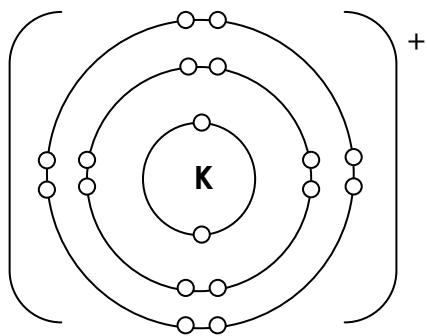
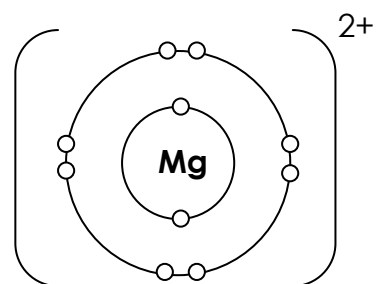


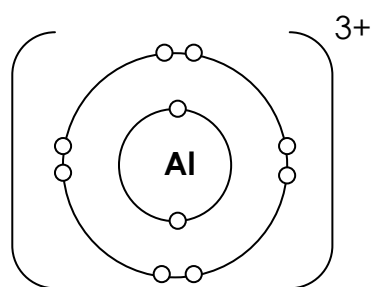
Suggested Answers on Note (Chapter 5) P.3



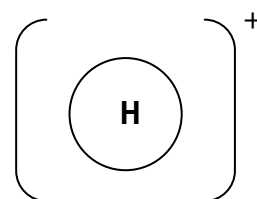
Potassium ion / K^+



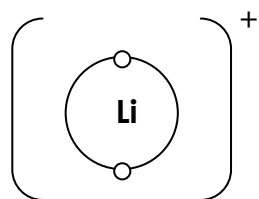
Magnesium ion / Mg^{2+}



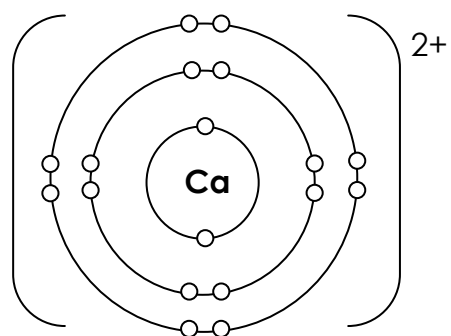
Aluminium ion / Al^{3+}



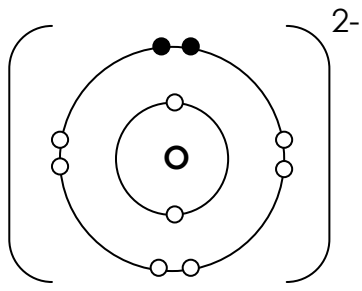
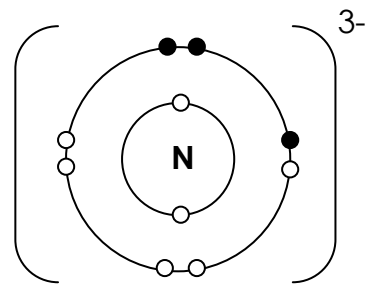
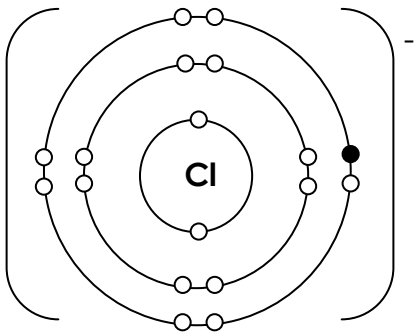
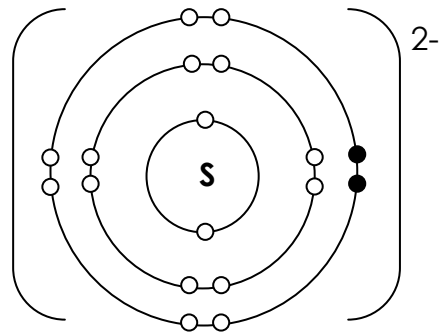
Hydrogen ion / H^+



Lithium ion / Li^+



Calcium ion / Ca^{2+}

Suggested Answers on Note (Chapter 5) P.4**Oxide ion / O²⁻****Nitride ion / N³⁻****Chloride ion / Cl⁻****Sulphide ion / S²⁻**

Suggested Answers on Note (Chapter 5) P.5

Period 2

Element	Li	Be	B	C	N	O	F
Electronic arrangement of the atom	2, 1	2, 2	2, 3	2, 4	2, 5	2, 6	2, 7
Common ion formed	Li ⁺	Be ²⁺	---	---	N ³⁻	O ²⁻	F ⁻
Electronic arrangement of the ion	2	2	---	---	2, 8	2, 8	2, 8

Period 3

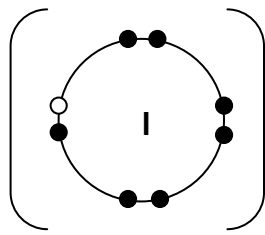
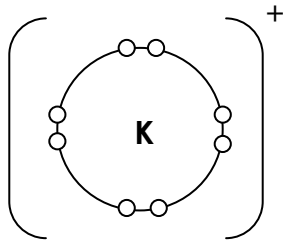
Element	Na	Mg	Al	Si	P	S	Cl
Electronic arrangement of the atom	2, 8, 1	2, 8, 2	2, 8, 3	2, 8, 4	2, 8, 5	2, 8, 6	2, 8, 7
Common ion formed	Na ⁺	Mg ²⁺	Al ³⁺	---	P ³⁻	S ²⁻	Cl ⁻
Electronic arrangement of the ion	2, 8	2, 8	2, 8	---	2, 8, 8	2, 8, 8	2, 8, 8

