9.5 Noble gases

01. 0620_w13_qp_31 Q: 1

For each of the following, name an element which matches the description.

(a) It is used as a fuel in nuclear reactors.

..... [1]

(b) It is the only non-metal which is a good conductor of electricity.

..... [1]

(c) Inert electrodes are made from this metal.

..... [1]

(d) This gaseous element is used to fill balloons in preference to hydrogen.

..... [1]

(e) An element which can form an ion of the type X^{3-}.

..... [1]

(f) It has the same electron distribution as the calcium ion, Ca^{2+}.

..... [1]

(g) The element is in Period 5 and Group VI.

..... [1]

[Total: 7]

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02. 0620_s12_qp_32 Q: 1

The table below includes information about some of the elements in Period 2.

element	carbon	nitrogen	fluorine	neon
symbol	C	N	F	Ne
structure	macromolecular	simple molecules N_2	simple molecules F_2	single atoms Ne
boiling point / °C	4200	–196	–188	–246

(a) Why does neon exist as single atoms but fluorine exists as molecules?

.....

..... [2]

(b) What determines the order of the elements in a period?

..... [1]

(c) When liquid nitrogen boils the following change occurs.

$$N_2(l) \rightarrow N_2(g)$$

The boiling point of nitrogen is very low even though the bond between the atoms in a nitrogen molecule is very strong. Suggest an explanation.

.....

..... [2]

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(d) Draw a diagram showing the arrangement of the outer shell (valency) electrons in a molecule of nitrogen.

[2]

[Total: 7]

01. 0620_w13_ms_31 Q: 1

(a) uranium / plutonium / thorium [1]

(b) graphite / carbon [1]

(c) platinum / titanium / mercury / gold [1]
NOT: carbon / graphite

(d) helium [1]

(e) nitrogen / phosphorus [1]

(f) argon [1]
ACCEPT: any ion 2 + 8 + 8 e.g. K^+ etc.

(g) tellurium [1]
ACCEPT: correct symbol

[Total: 7]

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(a) neon has full outer shell / energy level / valency shell / octet / 8 (electrons) in outer shell / neon does not need to lose or gain electrons; [1]
fluorine atoms have 7 electrons / needs 1 to fill / has incomplete shell / forms bonds with other fluorine atoms / fluorine (atoms) form covalent bonds / shares electrons; [1]

(b) atomic number / proton number / number of protons (in one atom); [1]

(c) weak intermolecular (or between molecules) forces / Van der Waals forces between molecules / low amount of energy required to break bonds between molecules; [1]
strong bonds don't break / covalent bonds don't break / (unnamed) bonds within molecules / between atoms don't break; [1]

(d) 1 non-bonding pair on each nitrogen atom; [1]
6 electrons between nitrogen atoms; [1]

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