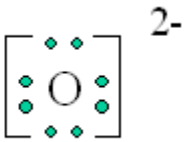
Chemistry Review ANSWERS

1. What are the rows of the periodic table called?
   Periods
2. What do all atoms in a group of the periodic table have in common?
   Number of valence electrons
3. What do all atoms in a period of the periodic table have in common?
   Number of electron orbits/shells
4. How many electrons, neutrons and protons does a neutral phosphorus atom have?
   Electrons = 15, Neutrons = 16, Protons = 15
5. What is an anion, cation, and polyatomic ion?
   Anion is a negatively charged ion (gained electrons)
   Cation is a positively charged ion (lost electrons)
   Polyatomic ion has more than one element as part of the ion (ie CO_3^{2-}, SO_4^{2-})
6. How many electrons, neutrons and protons does a bromine anion have?
   Electrons = 36, Neutrons = 45, Protons = 35
7. Draw an Lewis dot diagram for an oxygen atom and oxygen ion.



8. How is the bonding in calcium oxide different from the bonding in carbon tetrahydride?
   CaO is an ionic bond between two ions (give & take of ions), CF_4 is covalent bond between atoms (sharing of electrons)
9. What is the difference between a covalent bond and an ionic bond?
   ionic bond (give & take of ions), covalent bond (sharing of electrons)
10. What observations can you make to determine if a substance is molecular or ionic?
    Ionic bonds are between metals & non-metals. They are hard, brittle and have high melting points. Some dissolve in water and are electrolytes. Molecules do not conduct electricity or make electrolytes and have low melting points.
11. Which types of elements combine to form molecular compounds?
    Non-metals
12. Name the following compounds.
    a) $MgBr_2$ magnesium bromide
    b) NH_3 ammonia
    c) $PbSO_4$ lead (II) sulfate
    d) Na_2CO_3 sodium carbonate
15. Write the chemical formula for each of the following.
    a) Iron(ll) nitrate $Fe(NO_3)_2$
    b) Copper(ll) hydroxide $Cu(OH)_2$
    c) Diphosphorus pentaoxide P_2O_5
    d) Iodine hexachloride ICl_6
    e) Sodium nitride Na_3N
16. Given the following word equations, write a skeleton and balanced chemical equation

a) Gaseous sulfur dioxide reacts with oxygen gas to produce gaseous sulfur trioxide.

Word: sulfur dioxide (g) + oxygen gas → sulfur trioxide (g)
skeleton: $SO_{2\,(g)} + O_{2\,(g)} \rightarrow SO_{3\,(g)}$
balanced: $4\ SO_{2\,(g)} + 2\ O_{2\,(g)} \rightarrow 4\ SO_{3\,(g)}$

b) Solid aluminum chloride reacts with solid potassium to produce potassium chloride and solid aluminum.
Word: aluminum chloride (s) + potassium (s) → potassium chloride (s) + aluminum (s)
skeleton: $AlCl_{3\,(s)} + K_{(s)} \rightarrow KCl_{(s)} + Al_{(s)}$
balanced: $AlCl_{3\,(s)} + 3\ K_{(s)} \rightarrow 3\ KCl_{(s)} + Al_{(s)}$

c) When fluorine gas is put into contact with calcium metal at high temperatures, calcium fluoride powder is created in an exothermic reaction.
Word: fluorine gas + calcium (s) → calcium fluoride (s) + heat energy
skeleton: $F_{2\,(g)} + Ca_{(s)} \rightarrow CaF_{2\,(s)}$ + heat energy
balanced: $F_{2\,(g)} + Ca_{(s)} \rightarrow CaF_{2\,(s)}$ + heat energy. It is already balanced.

17. Suppose that you measure the mass of a chemical in an open container, and then heat it for a few minutes over a Bunsen burner flame. After the container and contents have cooled, you find that the mass is larger than before. If you accept the law of conservation of mass, how can you explain your observation?
Some atoms from the environment have bonded to the original substance increasing the mass. Since they were no originally massed it seems as if the reaction caused an increase in mass compared to the reactants.

18. Balance each skeleton equation and identify the type of reaction in each case.
a) $2\ NaBr + \_\_\_\ Ca(OH)_2 \rightarrow \_\_\_\ CaBr_2 + 2\ NaOH$

b) $2\ NH_3 + \_\_\_\ H_2SO_4 \rightarrow \_\_\_\ (NH_4)_2SO_4$

c) $4\ C_5H_9O + 27\ O_2 \rightarrow 20\ CO_2 + 18\ H_2O$ + energy

d) $3\ Pb + 2\ H_3PO_4 \rightarrow 3\ H_2 + Pb_3(PO_4)_2$

19. What is a chemical change?
A change that a substance goes through and produces one or more new substances

20. What are indicators of a chemical change?
Change of colour, energy release, energy absorbed, bubbles formed, a precipitate formed, very difficult to reverse