Remarks:

Change in	Cation	Anion
Number of proton	No change	No change
Number of neutron	No change	No change
Number of electron	Less than no. of proton	More than no. of proton
Charge	Positive	Negative

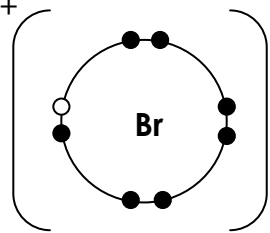
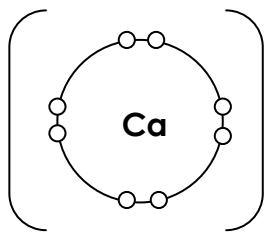
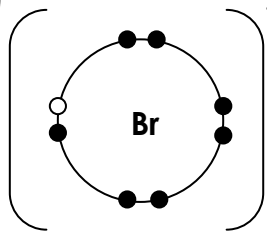
Suggested Answers on Note (Chapter 5) P.7 – 8

1. (a)



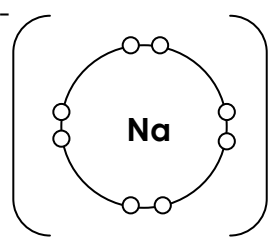
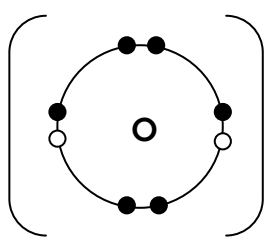
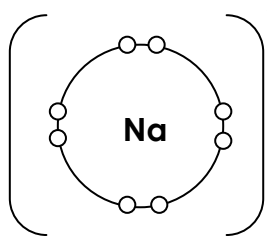
Potassium iodide
KI

(b)



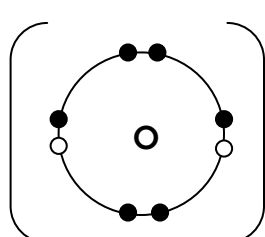
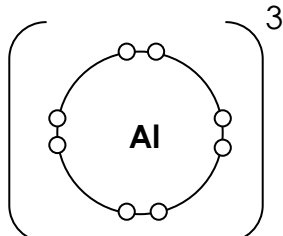
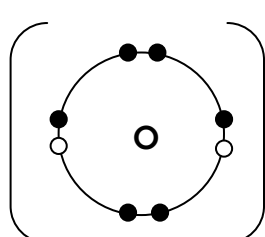
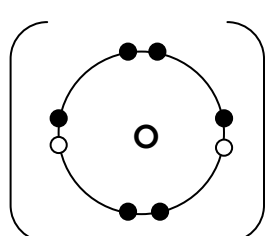
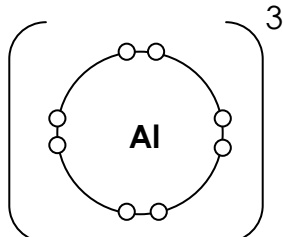
Calcium bromide
CaBr₂

(c)

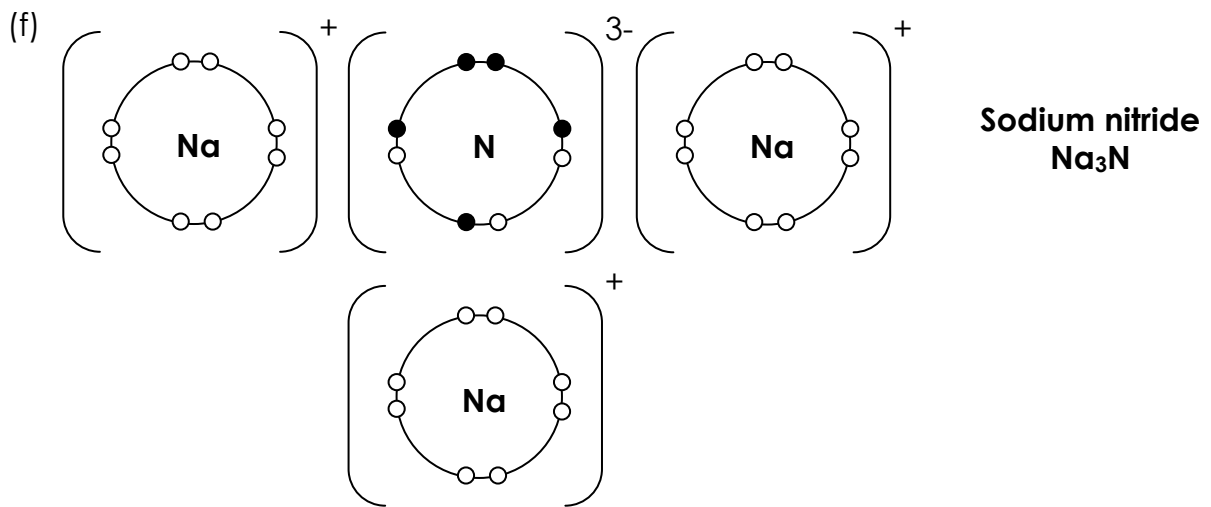
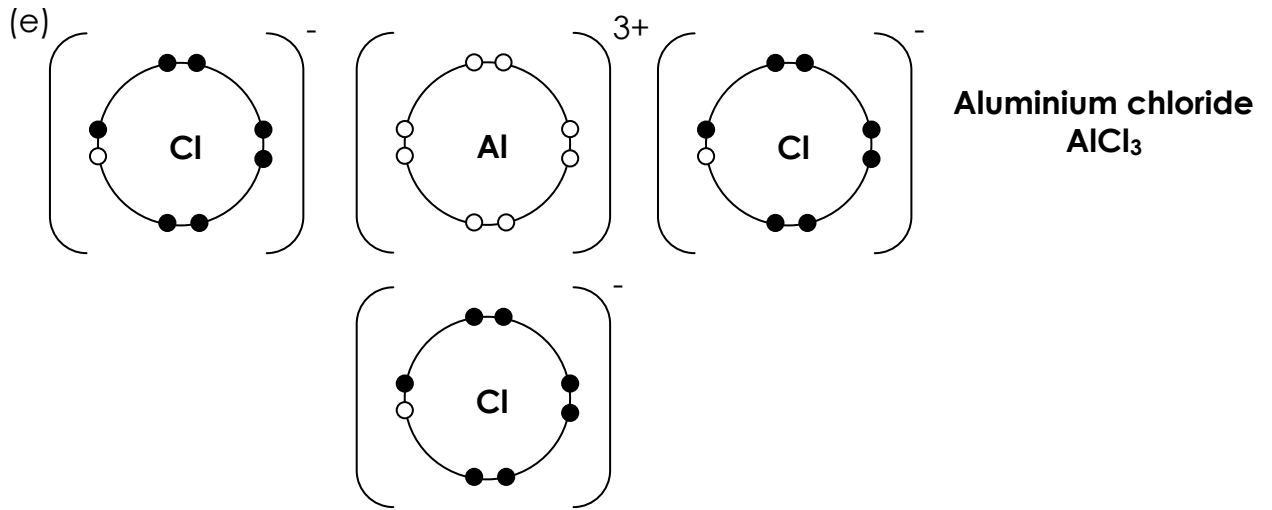


