Covalent bonding

61. (c) $H-O-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-O-O-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-O-H$ (Marshall acid)

62. (a) Among the given choice *Al* is least electropositive therefore, the bond between *Al* and *Cl* will be least ionic or most covalent or the difference in electronegativeity of two atom is less than 1.8.

63. (b) Electronic configuration of ${}_{16}S^{32} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^4$. In the last orbit it has only 6 electron. So it require 2 electron to complete its octet, therefore it share 2 electron with two hydrogen atom and forms 2 covalent bond with it.

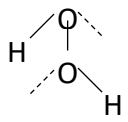
64. (b) The acidity of hydrides of *VI* group elements increase from top to bottom as the bond strength $x-H$ decrease from top to bottom

$H_2O < H_2S < H_2Se < H_2Te$

65. (b) We know that Al^{+3} cation is smaller than Na^+ (because of greater nuclear change) According to Fajan's rule, small cation polarise anion upto greater extent. Hence Al^{3+} polarise Cl^- ion upto greater extent, therefore $AlCl_3$ has covalent bond between $_{Al}$ and *Cl* atoms.

66. (b) Sulphur has the second highest catenation property after carbon. Its molecule has eight atom bonded together (*i.e.* S_8)

67. (b) H_2O_2 has open book structure.



68. (c) **3**

Explanation:

In **acetylene (C_2H_2)**, the structure is:

H–C≡C–H

Each carbon atom is bonded to:

- **One hydrogen atom** by a single bond
- **One carbon atom** by a triple bond

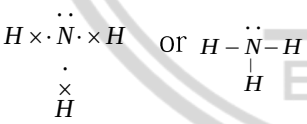
→ Total number of bonds around each carbon = **4 shared electron pairs**

→ Therefore, the **valency of carbon = 3** (since each carbon forms 3 covalent bonds with another carbon and 1 with hydrogen, effectively using 3 shared pairs with other atoms).

Hence, in **acetylene**, carbon shows a **valency of 3**.

69. (b) The electronic configuration of nitrogen is $_7N = 1s^2, 2s^2, 2p^3$

It has 5 electrons in valency shell, hence in ammonia molecule it complete its octet by sharing of three electron with three H atom, therefore it has 8 electrons in its valence shell in ammonia molecule



70. (c) **Covalent bond**

Explanation:

In a **hydrogen molecule (H_2)**, each hydrogen atom has **one electron**.

Both atoms **share one pair of electrons** to achieve a stable configuration (like helium).

This sharing of electrons forms a **single covalent bond (H–H)**, which holds the two hydrogen atoms together.

71. (c) Multiple bonds have more bond energy so $C \equiv N$ will be the strongest.

72. (c) Diamond, silicon and quartz molecule bounded by covalent bond.

73. (cd) C_2H_4 and N_2 has multiple bonds.

74. (ad) CO has only 6 electrons while PCl_5 has 10 electrons after sharing so both don't follow octet rule.

75. **Both (a) and (b)** are correct.

Explanation:

- In a **covalent bond**, atoms **share electrons** to achieve stable electronic configurations → hence **(a)** is correct.
- Depending on the **electronegativity difference** between the bonded atoms, a covalent bond may be **polar** (unequal sharing, e.g., H–Cl) or **non-polar** (equal sharing, e.g., H–H, Cl–Cl) → hence **(b)** is also correct.

Therefore, statements **(a)** and **(b)** correctly describe a **covalent bond**.

76. (a) Among these, NaH and CaH_2 are ionic hydrides and B_2H_6 and NH_3 are covalent hydrides.