Chemistry answers Section 1

**Activity 1.2: Solutions/hints:**

|  |  |
| --- | --- |
| **Statement** | **Answer** |
| Wax melts | Physical property - changing from solid to liquid state |
| Water can be broken down to H2 and O2 | Chemical property – need a chemical reaction to cause water to break down to hydrogen and oxygen |
| Water boils at 100oC | Physical property – the BP is the temperature at which water changes from a liquid into a gas (vapour). |
| Mercury is toxic | Physical property - no change needed in mercury to make it toxic. |
| Mercury is a liquid at room temperature | Physical property - describes physical state at a particular temperature. |
| A candle gives light | Chemical property – the light comes when the candle burns and changes into new substances. |
| Iron is magnetic | Physical property – describes something about the nature of iron |
| Iron sulfide is black | Physical property – describes the appearance of iron sulphide |
| Iron rusts to form iron oxide | Chemical property – describes a change that occurs by chemical means |
| Iron sulfide is made from iron and sulfur | Chemical property – describes the formation of a new substance from iron and sulphur. |

**Activity 1.3: Solutions/hints:**

|  |  |
| --- | --- |
| **Statement** | **Answer** |
| Hydrogen and oxygen explode when a flame is applied to them. | Chemical change. Something new (water) is being formed in explosive chemical reaction. |
| Sand does not dissolve in water | Physical change – the water and sand are mixed but still visible separately. |
| Water evaporates | Physical change – water changes from a liquid to a gas but is chemically the same. |
| Mercury cools to a silvery solid | Physical change – mercury changes from a liquid to a solid but is chemically the same. |
| Sodium reacts with chlorine to form sodium chloride | Chemical change – sodium and chlorine combine chemically to form a completely new substance, sodium chloride (salt) |
| Milk goes sour | Chemical change – sour milk is made of different substances from sweet milk |
| Air is pumped into a tyre | Physical change – air fills tyre without changing in any way. |
| Wood burns | Chemical change – the products after burning are different from wood |
| Copper and nickel form an alloy | Physical change – this is a homogeneous mixture of two metals. |
| Sugar makes coffee sweet | Physical change – sugar dissolves in coffee but remains sugar. |
| Fireworks explode when ignited | Chemical change - the fireworks burn up to form new products. |
| Sugar dissolves in water | Physical change - a homogeneous mixture of sugar and water forms. Sugar and water are still both present, chemically unchanged. |

**Activity 1.4: Solutions/hints:**

1. Mixture A is a heterogeneous mixture because the sand remains visible in the water after mixing.
A possible way to remove the sand from the water would be to pour the mixture through a piece of fine cloth and collect the water that comes through in a clean container. The sand should remain in the cloth. The finer the cloth the more sand will be removed.
In an equipped laboratory you would use filter paper instead of cloth and a funnel to hold the filter paper.
2. Mixture B is a homogeneous mixture. Because the sugar disappears into the water and can no longer be seen.
A possible way to get the sugar back is to leave the glass in a safe place in the sun. The water will **evaporate** off leaving the sugar behind.
In an equipped laboratory you would heat the container with the mixture to speed up the process. You could also collect the water coming off as steam by letting it **condense** as liquid using suitable equipment.

**Solutions for Assessment 1.1: Check that you understand about pure substances and mixtures.**

1. Coca cola: homogeneous mixture of water, sugar, colourants, flavours, gas (for the fizz).
2. Milk: homogeneous mixture of water, fats, sugar and all sorts of other soluble foods.
3. Air (clean): homogeneous mixture of gases like nitrogen, oxygen and hydrogen
4. Tap water: homogeneous mixture of water and dissolved gases and salts.
5. Stew: a heterogeneous mixture of meat, vegetables, water, salt.
6. Table salt: pure substance made up of only one thing. The chemical name of salt is sodium chloride.
7. Oil and water: heterogeneous mixture because the oil will remain separate from the water as soon as you stop shaking the container.
8. Sugar: Pure substance made up of only one thing. The chemical name of sugar is sucrose.
9. Paraffin: a homogeneous mixture of fuels that can burn to give heat and energy.
10. Egg: a heterogeneous mixture of the yellow part (yolk) and the white part and the shell.