Sodium oxide
Na₂O

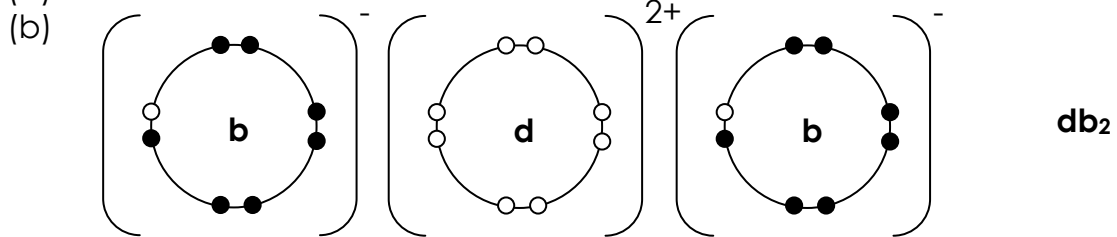
(d)



Aluminium oxide
Al₂O₃



2. (a) b and d



3.

Name of ion	Atomic number	Mass number	No. of			Formula of ion
			protons	neutrons	electrons	
Potassium ion	19	39	19	20	18	${}^{39}_{19}\text{K}^+$
Bromide ion	35	81	35	46	36	${}^{81}_{35}\text{Br}^-$
Chloride ion	17	37	17	20	18	${}^{37}_{17}\text{Cl}^-$
Iron(III) ion	26	56	26	30	23	${}^{56}_{26}\text{Fe}^{3+}$
Sulphide ion	16	34	16	18	18	${}^{34}_{16}\text{S}^{2-}$

Suggested Answers on Note (Chapter 5) P.9

Positive ions (Cations)

1+ ions		2+ ions		3+ ions	
Name	Formula	Name	Formula	Name	Formula
Lithium ion	Li^+	Magnesium ion	Mg^{2+}	Aluminium ion	Al^{3+}
Sodium ion	Na^+	Calcium ion	Ca^{2+}	Iron(III) ion	Fe^{3+}
Potassium ion	K^+	Barium ion	Ba^{2+}	Chromium(III) ion	Cr^{3+}
Silver ion	Ag^+	Lead(II) ion	Pb^{2+}		
Copper(I) ion	Cu^+	Copper(II) ion	Cu^{2+}		
Hydrogen ion	H^+	Zinc ion	Zn^{2+}		
Ammonium ion	NH_4^+	Iron(II) ion	Fe^{2+}		
		Mercury(II) ion	Hg^{2+}		
		Manganese(II) ion	Mn^{2+}		
		Cobalt(II) ion	Co^{2+}		
		Nickel(II) ion	Ni^{2+}		
		Tin(II) ion	Sn^{2+}		

Negative ions (Anions)

1- ions		2- ions		3- ions	
Name	Formula	Name	Formula	Name	Formula
Fluoride ion	F^-	Oxide ion	O^{2-}	Nitride ion	N^{3-}
Chloride ion	Cl^-	Sulphide ion	S^{2-}	Phosphate ion	PO_4^{3-}
Bromide ion	Br^-	Sulphate ion	SO_4^{2-}	Phosphide ion	P^{3-}
Iodide ion	I^-	Sulphite ion	SO_3^{2-}		
Hydroxide ion	OH^-	Thiosulphate ion	$\text{S}_2\text{O}_3^{2-}$		
Nitrate ion	NO_3^-	Chromate ion	CrO_4^{2-}		
Nitrite ion	NO_2^-	Dichromate ion	$\text{Cr}_2\text{O}_7^{2-}$		
Hydrogencarbonate ion	HCO_3^-	Carbonate ion	CO_3^{2-}		
Hydrogensulphate ion	HSO_4^-	Silicate ion	SiO_3^{2-}		
Hydrogensulphite ion	HSO_3^-				
Permanganate ion	MnO_4^-				
Hypochlorite ion	ClO^-				

