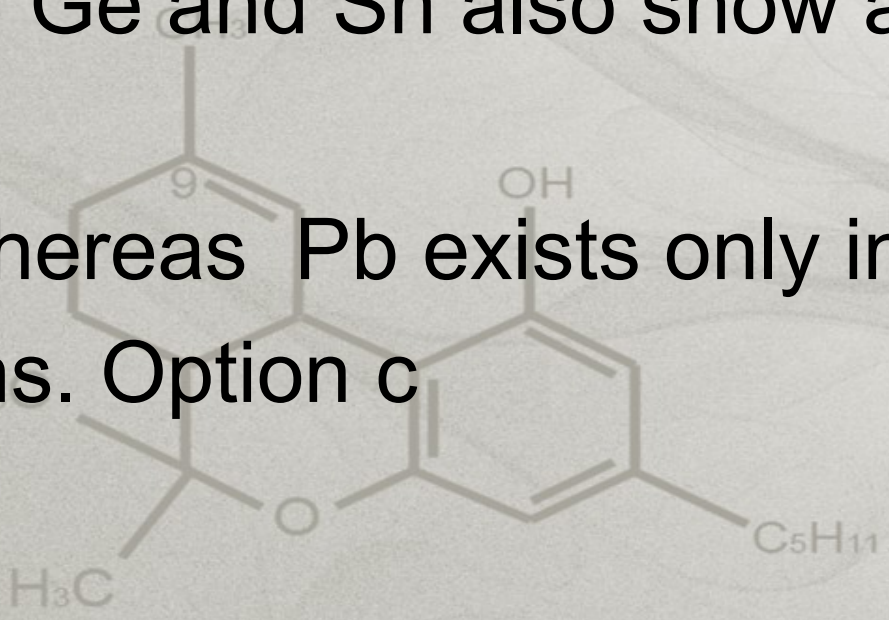


Carbon has number of allotropes i.e. diamond, graphite, coal, wood charcoal, lamp black, fullerene, coke

Si, Ge and Sn also show allotropy.

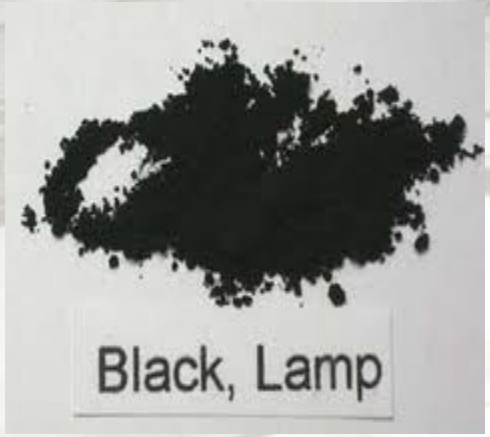
Whereas Pb exists only in metallic form.

Ans. Option c



Graphite

Diamond



Crystalline Silicon

Amorphous Silicon

Grey tin

White tin

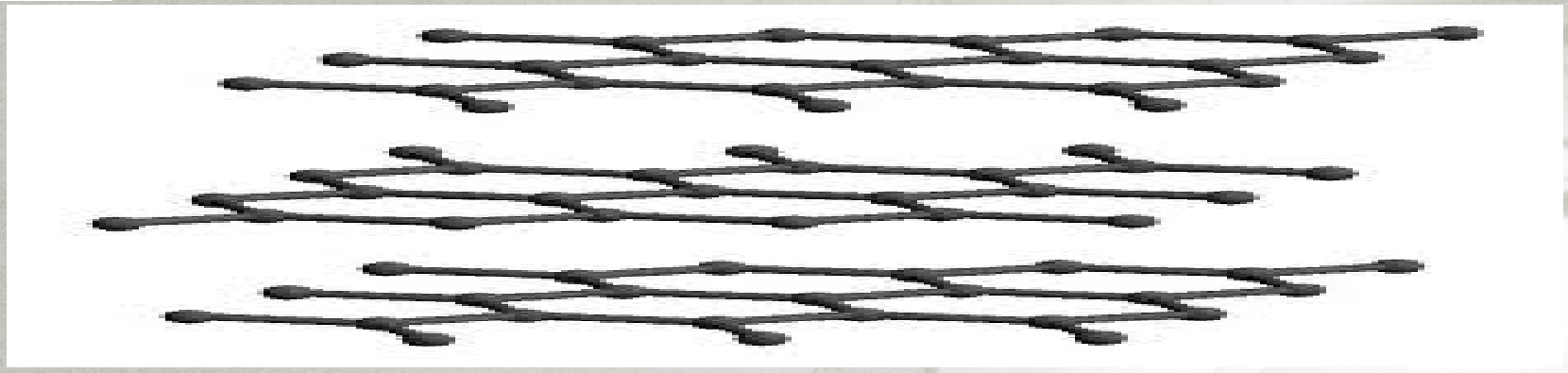
36. Which of the following pair has similar crystal structure ?

