

GCSE CHEMISTRY

Topic Paper: 1 Atomic structure and the periodic table

MARK SCHEME



28 Marks



- M1.** (a) hydrogen has one proton whereas helium has two protons
accept numbers for words
accept hydrogen only has one proton
ignore references to groups 1
- hydrogen has one electron whereas helium has two electrons
accept hydrogen only has one electron
allow helium has a full outer shell (of electrons) 1
- hydrogen has no neutrons **or** helium has two neutrons
if no other mark awarded, allow helium has more electrons /
protons / neutrons for 1 mark 1
- (b) (i) 2 electrons on first shell **and**
8 electrons on outer shell 1
- (ii) they have a stable arrangement of electrons
accept they have full outer energy level / shell of electrons
*do **not** accept they have the same number of electrons in their*
outer energy level / shell
allow they are noble gases
ignore they are in group 0 1
- M2.** (a) (i) both have one / 1 electron in the outer energy level / shell
allow both react in a similar way 1
- (ii) eleven / 11 1
- (iii) twelve / 12 1
- (iv) (2x)
max 1 if candidate changes the number of electrons in the first
energy level / shell
- 8x (in second energy level / shell) 1
- 1x (in outer energy level / shell) 1

[5]



- (b) two sodium atoms (react) 1
- two (bonded) chlorine atoms (react)
allow one chlorine molecule (reacts) 1
- two sodium ions and two chloride ions (are produced)
allow two molecules of sodium chloride (are produced) or two sodium chloride particles (are produced) 1
- [8]

- M3.** electron
nucleus
neutron

each for 1 mark
- [3]

- M4.** contains oxygen atoms
contains hydrogen atoms
atoms are [chemically] bonded
ratio of two hydrogen to two oxygen atoms
each for 1 mark
- [4]

- M5.** (a) react with oxygen / oxidise / burn in oxygen / burning / combustion **or**
tungsten to tungsten oxide **or** makes an oxide
key idea is oxidation
ignore breaking ignore fire / flames / exothermic
ignore react with air 1
- (b) it is (very) unreactive / not reactive / inert / does not react with tungsten
or it is a noble gas **or** it is in group 0 or 8 or 18
do not accept unreactive / inert metal or argon is not very reactive 1
- full outer shell (of electrons) / 8 electrons in outer shell 1
- does not need to gain / lose / swap / transfer / share electrons **or** does not need to
form bonds
does not bond ionically / covalently 1
- [4]



- M6.** (a) (i) $H_2 + O_2 \rightarrow H_2O$ *both circled correct
for 1 mark 1
- (ii) $A_1 + O_2 \rightarrow A_1O_3$ all circled correct
for 1 mark 1
- (b) *idea that:*
must end up with the same number of atoms as at the start
any 2 each
- otherwise matter is shown to be lost/gained
for 1 mark
- won't show correct amount of each element/compound 2

[4]