Suggested Answers on Note (Chapter 5) P.11

Name of Ion	Formula	Colour
Copper(II)	Cu^{2+}	Blue
Iron(II)	Fe^{2+}	Green
Iron(III)	Fe^{3+}	Brown / yellow
Nickel(II)	Ni^{2+}	Green
Cobalt(II)	Co^{2+}	Pale pink
Chromium(III)	Cr^{3+}	Green
Chromate	CrO_4^{2-}	Yellow
Dichromate	$\text{Cr}_2\text{O}_7^{2-}$	Orange
Permanganate	MnO_4^-	Purple
Manganese(II)	Mn^{2+}	Pale pink

Suggested Answers on Note (Chapter 5) P.12

1. (a) colourless
(b) colourless
(c) orange

2. (a) colourless
(b) colourless
(c) blue

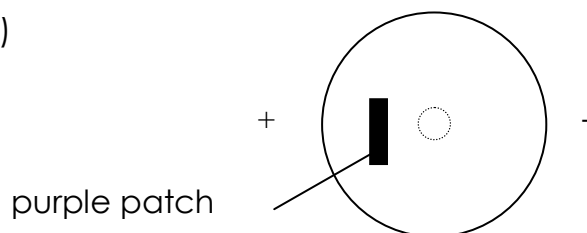
3.

	Substance	Colour
(a)	Calcium chloride powder	White
(b)	Calcium chloride solution	Colourless
(c)	Potassium chromate solution	Yellow
(d)	Copper(II) chloride solution	Blue / green
(e)	Silver nitrate solution	Colourless
(f)	Nickel(II) sulphate powder	Green
(g)	Iron(III) hydroxide powder	Yellow / brown

Suggested Answers on Note (Chapter 5) P.16

(i) To help the current passes through.

(ii) (1)



(2) permanganate ion.

(iii) The purple patch will remove towards the new position of the position pole. It is because the negative ion goes towards the positive electrode of a D.C. supply.

Suggested Answers on Note (Chapter 5) P.17

1. (a) Calcium iodide
(b) Sodium oxide
2. (a) Lithium fluoride
(b) Potassium sulphide
(c) Beryllium nitride
3. (a) X: Aluminium, Al
Y: Sulphur, S
(b) Aluminium sulphide

Suggested Answers on Note (Chapter 5) P.19

1. (a) AlCl_3
(c) MgO
(e) Cu_3PO_4
(g) $\text{Ca}(\text{OH})_2$
(i) Fe_2O_3
(b) $(\text{NH}_4)_2\text{SO}_4$
(d) FeS
(f) NaOH
(h) CuO
(j) $\text{Pb}(\text{OH})_2$
2. (a) Potassium bromide
(c) Barium nitrate
(e) Potassium dichromate
(g) Sodium sulphate
(i) Copper(II) chromate
(b) Iron(III) oxide
(d) Manganese(II) sulphate
(f) Ammonium phosphate
(h) Ammonium hydrogensulphate
(j) Chromium(III) sulphite

Suggested Answers on Note (Chapter 5) P.23

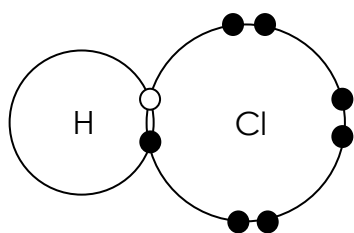
Group No.	4	5	6	7	H
Example	C	N	O	F	H
No. of outermost shell e ⁻	4	5	6	7	1
No. of e ⁻ needed to obtain the electronic arrangement of a noble gas atom	4	3	2	1	1
No. of electron(s) contributed for sharing	4	3	2	1	1
Type of covalent bond	$\begin{array}{c} \\ -C- \\ \end{array}$ $\equiv C-$ $= C =$ $= C-$ $ $	$N \equiv$ $-N =$ $ $ $-N-$	$O =$ $-O-$	X—	H—

Suggested Answers on Note (Chapter 5) P.24

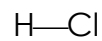
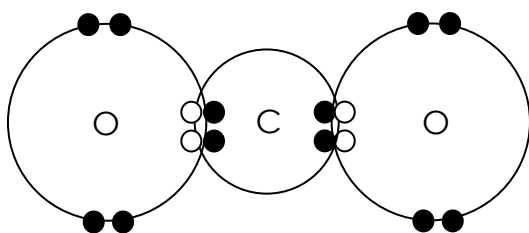
Step	Hydrogen & Sulphur	Silicon & Chlorine
1. Write down the electronic arrangements	H 1	S 2, 8, 6
2. No. of e ⁻ needs to obtain a stable electronic arrangement	H 1	S 2
3. Cross multiply the numbers and the symbols	$\begin{array}{c} H \\ 1 \end{array} \begin{array}{c} S \\ 2 \end{array}$	$\begin{array}{c} Si \\ 4 \end{array} \begin{array}{c} Cl \\ 1 \end{array}$
4. Combine the symbols and simplify the ratio if necessary	H ₂ S	SiCl ₄

