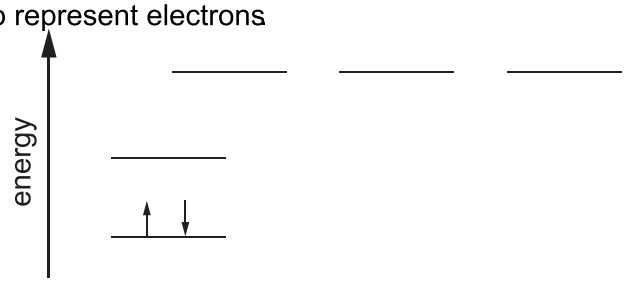
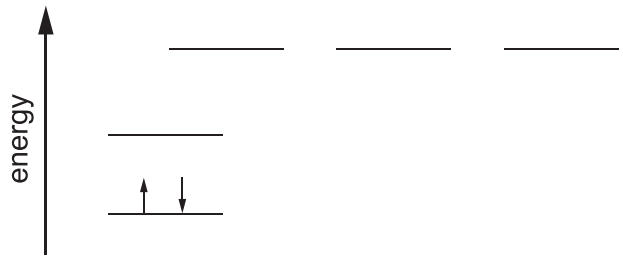
SMART EXAM RESOURCES
9701 CAMBRIDGE AS CHEMISTRY
TOPIC QUESTIONS AND MARK SCHEMES
TOPIC :ATOMIC STRUCTURE
SUB-TOPIC: ELECTRONIC CONFIGURATION
SET-1-QP-MS

1 Complete the electronic configurations of nitrogen atoms and oxygen atoms on the energy level diagrams below.

Use arrows to represent electrons.



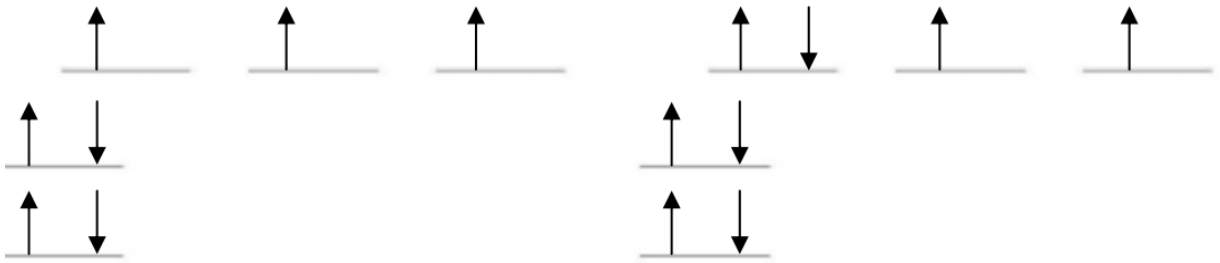
nitrogen



oxygen

[6]

MARK SCHEME:



nitrogen

oxygen

both correct (1) [6]

2 Copper and titanium are each used with aluminium to make alloys which are light, strong and resistant to corrosion.

Aluminium, Al, is in the third period of the Periodic Table; copper and titanium are both transition elements.

(a) Complete the electronic configuration of aluminium and of titanium, proton number 22.

Al	$1s^2$
Ti	$1s^2$

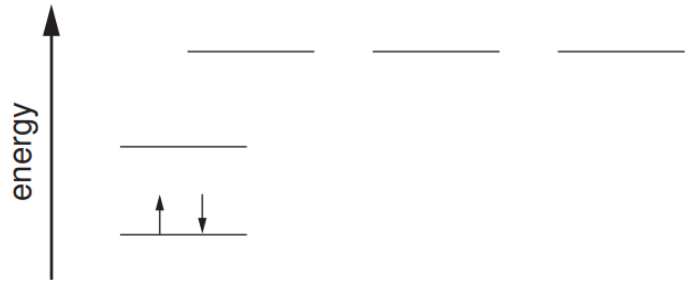
MARK SCHEME:

(a) Al $1s^2\ 2s^2 2p^6\ 3s^2 3p^1$ (1)

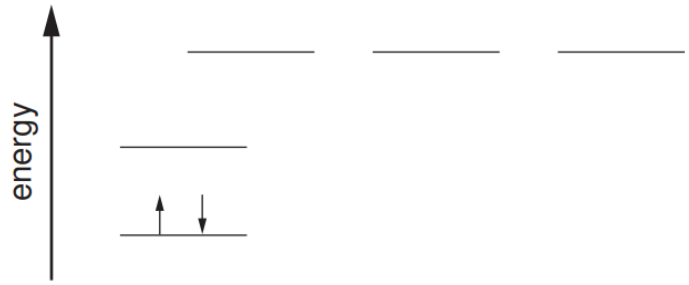
Ti $1s^2\ 2s^2 2p^6\ 3s^2\ 3p^6\ 3d^2\ 4s^2$ **or**

$1s^2\ 2s^2 2p^6\ 3s^2\ 3p^6\ 4s^2 3d^2$ penalise any error (1) [2]

3 Complete the electronic configurations of nitrogen atoms and oxygen atoms on the energy level diagrams below.
Use arrows to represent electrons.



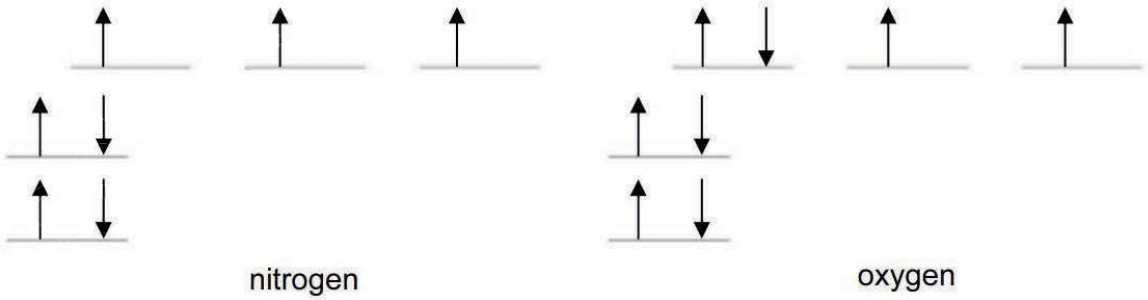
nitrogen



oxygen

[6]

MARK SCHEME:

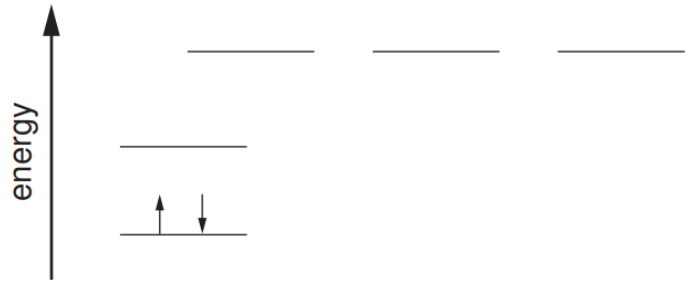


nitrogen

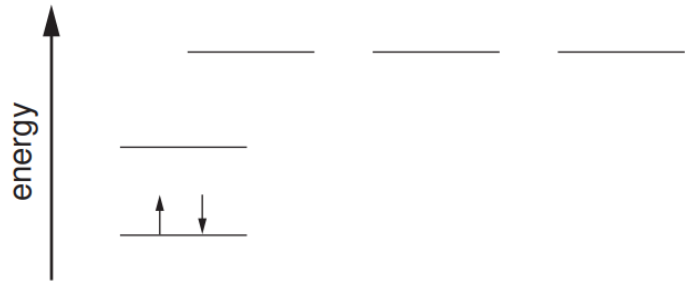
oxygen

both correct (1) [6]

4 Complete the electronic configurations of nitrogen atoms and oxygen atoms on the energy level diagrams below.
Use arrows to represent electrons.