**Activity 1.5: Solutions/hints:**

1. Ice is found in cold places either in nature (frozen streams in the winter) or man-made (freezers). Ice has a very low temperature (0oC)
Ice is a solid
Ice is made by cooling water down until it becomes cold enough to become solid
2. Water is found in rivers and taps.
Water cannot be made. It occurs naturally.
Water can vary in temperature from very cold (when it gets close to freezing), to very hot (when it boils).
Water is a liquid.
3. Steam is found where water is at very high temperatures e.g. above a pot of boiling water, in a hot shower. Steam rises off boiling water. Steam has a high temperature (100oC) and burns badly. Steam is a gas or vapour.
4. Ice is a solid, water is a liquid and steam is a gas so they appear very different.
5. Ice, water and steam are actually the same thing, namely water, appearing in different states.

**Activity 1.6: Solutions/hints:**

1. Nitrogen (MP -209.9oC, BP -195.8oC): Nitrogen would be a gas at 25oC because it would boil (become a gas) at -195.8oC which is a lower temperature.
2. Iodine (MP 113.5oC, BP 184.0oC): Iodine would be a solid at 25oC because it’s melting point is 113.5oC and it would only become a liquid at that temperature.
3. Mercury (MP -38.9oC, BP 356.6oC): Mercury would be a liquid at 25OC because it would melt at -38.9oC but only become a gas at 356.6oC
4. Sulfur (MP 115.2oC, BP 444.6oC): Sulfur would be a solid at 25oC because it’s melting point is 115.2oC and it would only become a liquid at that temperature.
5. Benzene (MP 5.5oC, BP 80.2oC): Benzene would be a liquid at 25OC because it would melt at 5.5oC but only become a gas at 80.2oC

**Activity 1.6: Solutions/hints**

1. HF is a compound as it is made of two different kinds of elements, hydrogen (H) and fluorine (F). There is 1 H atom and 1 F atom for each particle of the compound. (Note: the combining ratio of atoms would be 1:1, H:F).
2. Gold is an element as it is not combined with anything else (Au). (Note: in the symbol for an element if the second letter is lower case it is part of the symbol, not a separate element).
3. Iron oxide is a compound made of two different kinds of elements, iron (Fe) and oxygen (O). (Note: the combining ratio of atoms would be 2:3, Fe:O).
4. Sodium sulfide is a compound made of two elements, sodium (Na) and sulfur (S). There is 1 Na atom and 1 S atom in each particle of the compound. (Note: the combining ratio of atoms would be 1:1, Na:S)
5. Calcium carbonate is a compound made of three different kinds of elements, calcium (Ca), carbon (C) and oxygen (O). (Note: the combining ratio of atoms would be 1:1:3, Ca:C:O)

Activity 1.7: Solutions

|  |  |  |  |
| --- | --- | --- | --- |
| **Atomic symbol** | **No of protons** | **No of neutrons** | **No of electrons** |
| 2311Na | 11 | 23 - 11 = 12 | 11 |
| 199F | 9 | 19 – 9 = 10 | 9 |
| 3216S | 16 | 32 – 16 =16 | 16 |
| 2713Al | 13 | 27 – 13 = 14 | 13 |
| 4020Ca | 20 | 40 – 20 = 20 | 20 |

Isotope activity?

**Activity 1.8 Bohr diagrams for:**

|  |  |
| --- | --- |
| Cl | Image result for bohr diagram chlorine |
| He | Image result for bohr diagram helium |
| K | Image result for bohr diagram potassium |
| S | Image result for bohr diagram sulfur |
| O | Image result for bohr diagram magnesium |
| Be | Image result for bohr diagram beryllium |
| Ne | Image result for bohr diagram helium |
| Mg | Image result for bohr diagram magnesium |

**Activity 1.9: Solutions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Atom** | **Z****(mass number)** | **A****(atomic number)** | **No of neutrons** | **No of electrons** |
| 3115P | 31 | 15 | 31 – 15 = 16 | 15 |
| 2010Ne | 20 | 10 | 20 – 10 = 10 | 10 |
| 14159Pr | 141 | 59 | 141 – 59 = 82 | 59 |
| 3919K | 39 | 19 | 39 – 19 = 20 | 19 |
| 2412Mg | 24 | 12 | 24 – 12 = 12 | 12 |

Activity 1.10: Assessment

1.

|  |  |
| --- | --- |
| **Key term** | **Definition/explanation** |
| Nuclide | A particle found within the nucleus of an atom |
| Atomic number (Z) | The number of protons in the nucleus |
| Electron | A particle found outside of the nucleus |
| Mass number (A) | The number of protons and neutrons in the nucleu |
| Atomic nucleus | Dense region in the centre of an atom containing protons and neutrons |

1. The relative atomic mass of an element is a measure of the mass of one atom of the element relative to one-twelfth the mass of an atom of carbon-12

The unit of measurement is the atomic mass unit = 1 dalton (D) = 1.661 x 10-24 g

1.

