



GCSE Chemistry

Electron Configuration

Mark Scheme

Time available: 45 minutes

Marks available: 44 marks

www.accesstuition.com

Mark schemes

- 1.** (a) **B** 1
- (b) **D** 1
- (c) **E** 1
- (d) **C** 1
- (e) 92.5×6 and 7×7.5 1
- $$\frac{607.5}{100}$$
 1
- 6.075 1
- 6.08 1
- allow 6.08 with no working shown for 4 marks*
- [8]**
- 2.** (a) (i) electronic structure 2,3 drawn
allow any representation of electrons, such as, dots, crosses, or numbers (2,3) 1
- (ii) nucleus 1
- (iii) protons and neutrons
do not allow electrons in nucleus 1
- (relative charge of proton) +1
allow positive 1
- (relative charge of neutron) 0
allow no charge/neutral 1
- ignore number of particles*
- (b) too many electrons in the first energy level or inner shell
allow inner shell can only have a maximum of 2 electrons 1

too few electrons in the second energy level or outer shell

allow neon has 8 electrons in its outer shell or neon does not have 1 electron in its outer shell

allow neon has a stable arrangement of electrons or a full outer shell

1

neon does not have 9 electrons or neon has 10 electrons

allow one electron missing

allow fluorine has 9 electrons

1

ignore second shell can hold (maximum) 8 electrons or 2,8,8 rule or is a noble gas or in Group 0

max 2 marks if the wrong particle, such as atoms instead of electrons

if no other mark awarded allow 1 mark for the electronic structure of neon is 2,8

[8]

3.

(a) carbon

accept C

1

(b) protons

1

[2]

4.

(a) (i) same number of shells/2 full shells/3 shells/same number of energy levels

any 1 for 1 mark

increasing number of electrons/different number of electrons/
number of electrons same as group
number

(if electrons not specifically mentioned assume they are referring to electrons)

any 1 for 1 mark

2

(ii) all have 7 electrons in outer shell/same number in outer shell/
each has one electron missing from outer shell
each can accept one electron

any 1 for 1 mark

number of shells/energy levels increases
increasing number of electrons

any 1 for 1 mark

2

(b) (i) increases down group/decreases up

for 1 mark

1

- (ii) down group atoms get bigger/larger/have more shells/
more energy levels

for 1 mark

electrons further away from nucleus/more
shielding down group

for 1 mark

outer electron more easily lost/less
firmly held

for 1 mark

3

- (c) H^+ or has positive ions/one electron in outer shell/can lose
one electron/ H^+ ions discharged at negative electrode (max 2)
covalent bonds or compounds/forms diatomic mols. or example/
ability to form H^- ions/non-conductor/
low Mt.Pt or low B.P. (max 2)

(overall max 3)

3

[11]

5.

- (i) B or 2, 8, 1

for one mark

1

- (ii) A or 2, 8

for one mark

1

[2]

6.

- (a) D

1

- (b) B

1

- (c) any **two** from:

(Group 1 elements)

- have lower melting / boiling points
- have lower densities
- are less strong
- are softer

allow (Group 1 elements are) more malleable / ductile

allow (Group 1 elements) are not useful as catalysts

ignore transition elements form coloured compounds

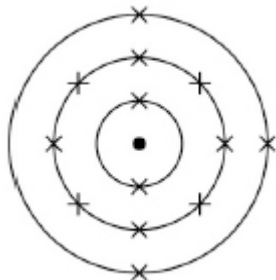
ignore transition elements form ions with different charges

ignore references to chemical properties

2

allow converse statements for transition elements

(d)



allow any combination of x, •, o, e⁽⁻⁾ for electrons

1

(e) delocalised electrons

allow free electrons

1

(the electrons) carry (electrical) charge

ignore current / electricity for charge

1

(the electrons move) through the metal / aluminium / structure

ignore throughout for through

1

(f) ionic

1

(g) magnesium (atom) loses electrons

1

oxygen (atom) gains electrons

1

two electrons (are transferred)

1

magnesium ions **and** oxide ions are formed

*allow Mg²⁺ (ions) **and** O²⁻ (ions) are formed*

allow magnesium forms positive ions and oxygen forms negative ions

allow (both) form a complete outer shell

1

[13]