Suggested Answers on Note (Chapter 5) P.25

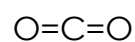
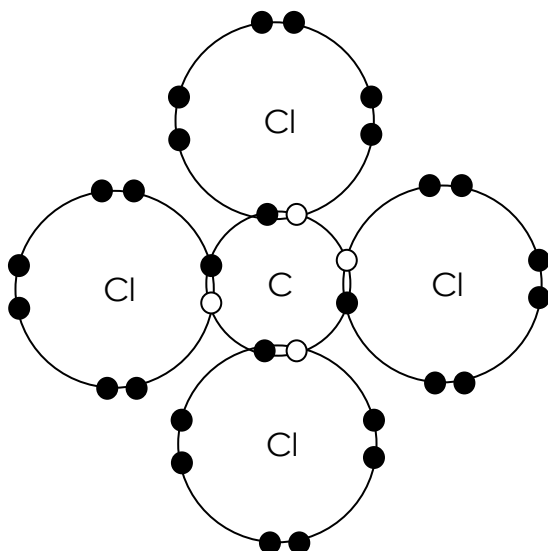
HCl



Hydrogen chloride

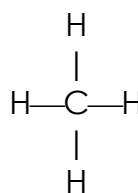
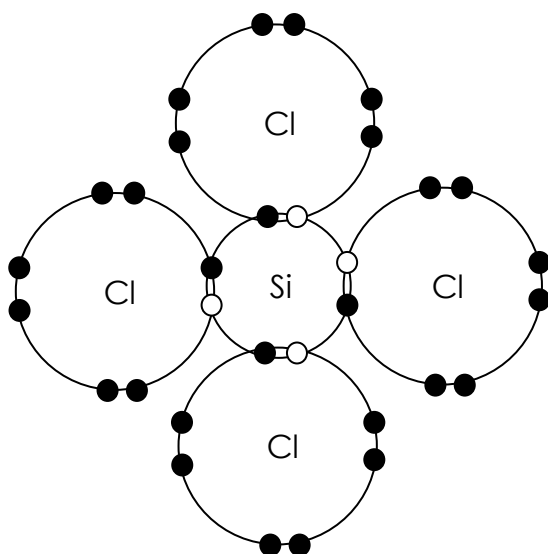
CO₂

Carbon dioxide

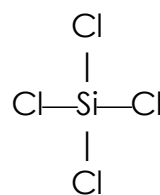
CCl₄

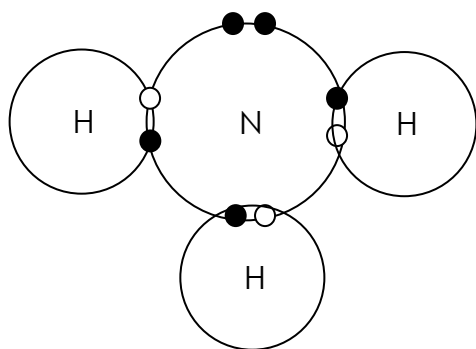
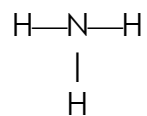
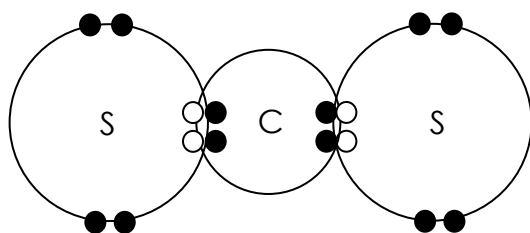
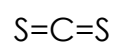
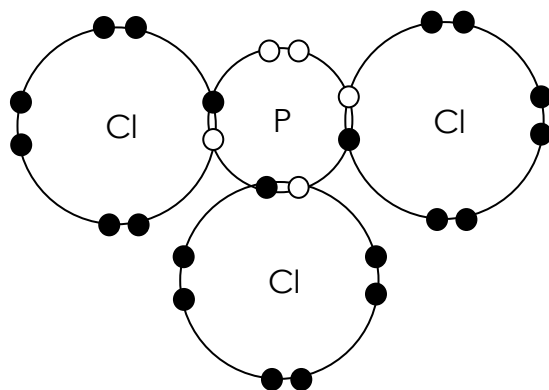
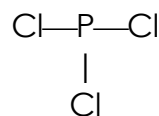
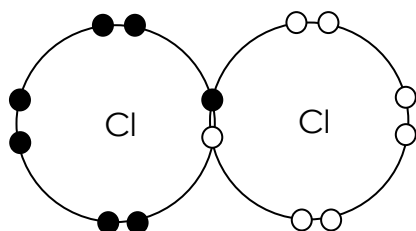
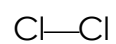
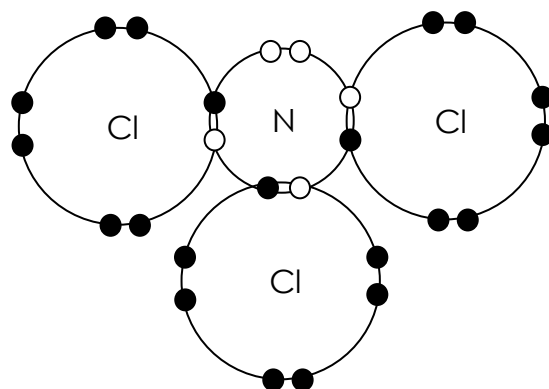
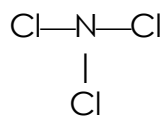
Carbon tetrachloride