a. Graphite & diamond

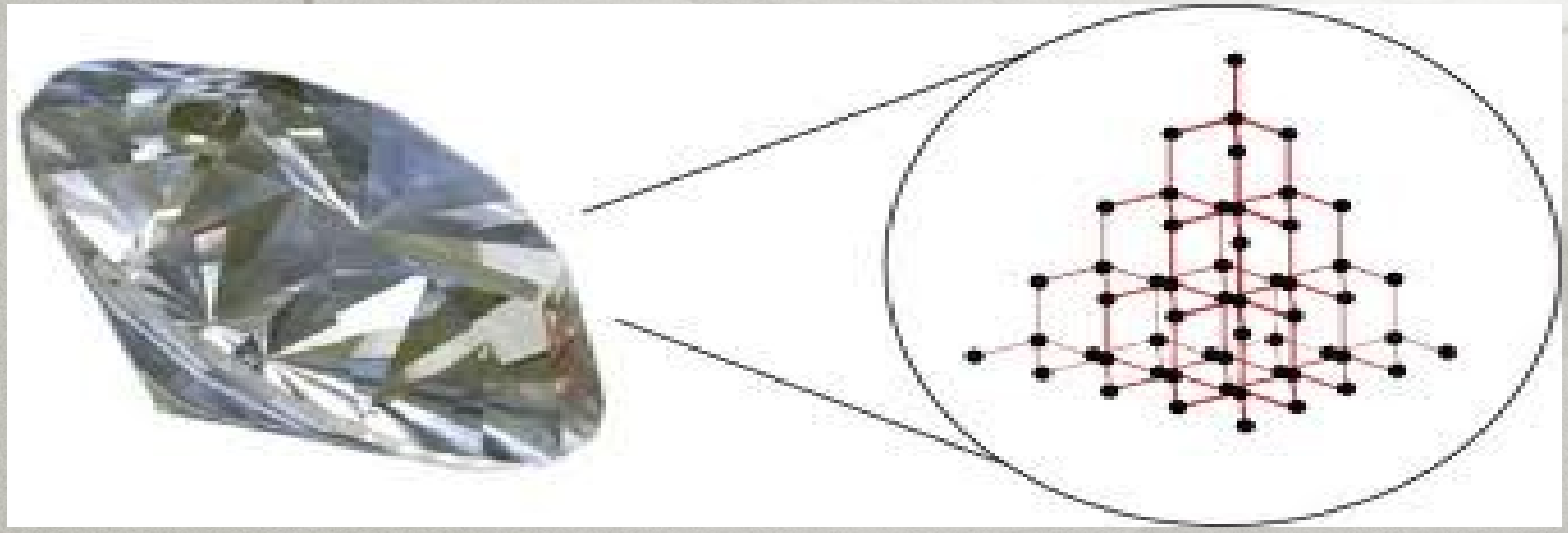
b. Graphite & crystalline silicon

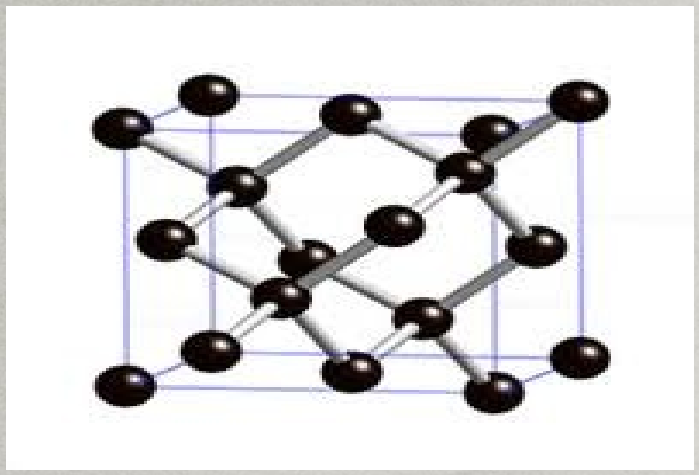
c. Diamond & crystalline silicon

d. Diamond & amorphous silicon

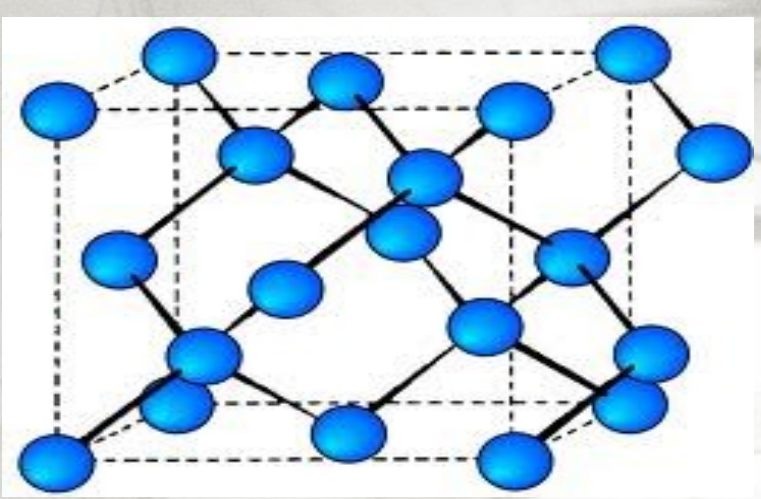


Graphite has layered structure and diamond has 3 dimensional structure





Diamond Structure



Silicon Structure

. Crystalline silicon and diamond have similar crystal structure.

Ans. Option c

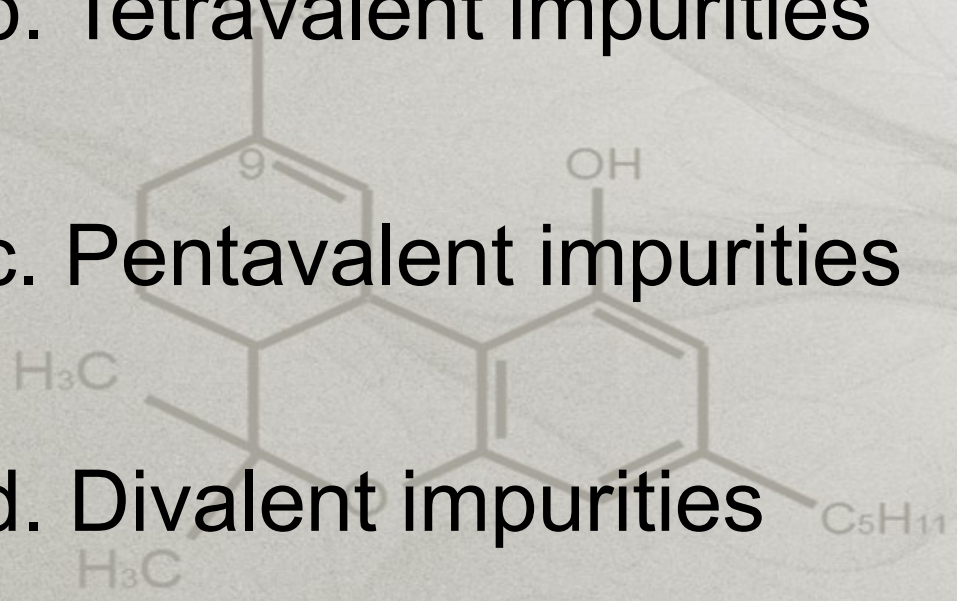
37. p – type semiconductor is obtained when silicon is mixed (doped) with

