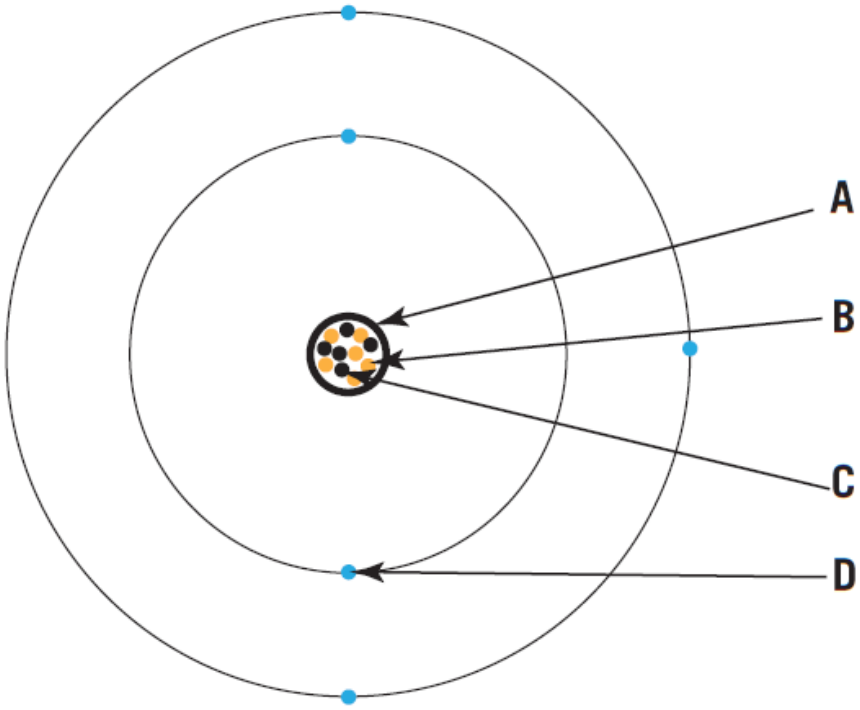
Cambridge Technical Laboratory Skills – Bridging Work

Part 1: Atomic structure

Study this diagram and then answer the questions that follow.



1 Name the dense central region of the atom labelled A.

2 Name particle B, which has no charge and a relative mass of 1.

3 Name particle C, which has a positive charge and a relative mass of 1.

4 Name the negatively charged particle D that orbits the central dense region of the atom.

5 What is the atomic number of this atom?

6 What is the mass number of this atom?

7 Identify the element.

Name: _____

Part 2: The Periodic Table

1 What names are given to the vertical columns and horizontal rows in the periodic table?

Vertical columns: Horizontal rows:

2 Complete this table.

Element	Atomic number	Period	Group	Metal or non-metal?
Boron				
Oxygen				
	11			
	13			
Phosphorous				
Iron	26			

3 a) State what happens to the melting points of the elements as a period is crossed (State the period you looked at and take care to check all the different elements).

b) The first ionisation energy is the energy required to remove the most loosely held electron from 1 mole of gaseous atoms. (http://www.bbc.co.uk/bitesize/higher/chemistry/energy/patterns/revision/3/)

State what happens to the first ionisation energy of the elements as:

i) A period is crossed:

ii) A group is descended:

c) Atomic radius is the size of an atom (one definition includes the distance from the nucleus to the outmost electrons). State what happens to the atomic radii of the elements as:

i) A period is crossed:

ii) A group is descended:

Name: _____

Part 3: **Bonding**

1 Complete these sentences by filling in the missing words.

Ionic compounds are formed when electrons are _____ or _____ by atoms. Metals form _____ charged ions by _____ electrons whereas non-metals form n*egatively c*harged ions by _____ electrons.

Many ions pack together to form giant _____ structures in which oppositely charged ions _____ each other.

Covalent compounds are usually formed between _____.

They are formed by the _____ of electrons.

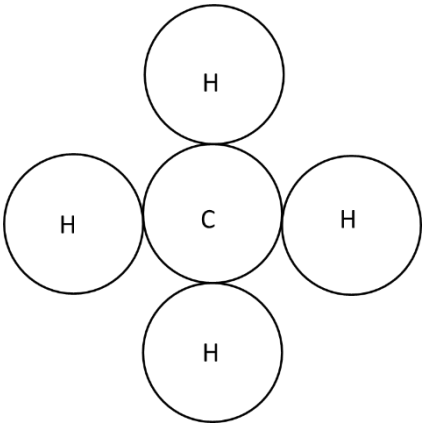
In both types of bonding the atoms of the elements become more stable by achieving the same electronic configuration as a _____ _____.

2 Complete the table by listing the type of bonding in each substances.

Substance	Type of bonding
NaF	
MgO	
CCl_4	
SO_2	
CaS	
Cl_2	

3 a) Identify the bonding in CH4.

b) Complete this **dot and cross** diagram for methane, showing only the outer electron shells.



Name: _____

Part 4: Cell Organisation

Produce a report naming and describing the different organelles and structures within Eukaryotic and Prokaryotic cells.

1. Write a report on the structure of an **animal cell (eukaryotic cell)**. It must include a labelled image and explanation of the role of the organelles listed below.

    - **Cell membrane;**
    - **Nucleus;**
    - **Nucleolus;**
    - **Cytoplasm;**
    - **Mitochondria;**
    - **Ribosome;**
    - **Smooth endoplasmic reticulum and rough endoplasmic reticulum;**
    - **Golgi body/apparatus;**
    - **Lysosomes and vesicles;**

2. You then need to create a table (plant cell and prokaryotic cell as the headings) and explain the role of the organelles present in Plant and Prokaryotic cells that animal cells don't have. You should include a picture of both types of cell and cover the organelles listed:
    - **Vacuole;**
    - **Cell wall;**
    - **Chloroplasts;**
    - **Flagellum;**
    - **Plasmid and nucleoid DNA;**
    - **Capsule;**
    - **Pili.**

    You should clearly state which of these organelles are present in plant cells and which are found in prokaryotic cells.

Name: _____