The Chemical Earth – Assessment Task
Answers

Part A (50 marks, 5 marks per row)

Letter	Element	Atomic Number	Atomic Mass	Electron Configuration	Melting Point (°C)	State at 25°C	Electrical Conductivity (MS m^{-1})
A	Hydrogen	1	1.008	1	-259	Gas	–
B	Carbon	6	12.01	2,4	3727	Solid	0.07
C	Oxygen	8	16.00	2,6	-219	Gas	–
D	Sodium	11	22.99	2,8,1	98	Solid	21
E	Aluminium	13	26.98	2,8,3	660	Solid	37
F	Phosphorus	15	30.97	2,8,5	44	Solid	10^{-15}
G	Calcium	20	40.08	2,8,8,2	839	Solid	29
H	Bromine	35	79.90	2,8,18,7	-7	Liquid	10^{-16}
I	Tin	50	118.7	2,8,18,18,4	232	Solid	8.5
J	Xenon	54	131.3	2,8,18,18,8	-112	Gas	–

Part B (12 marks, 3 marks per question)

1. Carbon has network covalent bonding. Each atom shares a pair of 4 neighbouring atoms forming a three dimensional covalent network structure (lattice). The covalent bonding is formed when each atom donates one electron to the shared pair.
2. Sodium has metallic bonding, where sodium ions are surrounded by a sea of electrons (outermost valence electrons). The electrons are delocalised.
3. Oxygen and calcium form a compound with ionic bonding. Calcium donates two electrons to oxygen so both become charged ions. The electrostatic attraction between the ions holds them together.
4. Phosphorus and bromine form a covalent molecule. The covalent bond is formed when each atom donates an electron to the shared pair. In this case 3 covalent bonds and formed to make PBr_3.

Part C (18 marks, 1, 2, 2, 1, 3, 3, 2, 4)

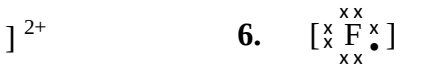
1. $[\ Mg\ ]^{2+}$

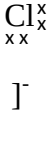
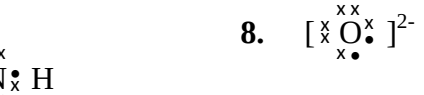
2.

3.

4.

5.

6. 

7. 

8.