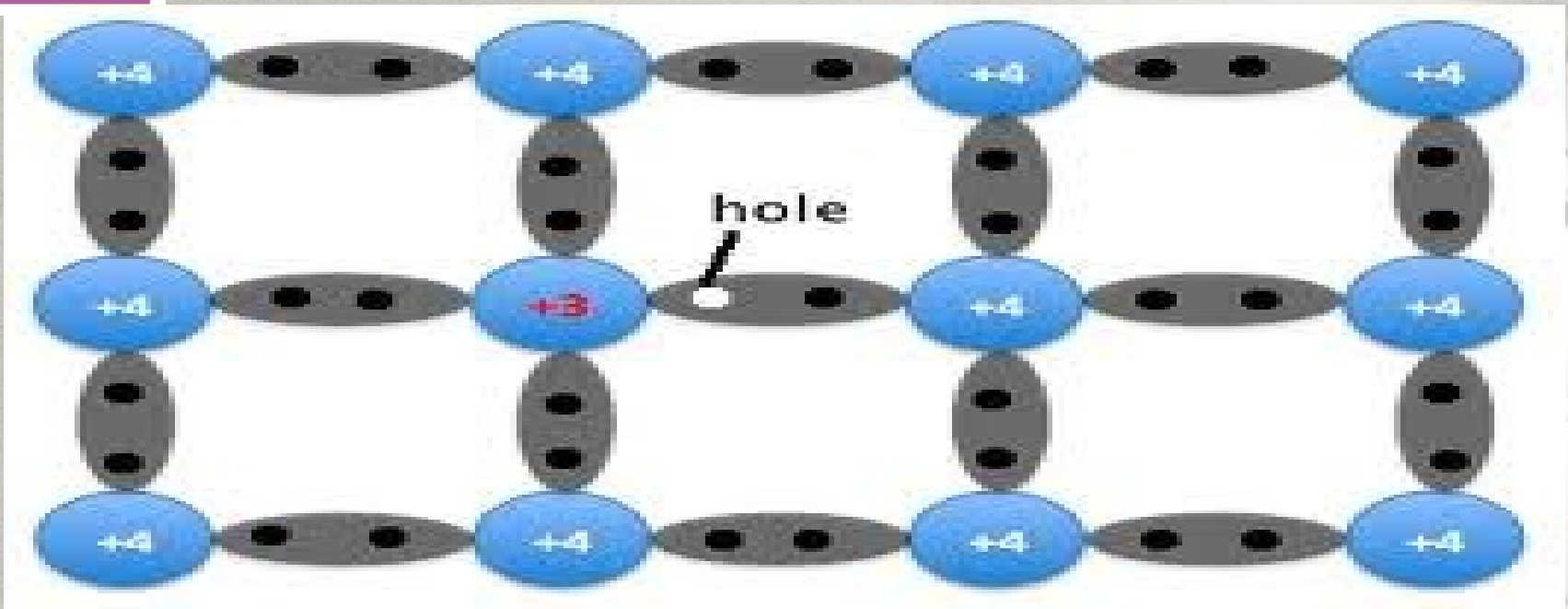
a. Trivalent impurities

b. Tetravalent impurities

c. Pentavalent impurities

d. Divalent impurities





Trivalent impurities like boron leaves a positive hole , the electrons move to fill these holes, hence conduct electricity.