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| --- | --- | --- | --- | --- |
| **Subatomic particle** | **Symbol** | **Location in atom** | **Relative atomic mass** | **Charge** |
| proton | p | nucleus | 1 | +1 |
| neutron | n | nucleus | 1 | 0 |
| electron | e | outside nucleus | 0 | -1 |
| Atomic notation (e.g. AZSy) | Atomic notation (e.g. Sy-A | Atomic number (Z) | Atomic mass(A) | Number of protons | Number of neutrons | Number of electrons |
| 168O | O-16 | 8 | 16 | 8 | 16 – 8 = 8 | 8 |
| 5927Co | Co-59 | 27 | 59 | 27 | 59 – 27 = 32 | 27 |
| 2311Na | Na-23 | 11 | 23 | 11 | 23 – 11 = 12 | 11 |

|  |  |
| --- | --- |
| F | Image result for bohr diagram fluorine |
| Al | Image result for bohr diagram aluminium |

Activity 1.11: Working with electronic configurations.

1.

|  |  |
| --- | --- |
| P | ↑↑↑↓↑↓↑↓↑↓↑↓↑↓↑ |
| Ne | ↑↓↑↓↑↓↑↓↑↓ |
| Ca | ↑↓↑↓↑↓↑↓↑↓↑↓↑↓↑↓↑↓↑↓ |
| Li | ↑↑↓ |
| Cl | ↑↓↑↓↑↓↑↓↑↓↑↓↑↓↑↓↑ |

1.

|  |  |
| --- | --- |
| Al | 1*s*22*s*22*p*63*s*23*p*1 |
| B |  1*s*22*s*22*p*1 |
| Ar | 1*s*22*s*22*p*63*s*23*p*6 |
| Si | 1*s*22*s*22*p*63*s*23*p*2 |
| Na | 1*s*22*s*2263*s*1 |

Activity 1.12: Lewis dot diagrams

|  |  |  |  |
| --- | --- | --- | --- |
| B | Image result for lewis dot diagrams neon | Ne | Image result for lewis dot diagrams neon |
| C | Image result for lewis dot diagrams neon | S | Image result for lewis dot diagrams antimony |
| N | Image result for lewis dot diagrams helium | Ar | Image result for lewis dot diagrams argon |
| O | Image result for lewis dot diagrams | Na | Image result for lewis dot diagrams sodium |
| F | Image result for lewis dot diagrams fluorine | Ca |  **●****Ca●** |

Activity 1.13:

|  |
| --- |
|  ●●●S● + 2e- → S2- ●● |
| Cs● → Cs+ + e- |
| ●Be● → Be2+ + 2e- |
|  ●●●P● + 3e- → P3- ● |
|  ●●●●I ● + e- → I- ●● |

Activity 1.14:

1. Aufbau diagrams:

Magnesium:

Potassium:

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Neon:

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Nitrogen:

1. Spectroscopic electron configuration for P:

1*s*22*s*22*p*63*s*23*p*3

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Orbital (Aufbau) diagram

1. Complete the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Element** | **Spectroscopic Electron configuration** | **Number of Core electrons** | **Number of Valence electrons** |
| Sulfur (S) | 1*s*22*s*22*p*63*s*23*p*4 | 16 | 6 |
| Magnesium (Mg) | 1*s*22*s*22*p*63*s*2 | 10 | 2 |
| Lithium (Li) | 1*s*22*s*1 | 2 | 1 |
| Aluminium (Al) | 1*s*22*s*22*p*63*s*23*p*1 | 10 | 3 |

* 1. Most of the volume of an atom is occupied by
	(A). electrons.
	2. The atomic number of an atom identifies the number of
	(A). protons.
	3. What is the electron configuration for potassium?
	(C). 1s22s22p63s23p64s1

**Activity 1.15: Electron configuration and ions**

1. Write out an equation for the formation of the ions of the following elements:

K● → K+ + e-

* 1. Potassium

●Ca● → Ca2+ + 2e-

* 1. Calcium

 ●●

●●Br● + e- → Br-

 ●●

* 1. Bromine
	2. Sulfur

 ●●

●N● + 3e- → N3-

 ●

 ●●

●S● + 2e- → S2-

 ●●

* 1. Nitrogen

|  |  |
| --- | --- |
| S2-  | Argon |
| Na+ | Neon |
| Al3+ | Neon |
| Br- | Krypton |
| P3- | Argon |

1. Use Lewis Dot formulae to depict the electron arrangement in compounds such as
	1. lithium oxide (Li2O)
	
	2. calcium chloride (CaCl2)



* 1. aluminium oxide (Al2O3)?