OR Methane

SiCl₄

Silicon tetrachloride

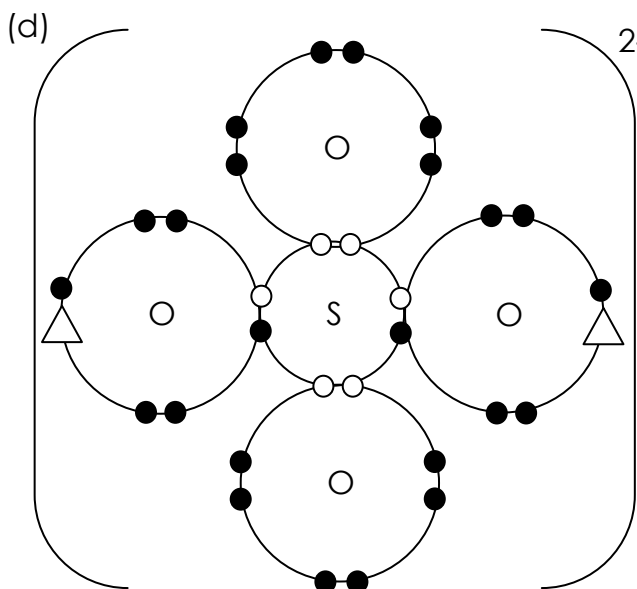
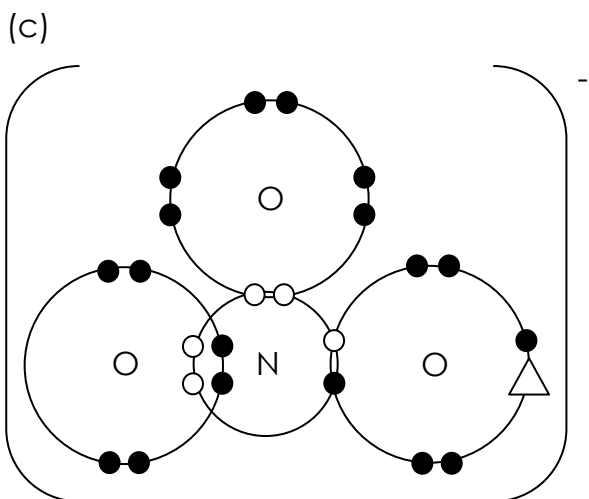
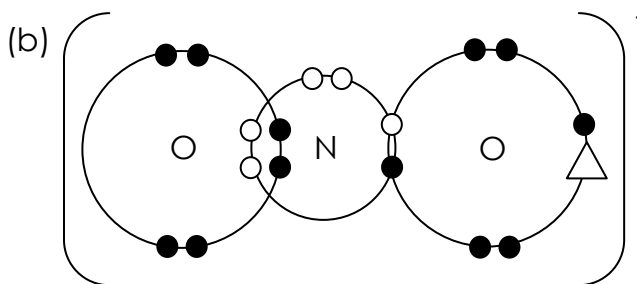
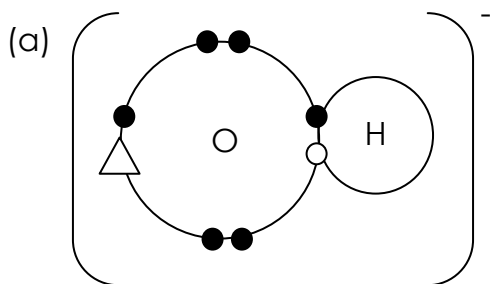


NH₃**Ammonia**CS₂**Carbon disulphide**PCl₃**Phosphorus trichloride**Cl₂**Chlorine**NCl₃**Nitrogen trichloride**

Suggested Answers on Note (Chapter 5) P.26

	Elements	Formula	Name
(a)	Bromine and nitrogen	NBr₃	Nitrogen tribromide
(b)	Sulphur and carbon	CS₂	Carbon disulphide
(c)	Chlorine and sulphur	SCl₂	Sulphur dchloride
(d)	Phosphorus and fluorine	PF₃	Phosphorus trifluoride
(e)	Bromine and sulphur	SBr₂	Sulphur dibromide
(f)	Hydrogen and phosphorus	PH₃	Phosphorus trihydride
(g)	Nitrogen and iodine	NI₃	Nitrogen triiodide

Suggested Answers on Note (Chapter 5) P.30



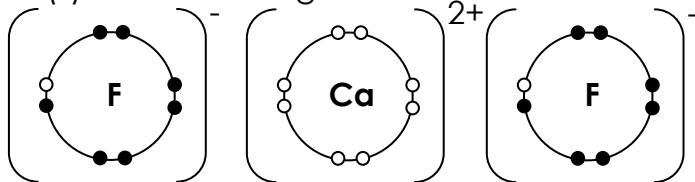
Suggested Answers on Note (Chapter 5) P.31 – 32