Ans. Option a

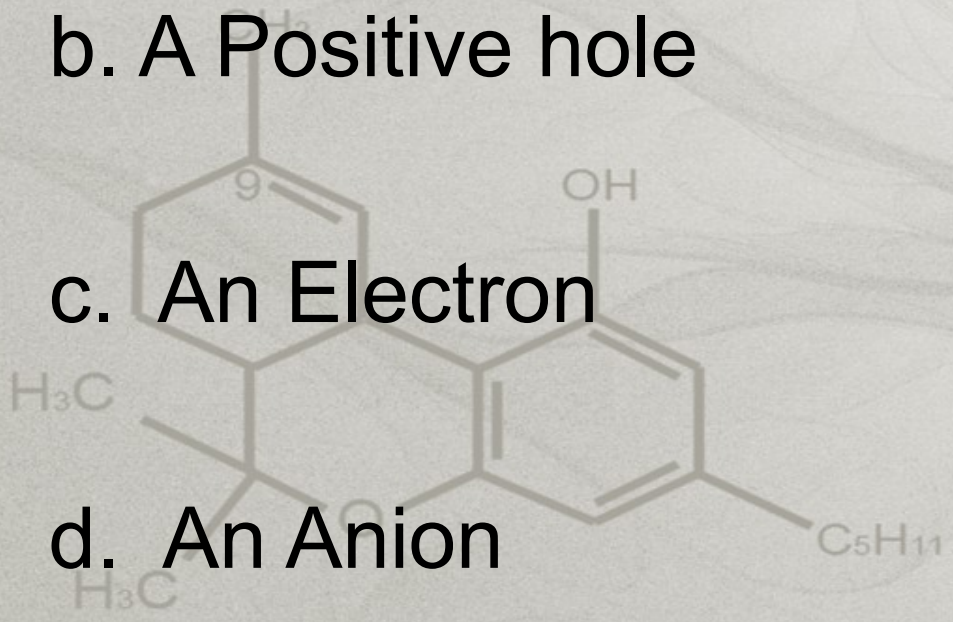
38. In n – type semiconductors there is

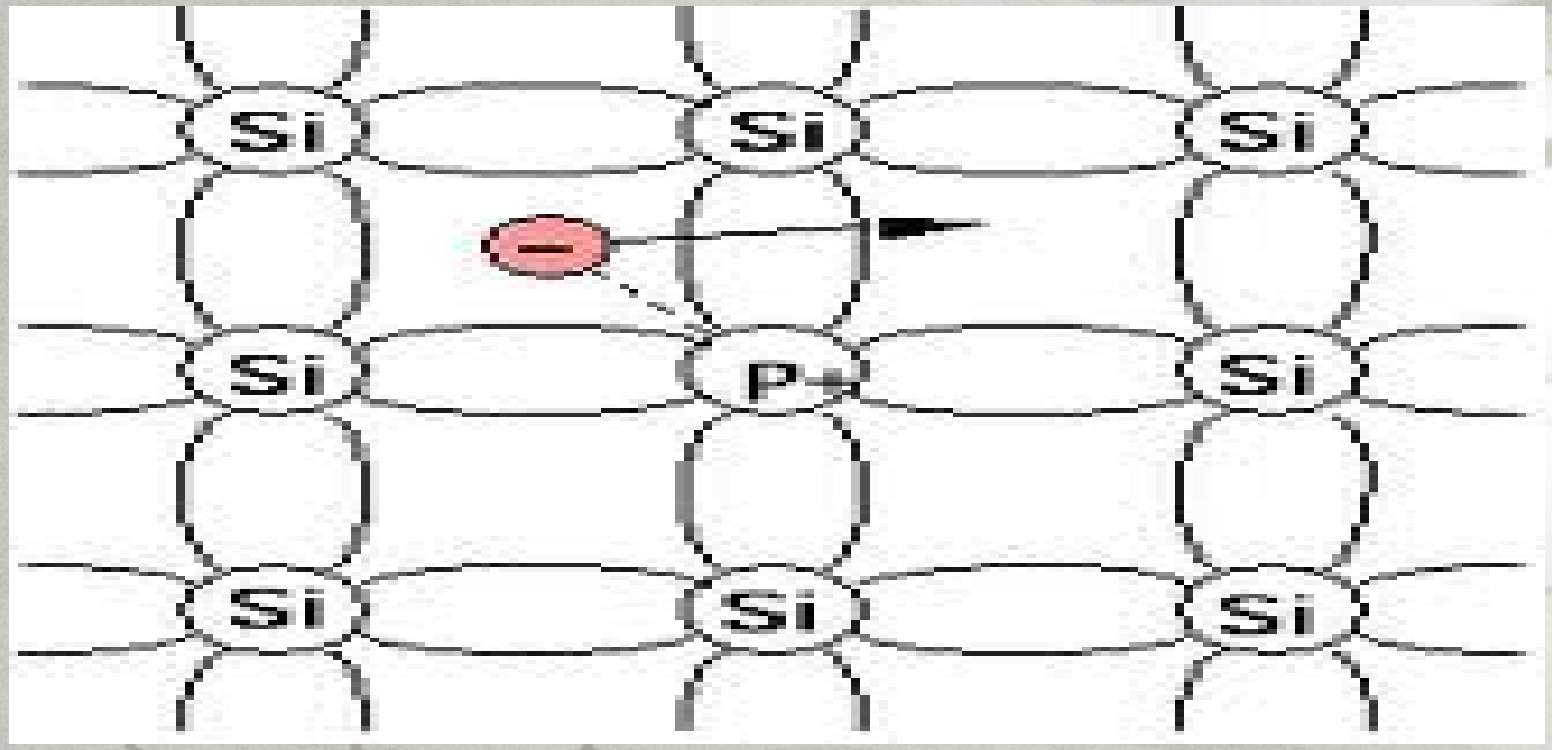
a. A cation

b. A Positive hole

c. An Electron

d. An Anion





In n – type semiconductors pentavalent impurities give extra electron.

Ans. c An electron

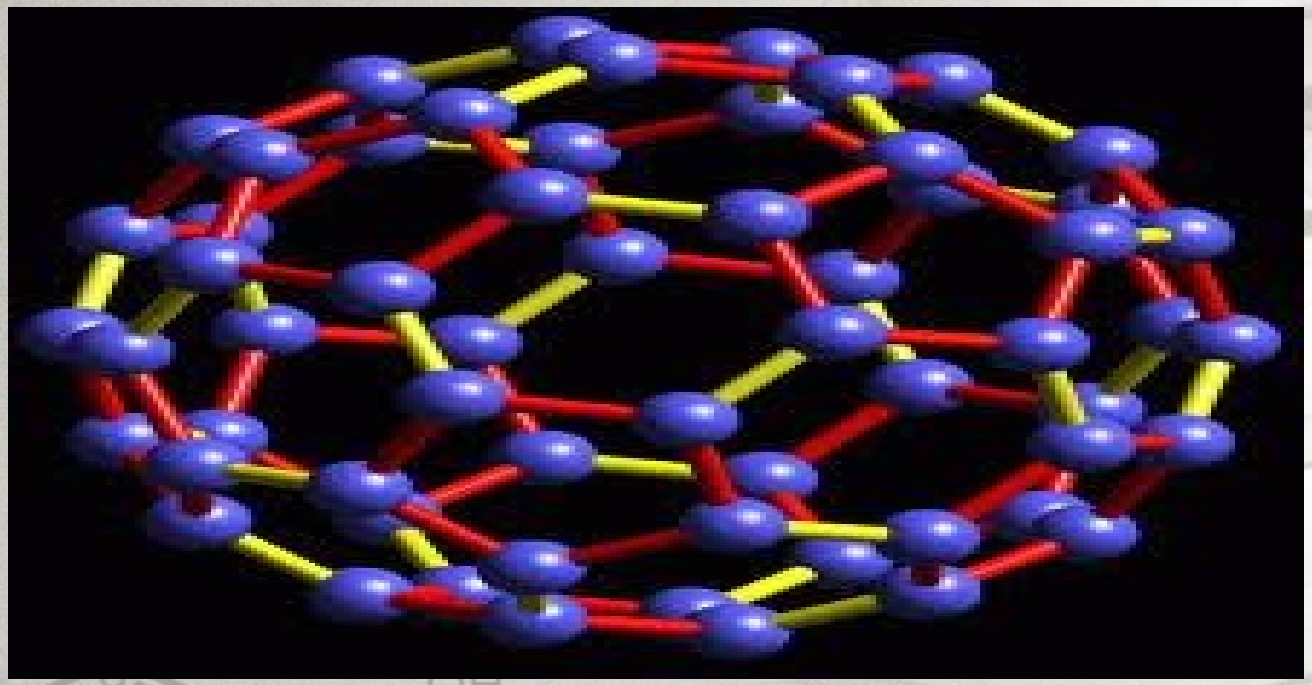
39. The shapes of Fullerene (C_{60}) resembles that of soccer ball with