1. Formula:

|  |  |  |
| --- | --- | --- |
|  | Formula | Name |
| Potassium and iodine | KI | Potassium iodide |
| Aluminium and chlorine | AlCl3 | Aluminium chloride |
| Lithium and sulfur | Li2S | Lithium sulfide |
| Magnesium and oxygen | MgO | Magnesium oxide |
| Sodium and nitrogen  | Na3N | Sodium nitride |

**Activity 1.16: Naming ionic compounds**

|  |  |
| --- | --- |
| KBr | Potassium bromide |
| CaCl2 | Calcium chloride |
| LiF | Lithium fluoride |
| Al2O3 | Aluminium oxide |
| Na2S  | Sodium sulfide |

**Activity 1.17: Using the Periodic Table to determine ionic charges**

|  |  |
| --- | --- |
| Group | Charge |
| Group 18 | 0 |
| Group 2 | +2 |
| Group 15 | -3 |
| Group 17 | -1 |
| Group 16 | -2 |

Activity 1.18 : Complete the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Compound name** | **Compound formula** | **Cation** | **Anion** |
| Ammonium hydroxide | NH4OH | NH4+ | OH- |
| Sodium carbonate | Na2CO3 | Na+ | CO32- |
| Potassium permanganate | KMnO4 | K+ | MnO4- |
| Magnesium nitrate | Mg(NO3)2 | Mg2+ | NO3- |
| Calcium hydroxide | Ca(OH)2 | Ca2+ | OH- |
| Sodium phosphate | Na3PO4 | Na+ | PO43- |

Activity 1.19 : Electron tug-of-war

1. Fluorine
2. F has a strong attraction for electrons so can form highly polar covalent bonds.
3. N, O, Cl, Br all above 2.5
4. Non-metals.
5. Francium (Fr) 0.7.
6. It easily loses and electron so is very reactive in forming ionic bonds.
7. The elements on the left hand side of the Periodic Table.
8. Metals.
9. The EN reduces as you move down a group.
10. The EN values increase as you move along a Period.
11. Study the following diagram which depicts a covalent bond between two hydrogen atoms:

 

	1. EN = 2.1
	2. The electrons will be shared equally between the two atoms since the EN values are the same.
	3. The electron pair would be closer to the F atom since the EN for F is 4.0 and the EN for H is 2.1

Lewis do to H-F bonding showing electrons closer to F

* 1. A bond can only be neutral if the electron pair is shared equally between tow atoms. If it is closer to one of the atoms that atom will have a stronger electron cloud around it so would tend towards being negatively charged, although not completely.

Activity 1:20:

1. O2, N2, H2, F2, Cl2, Br2, I2
2. When the electro-negativity value of one non-metal is the same as the electro-negativity of another different non-metal element e.g. C and S, B and As
3. When the electro-negativity value of one non-metal element is different from the electro-negativity of the other element in the bond the bond is polar, e.g. H and O in H2O and C and O in CO2

Activity 1:21:

|  |  |  |
| --- | --- | --- |
| **Element pairs** | **ΔEN** | **Type of bond** |
| H and F | 4.0 - 2.1 = 1.9 | Polar covalent |
| P and O | * 1. 2.1 = 1.4
 | Polar covalent |
| K and Cl | 3.0 - 0.8 = 2.2 | Ionic |
| Ca and O | 3.5 -1.0 = 2.5 | Ionic |
| H and H | 2.1 - 2.1 = 0 | Non-polar covalent |
| N and O | 3.5 - 3.0 = 0.5 | Polar covalent |
| Na and S | 2.5 - 0.9 = 1.4 | Ionic |
| N and H | 3.0 - 2.1 = 0.9 | Polar covalent |
| Li and F | 4.0 - 1.0 = 3.0 | Ionic |
| C and H | 2.5 - 2.1 = 0.4 | Polar covalent |
| C and Cl | 3.0 - 2.5 = 0.5 | Polar covalent |
| N and N | 3.0 - 3.0 = 0 | Non-polar covalent |