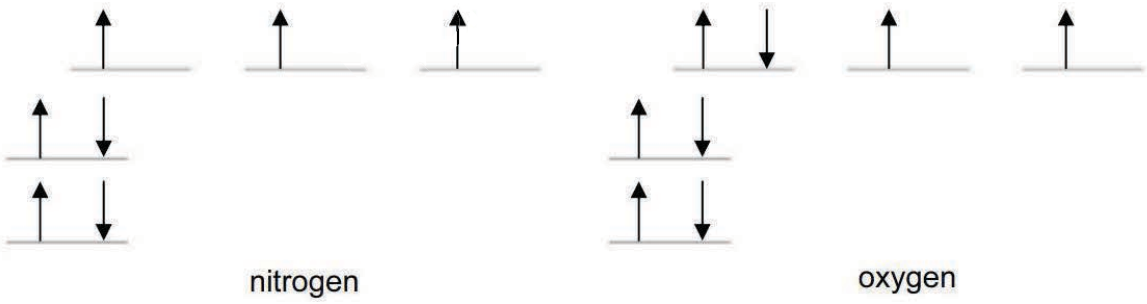
nitrogen



oxygen

[6]

MARK SCHEME:



nitrogen

oxygen

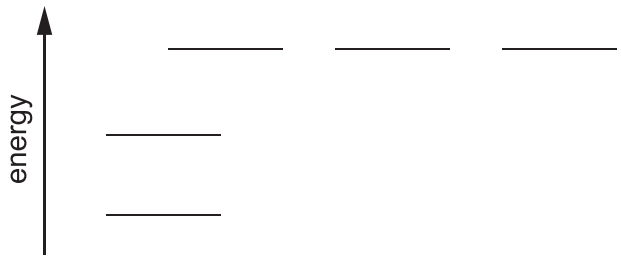
both correct (1) [6]

5 In the 19th and 20th centuries, experimental results showed scientists that atoms consist of a positive, heavy nucleus which is surrounded by electrons.

Then in the 20th century, theoretical scientists explained how electrons are arranged in orbitals around atoms.

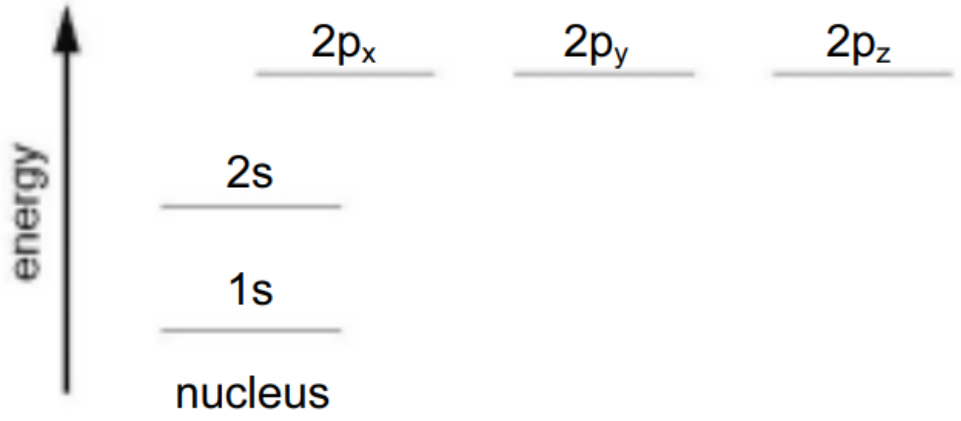
(a) The diagram below represents the energy levels of the orbitals present in atoms of the second period (Li to Ne).

(i) Label the energy levels to indicate the principal quantum number **and** the type of orbital at each energy level.



MARK SCHEME:

(a) (i)



correct 1s and 2s (1)

correct $2p_x$, $2p_y$ and $2p_z$ (1)