a. Six member carbon rings

b. Five member carbon rings

c. Five and six member carbon rings

d. Seven member carbon rings



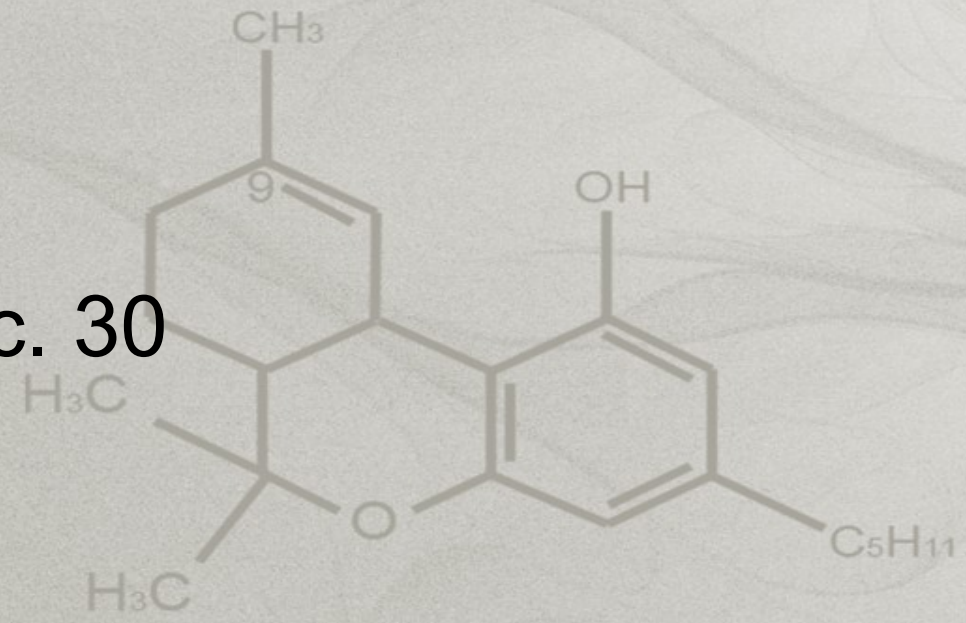
C_{60} contains 12 five membered rings and 20 six membered rings.

Ans. Option c

40. No. Of hexagonal rings in C_{70} type of fullerene is

a. 25

b. 20



c. 30

d. 40

No. Of hexagonal rings $= \frac{n - 20}{2} = \frac{70 - 20}{2}$

$= 25$

Ans. option a

There are 25 hexagonal rings and

12 pentagonal rings in C_{70} type of fullerene

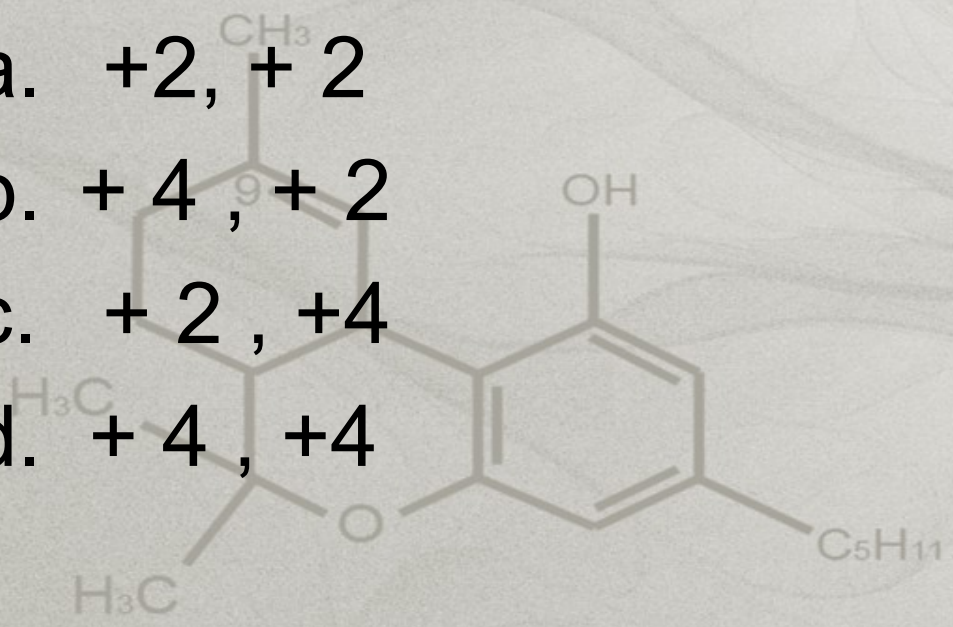
41. Which of the following oxidation states are the most characteristic for lead and tin respectively?