(a) Calcium and fluorine

(i) Type of compounds

Calcium	Fluorine	Type of compound
Metal	Non-metal	Ionic

(ii) Electron diagram



(iii) **CaF₂**

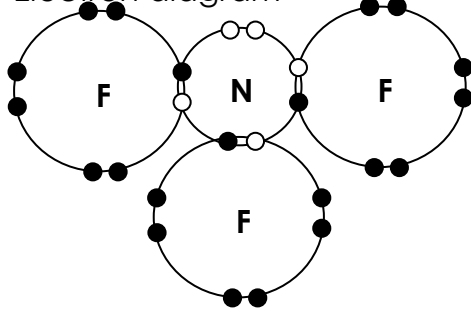
(iv) **Calcium fluoride**

(b) Nitrogen and fluorine

(i) Type of compounds

Nitrogen	Fluorine	Type of compound
Non-metal	Non-metal	Covalent

(ii) Electron diagram



(iii) **NF₃**

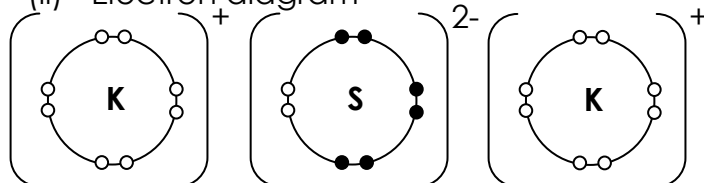
(iv) **Nitrogen trifluoride**

(c) Potassium and sulphur

(i) Type of compounds

Potassium	Sulphur	Type of compound
Metal	Non-metal	Ionic

(ii) Electron diagram



(iii) **K₂S**

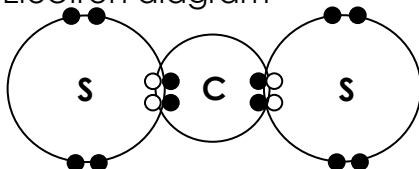
(iv) **Potassium sulphide**

(d) Carbon and Sulphur

(i) Type of compounds

Carbon	Sulphur	Type of compound
Non-metal	Non-metal	Covalent

(ii) Electron diagram



(iii) **CS₂**

(iv) **Carbon disulphide**

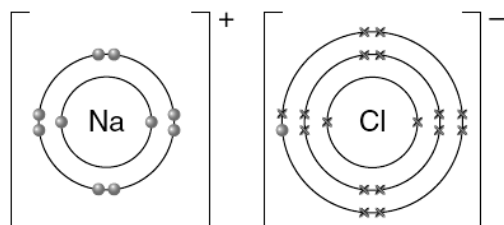
Suggested Answers on Note (Chapter 5) P.33 – 40

1. (a) sodium + chlorine \longrightarrow sodium chloride

(b) A white solid

(c) (i) Ionic bonding

(ii)



2. (a) (i) Atomic number = 8

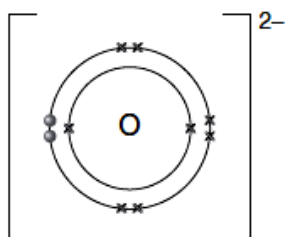
Mass number = 16

(ii) Atomic number = 8

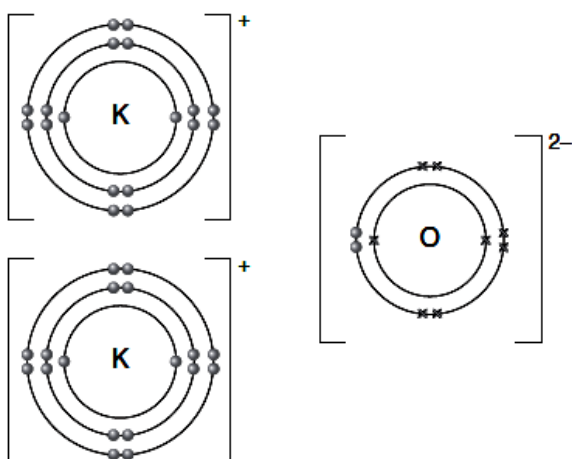
Mass number = 18

(iii) Isotopes

(b) (i)



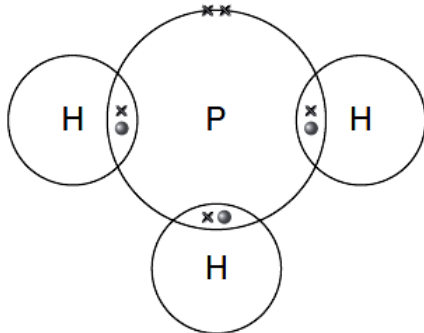
(ii)



3. (a) Number of protons = 19
 Number of neutrons = 20
 Number of electrons = 19

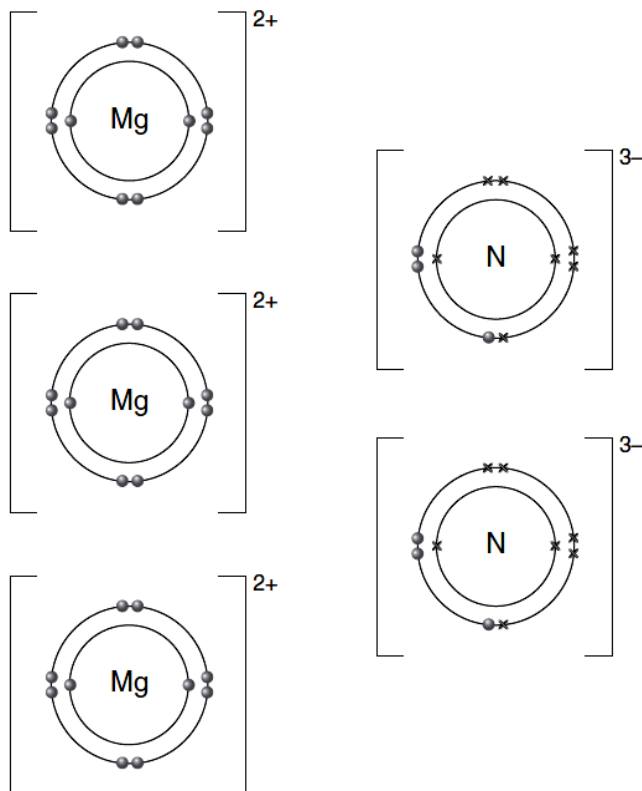
- (b) (i) MnO_4^-
 (ii) A purple colour has moved towards the positive electrode.
 A blue colour appears near the negative electrode.
 (iii) This is because positive copper(II) ions move towards the negative electrode.

