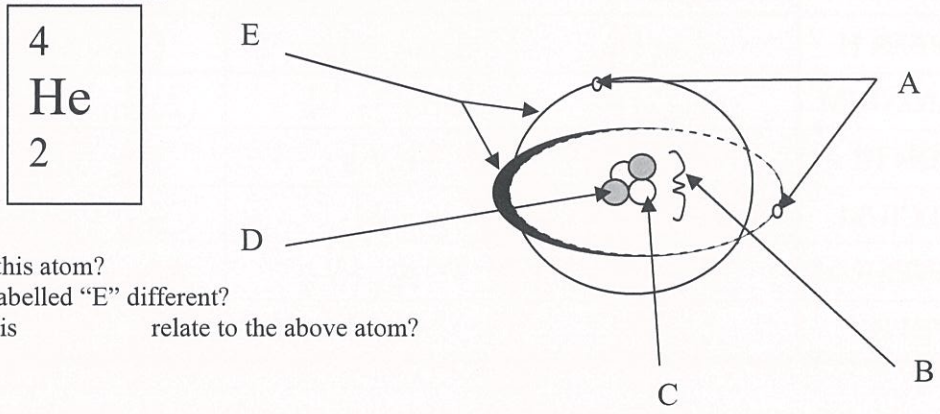
ADVANCED CHEMISTRY
REVISION
THE FIRST 5 WEEKS

Solutions

1. Define each of the following words so that you can differentiate between them:-
   ELEMENT and COMPOUND, ATOM and MOLECULE
2. Label each of the following parts on the atom.



   a. What is the name of this atom?
   b. Why are the 2 parts labelled "E" different?
   c. In what **ways** does this relate to the above atom?
   d. If you pick up an atom off the ground how many electron should there be?
   e. What are the relative charges and masses of each of the particles found in an atom?

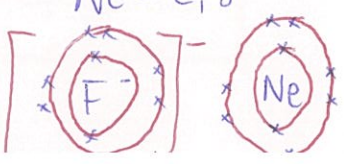
3. Fill in the following table.

SYMBOL	NAME	ATOMIC NUMBER	MASS NUMBER	NUMBER OF PROTONS	NUMBER OF NEUTRONS	NUMBER OF ELECTRONS
12 C 6	Carbon	6	12	6	6	6
16 O 8	Oxygen	8	16	8	8	8
58.69 Ni 28	Nickel	28	59	28	31	28
137 Ba 56	Barium	56	137	56	81	56
207 Pb 82	Lead	82	207	82	125	82
63.55 Cu 29	Copper	29	64	29	35	29
27 Al 13 3+	Aluminium ion	13	27	13	14	10
23 + Na 11	Sodium ion	11	23	11	12	10
32 S 16 2-	Sulphide ion	16	32	16	16	18
31 P 15 3-	Phosphide ion	15	31	15	16	18

4. Write down the electron configuration of the following atoms/ions. Lithium, nitrogen, argon, and magnesium ion. Draw each of the atoms including the electrons surrounding each atom.
5. Why can it be said that the fluoride ion is, in one way, similar to the noble gas neon? Draw the 2 atoms to illustrate your answer.
6. Fill in the following table by writing the correct formulae.

4) Li = 2,1
N = 2,5
Ar = 2,8,8
Mg^{2+} = 2,8

5) F^- = 2,8
Ne = 2,8



SO_2^{3-} PO_4^{3-}

	FLUORIDE F^-	NITRIDE N^{3-}	SULPHITE	PHOSPHATE
Na^+ SODIUM	NaF	Na_3N	Na_3SO_2	Na_3PO_4
Ba^{2+} BARIUM	BaF_2	Ba_3N_2	$Ba_3(SO_2)_2$	$Ba_3(PO_4)_2$
Cu^{2+} COPPER II	CuF_2	Cu_3N_2	$Cu_3(SO_2)_2$	$Cu_3(PO_4)_2$
NH_4^+ AMMONIUM	NH_4F	$(NH_4)_3N$	$(NH_4)_3SO_2$	$(NH_4)_3PO_4$
Fe^{3+} IRON III	FeF_3	FeN	$FeSO_2$	$FePO_4$
Ca^{2+} CALCIUM	CaF_2	Ca_3N_2	$Ca_3(SO_2)_2$	$Ca_3(PO_4)_2$
Mg^{2+} MAGNESIUM	MgF_2	Mg_3N_2	$Mg_3(SO_2)_2$	$Mg_3(PO_4)_2$
Sn^{2+} TIN II	SnF_2	Sn_3N_2	$Sn_3(SO_2)_2$	$Sn_3(PO_4)_2$

7. Fill in the following table by either giving the name or the formula of the missing part.

NAME	FORMULA
Dihydrogen monoxide	H_2O
ammonia	~~NH_4~~ NH_3
Sulphur trioxide	SO_3
silicon dioxide	SiO_2
Dinitrogen tetroxide	N_2O_4
Disulphur tetrachloride	S_2Cl_4
Oxygen dichloride	OCl_2
methane OR tetrahydridocarbon	CH_4
Sulphur hexafluoride	SF_6

← typo: should be NH_3

8. What is the difference between the bonding in the compounds in question 6, and that of the bonding in the compounds of question 7?
9. Write balanced DISSOCIATION equations for the dissolving of the soluble solids potassium sulphate, and magnesium chloride.
10. Using a solubility table write down a balanced precipitation equation leaving out the spectator ions. If there are no precipitates produced then write down no reaction.

AQUEOUS SOLUTIONS MIXED	BALANCED PRECIPITATION EQUATION	SPECTATOR IONS
Lead II nitrate and Potassium hydroxide	$Pb^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Pb(OH)_{2(s)}$	NO_3^- K^+
Copper II sulphate and aluminium chloride	no reaction	—
Iron (III) Sulfate + Potassium Carbonate	$2Fe^{3+}_{(aq)} + 3CO_3^{2-}_{(aq)} \rightarrow Fe_2(CO_3)_{3\,(s)}$	SO_4^{2-} and K^+
~~[illegible]~~	~~[illegible]~~ $\rightarrow Fe_3Sn_{2\,(s)}$	CH_3COO^- and SO_4^{2-}
Barium hydroxide and magnesium iodide	$Mg^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Mg(OH)_{2\,(s)}$	Ba^{2+} I^-
Strontium II iodide and Barium hydroxide	$Sr^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Sr(OH)_{2(s)}$	Ba^{2+} I^-
Calcium hydroxide & ammonium phosphate	$3Ca^{2+}_{(aq)} + 2PO_4^{3-}_{(aq)} \rightarrow Ca_3(PO_4)_{2(s)}$	OH^- and NH_4^+