a. +2, + 2

b. + 4 , + 2

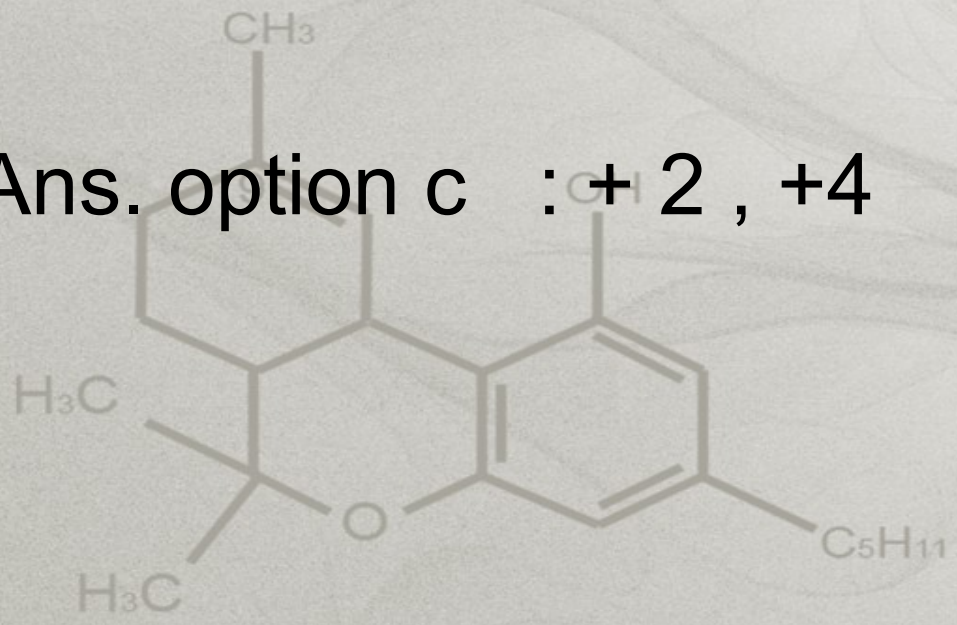
c. + 2 , +4

d. + 4 , +4



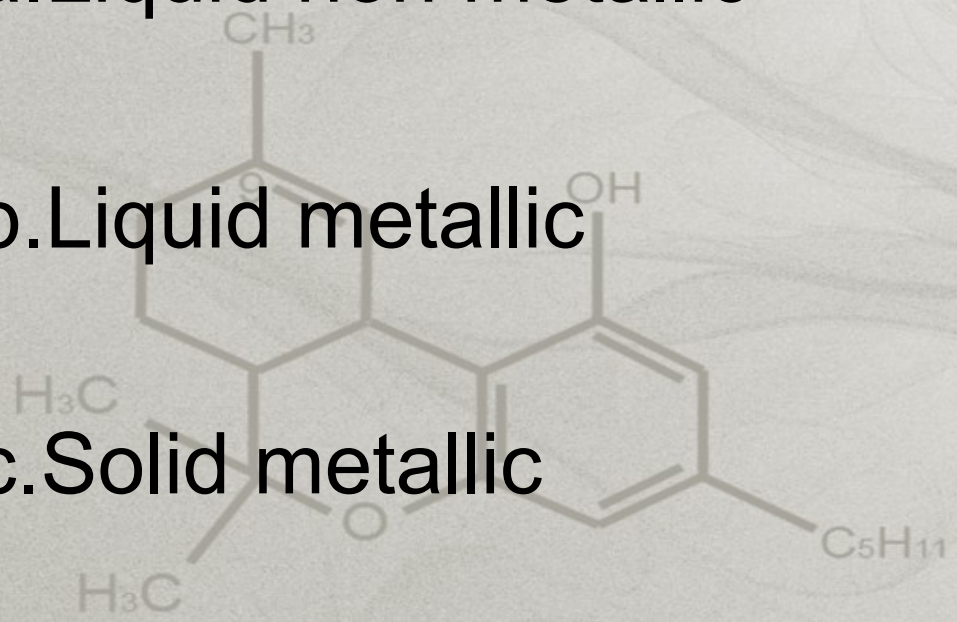
Due to inert pair effect + 2 oxidation state of lead is more stable, while + 4 state of tin is more stable.

Ans. option c : + 2 , +4



42. An element belong to 3rd period and 13th group of the periodic table . Which of the following properties will be shown by the element.