4. (a) Covalent compound

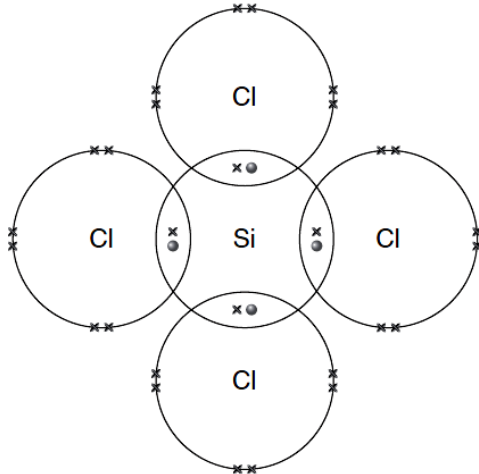


Only electrons in the outermost shells are shown.

- (b) Ionic compound

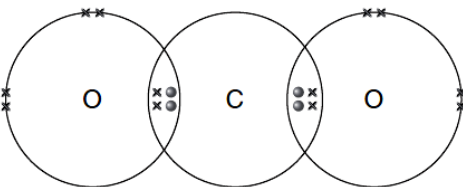


(c) Covalent compound



Only electrons in the outermost shells are shown.

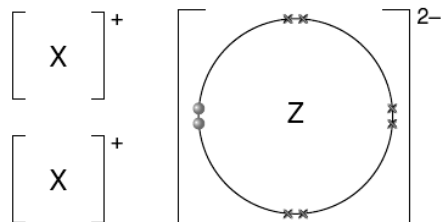
(d) Covalent compound



Only electrons in the outermost shells are shown.

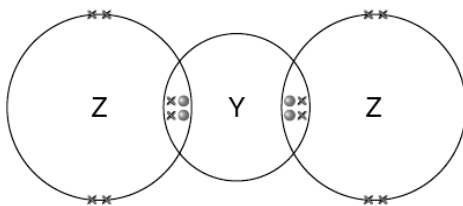
5. (a) X — Group I
Y — Group IV
Z — Group VI

(b) (i) Compound P



(ii) X_2Z

(c) (i) Compound Q



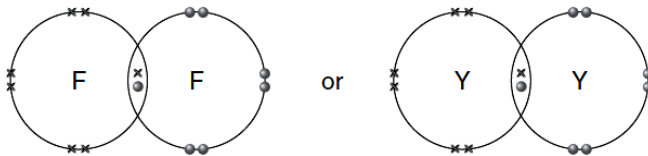
(ii) YZ_2

6. (a) X and Z

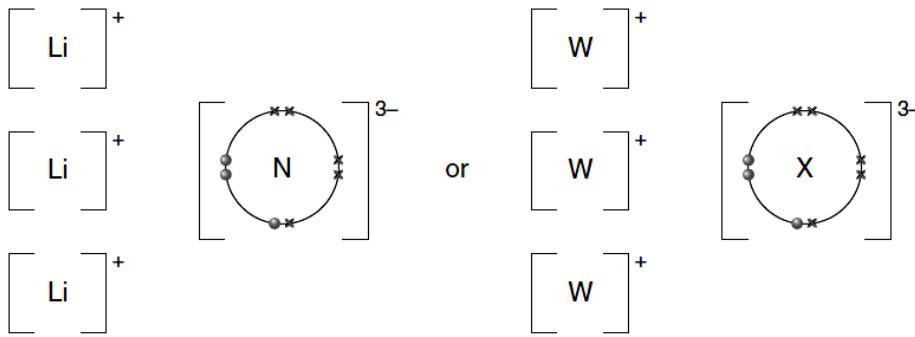
Their atoms have the same number of outermost shell electrons.

(b) (i) An atom of Y has an electronic arrangement of 2,7. It needs one more electron to obtain the stable electronic arrangement of a neon atom. Each atom of Y can obtain the electronic arrangement of a neon atom by sharing one of its outermost shell electrons with another atom of Y.

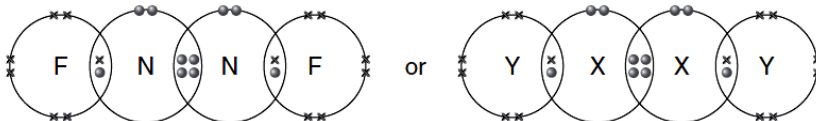
(ii)



(c)



(d) (i)

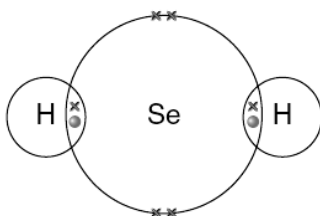


(ii) 1 lone pair of electrons

7. (a) Group VI

(b) (i) Covalent bond

(ii)



8. In boron trifluoride, the boron atom has only 6 outermost shell electrons and it needs two more electrons to attain an octet structure. The nitrogen atom in ammonia acts as a donor and supplies the lone pair electrons to the boron atom, forming a dative covalent bond. As a result, the boron atom attains an octet structure.