Activity 1.22:

1. An ionic bond forms when a metal atom donates its valence electron(s) to a non-metal atom. The metal becomes positively charged and the non-metal negatively charged. The two ions then bond by means of electrostatic attraction.
2. A covalent bond forms between two non-metal elements which share a pair of electrons to form a bond.
3. Bond types:
	1. Covalent
	2. Ionic
	3. Ionic
	4. Covalent
	5. Covalent
4.

|  |  |
| --- | --- |
| HBr | Image result for lewis dot structure HBr |
| NaCl | Image result for lewis dot structure NaCl |
| H2O | Image result for lewis dot structure H2O |
| NH3 | Image result for lewis dot structure NH3 |

1. Using electro-negativity data:
	1. C-O ΔEN = 3.5 – 2.5 = 1.0 Bond is polar covalent
	2. N-N ΔEN = 3.0 – 3.0 = 0 Bond is non-polar covalent
	3. P-I ΔEN = 2.5 – 2.1 = 0.4 Bond is non-polar covalent
	4. S-F ΔEN = 4.0 – 2.5 = 1.5 Bond is polar covalent
	5. H-Br ΔEN = 2.8 – 2.1 = 0.7 Bond is polar covalent
2. Electro-negativity decreases down a group
3. Electro-negativity increases across a period
4. Answers in bold:
	1. A bond composed of one shared electron pair between two atoms..**single bond**
	2. The valence electrons in a molecule that are not shared…**non-bonding electrons**
	3. The ability of an atom to attract a shared pair of electrons…**electro-negativity**.
	4. A bond in which the electron pair is shared equally between two atoms…**non-polar covalent bond**
	5. A bond in which the electron pair is shared unequally between two atoms…**polar covalent bond**.
	6. A method used to indicate partial positive and partial negative charges in a covalent bond…**delta (δ) notation**
	7. The statement that an atom must be surrounded by eight valence electrons to be stable….**octet rule**

Activity 1:23

|  |  |
| --- | --- |
| potassium chloride  | KCl |
| sodium oxide  | Na2O |
| lithium nitride  | Li3N |
| magnesium fluoride  | MgF2 |
| calcium oxide  | CaO |
| aluminium bromide  | AlBr3 |
| aluminium sulfide  | Al2S3 |
| aluminium nitride  | AlN |
| copper (II) chloride  | CuCl2 |
| iron (III) chloride  | FeCl3 |
| mercury (I) oxide  | Hg2O |
| mercury (II) oxide  | HgO |
| zinc bromide  | ZnBr2 |
| silver oxide  | Ag2O |
| lead sulfide  | PbS |

Activity 1.24

|  |  |  |
| --- | --- | --- |
| Compound name | Ions | Chemical formula |
| magnesium sulfate  | Mg2+, SO42- | MgSO4 |
| calcium sulfite  | Ca2+, SO32- | CaSO3 |
| potassium sulfate  | K+, SO42- | KsSO4 |
| potassium carbonate  | K+, CO32- | K2CO3 |
| sodium hydrogen carbonate (bicarbonate of soda) | Na+, HCO3- | NaHCO3 |
| ammonium sulfide  | NH4+, S2- | (NH4)2S |
| ammonium hydroxide  | NH4+, OH- | NH4OH |
| barium nitrate  | Ba2+, NO3- | Ba(NO3)2 |
| lithium hydroxide (Li+, OH | Li+, OH- | LiOH |
| aluminium hydroxide  | Al3+, OH- | Al(OH)3 |

Activity 1.25

|  |  |
| --- | --- |
| NO2  | Nitrogen dioxide |
| CO2  | Carbon dioxide |
| HCl  | Hydrogen chloride |
| N2O4  | Dinitrogen tetroxide |
| P4S3  | Tetraphosphorus trisulfide |
| NO2  | Nitrogen dioxide |
| I2O4 | Di-iodine tetroxide |
| CO | Carbon monoxide |
| SIO2 | Silicon dioxide |
| P2I4 | Diphosphorus tetraiodide |
| HF | Hydrogen fluoride |

Activity 1.26:

Ice forms at 0oC. Ice is in the solid phase.

The ice starts to melt.