a. Liquid non metallic

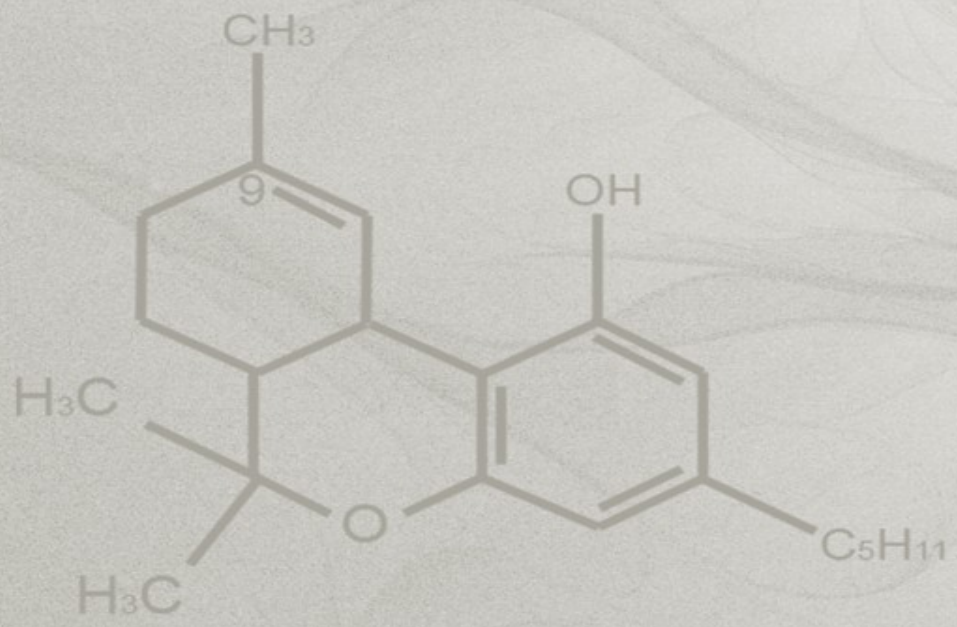


b. Liquid metallic

c. Solid metallic

d. Solid non metallic

Ans. Option c



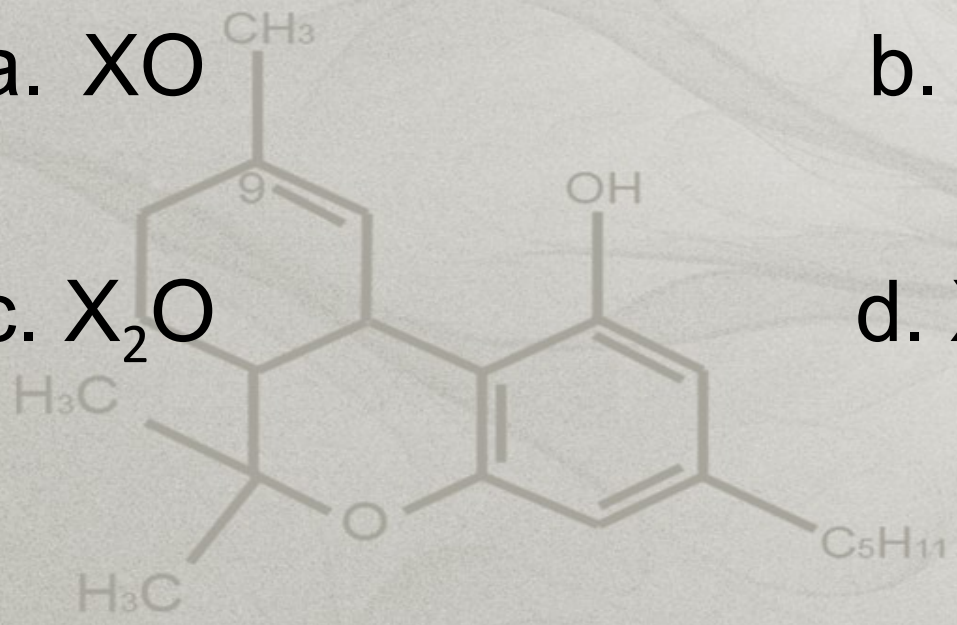
43. The formula of a stable binary compound formed from 14th group element (X) with oxygen is

a. XO

b. XO_2

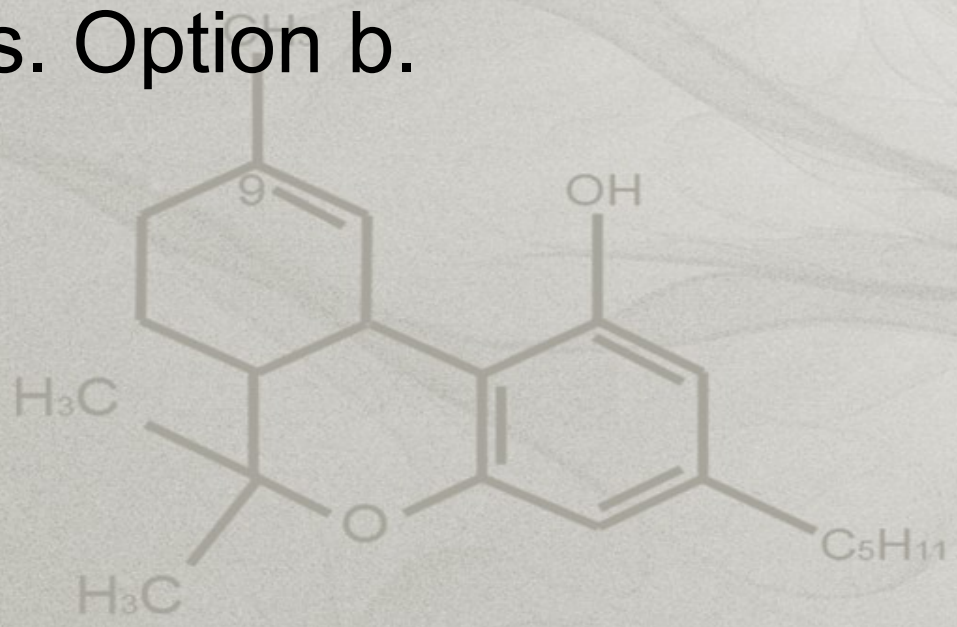
c. X_2O

d. X_2O_3



The common valency of 14th group elements is + 4 . Hence formula of stable compound of this group is XO_2

Ans. Option b.



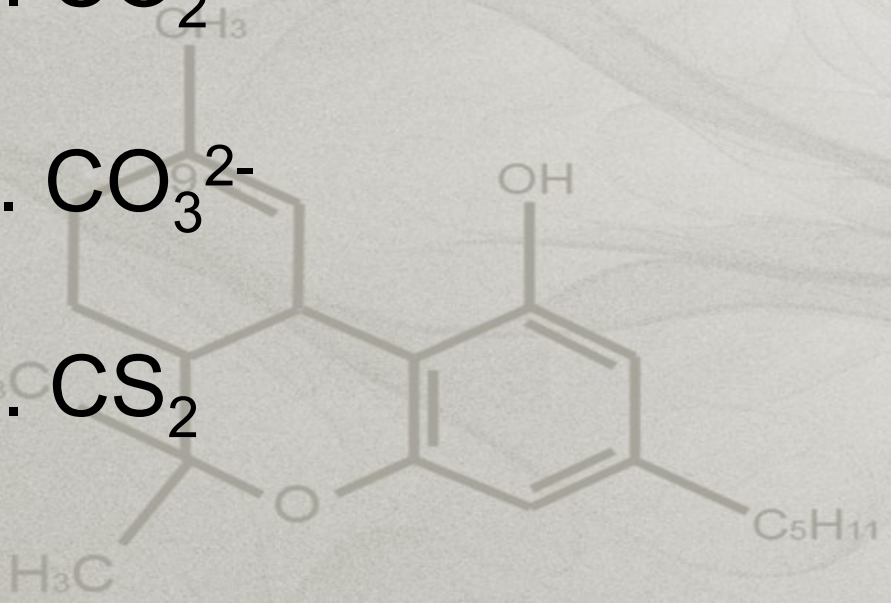
44. Anhydride of carbonic acid is

a. CO

b. CO_2

c. CO_3^{2-}

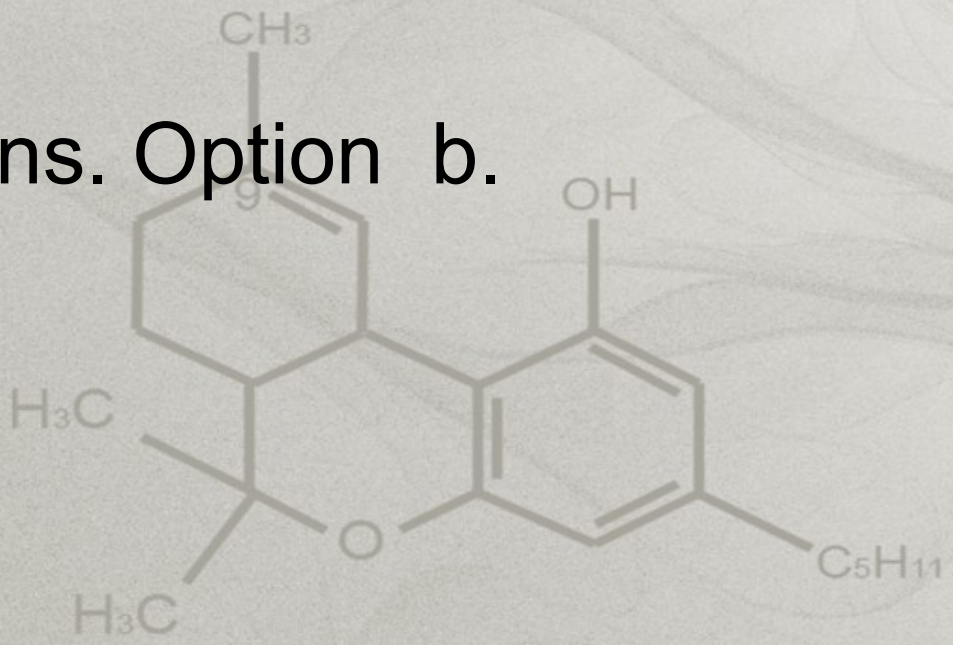
d. CS_2

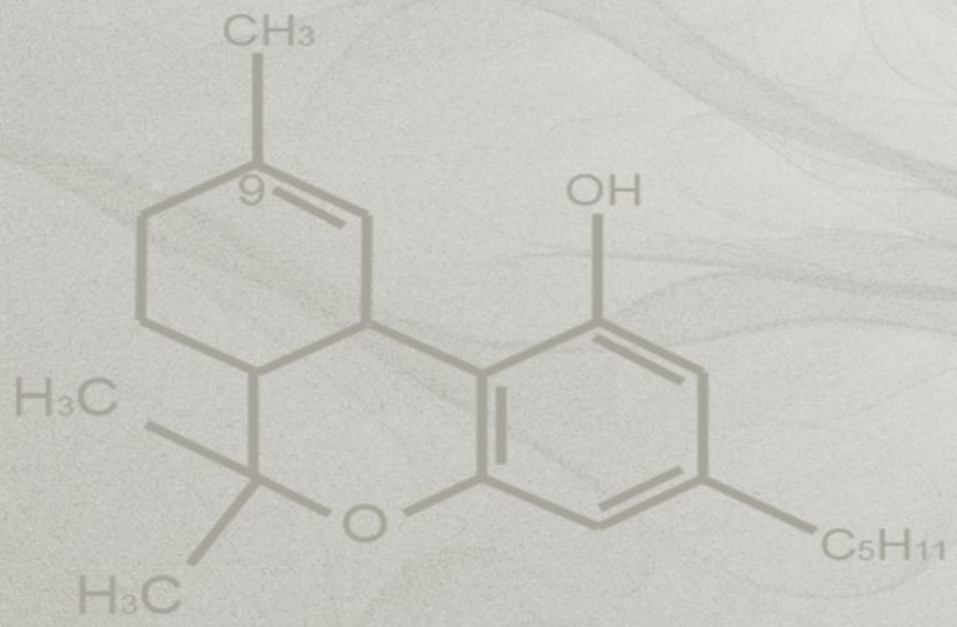


Carbonic acid decomposes to give CO_2 and H_2O

$$H_2CO_3 \text{ --------} \rightarrow H_2O + CO_2$$

Ans. Option b.




CH3
9
OH
H3C
O
C5H11
H3C