Water is in the liquid phase.

The boiling point of water is 100oC.

The water starts to boil – bubbles rapidly rise to the surface and the whole body of water moves around vigorously. The water turns into steam or water vapour.

Water is entering the gas phase when it starts to boil.

As boiling continues the water volume decreases until it disappears completely.

Activity 1.27

1. 1. SiH4
	2. The greater the size of the molecule the higher the boiling point.
	3. No. Oxygen, which is in Period 2, is bonded to H to form water and it has the highest boiling point.
	4. H2O is liquid. The rest are gases as they boil before reaching room temperature (25oC).
	5. Water remains a liquid for drinking as well as for many other uses over a wide range of temperatures (0 - 100 oC). Usual climate temperatures remain well within this range so life is not compromised by water changing phase without an input of energy.
2. London forces. London forces are relatively weak forces of attraction that exists between nonpolar molecules and noble gas atoms.

Activity 1.28:

|  |  |  |
| --- | --- | --- |
| **Name** | **Formula** | **Structural formula** |
| Methane | C1H4 | Image result for structural formula methane |
| Ethane | C2H6 | Image result for structural formula ethane |
| Propane | C3H8 | Image result for structural formula propane |
| Butane | C4H10 | Image result for structural formula butane |
| Pentane | C5H12 | Image result for structural formula pentane |
| Hexane | C6H14 | Image result for structural formula hexane |
| Heptane | C7H16 | Image result for structural formula heptane |
| Octane | C8H18 | Image result for structural formula octane |

Activity 1.29:



Activity 1:30:

|  |  |  |
| --- | --- | --- |
| **Name** | **Formula** | **Structural formula** |
| Ethene | C2H4 | Image result for structural formula ethene |
| Prop-1-ene | C3H6 | Image result for structural formula propene |
| But-1-ene | C4H8 | Image result for structural formula butene |
| Pent-1-ene | C5H10 | Image result for structural formula of alkenes and alkynes |
| Hex-1-ene | C6H12 | Image result for structural formula of heptene |
| Hept-1-ene | C7H14 | Image result for structural formula of heptene |
| Oct-1-ene | C8H16 | Image result for structural formula of octene |

Activity 1.31

|  |  |  |
| --- | --- | --- |
| **Name** | **Formula** | **Structural formula** |
| Ethyne | C2H2 | Image result for structural formula ethyne |
| Prop-1-yne | C3H4 | Image result for structural formula propene |
| But-1-yne | C4H6 | Image result for structural formula of butyne |
| Pent-1-yne | C5H8 | Image result for structural formula of pentyne |
| Hex-1-yne | C6H10 | Image result for structural formula of heptyne |
| Hept-1-yne | C7H12 | Image result for structural formula of heptyne |
| Oct-1-yne | C8H14 | Image result for structural formula of heptyne |

Activity 1.32

|  |  |
| --- | --- |
| **Compound** | **Name** |
| CH2=CH-CH2-CH2-CH3 | 1-butene |
| CH≡C-CH2-CH2-CH3 | 1-butyne |
| CH3-CH-CH2-CH=CH2 | 1-butene |
| CH3- CH2- CH2-CH2-C≡CH | 1-pentyne |
| CH3-CH=CH-CH2-CH3 | 2-pentene |
| CH3-CH2-CH=CH-CH3 | 2-pentene |
| CH3-CH2-CH2-CH=CH2 | 1-pentene |
| CH3-C≡C-CH2-CH3 | 2-pentyne |
| CH3-CH2-C≡C-CH3 | 2-pentyne |
| CH3-CH2-CH2-C≡CH | 1-pentyne |

Activity 1.33

|  |  |
| --- | --- |
| But-1-ene | Image result for 1,2-dibromo-butane |
| 1,2 - dibromobutane | Image result for 1,2-dibromo-butane |

Activity 1.34:

|  |  |  |
| --- | --- | --- |
| 1 | butanoic acid  | Image result for butanoic acid |
| 2 | 2 - octyne | Image result for 2-octyne |
| 3 | 3 – pentanol | Image result for 3-pentanol |
| 4 | 3 - heptene | Image result for 3-heptene structural formula |
| 5 | butanone | Image result for butanone |
| 6 | hexaldehyde | Image result for hexaldehyde |
| 7 | propyl pentanoate | Image result for methyl pentanoate ivyrose |
| 8 | 2-bromopropane | Image result for 2-bromopropane |