

Covalent bonding

41. (b) In water molecule three atom are linked by covalent bond.

Structure is 

42. (b) $:N \equiv N^+ - \ddot{\overset{..}{O}}^-$ or $N \equiv N \rightarrow O$.

- 43 (b) Electron sharing

Explanation:

A **covalent bond** is formed when **two atoms share one or more pairs of electrons** so that each attains a stable electronic configuration (usually an octet).

- **Ionic bonds** involve **electron transfer**.
- **Covalent bonds** involve **electron sharing** between atoms.

Hence, a covalent bond is formed by **electron sharing**.

44. (b) The electronic configuration of Na ($Z=11$) is $1s^2, 2s^2 2p^6, 3s^1$. The oxide of Na is Na_2O .

45. (b) Covalent bond is directional.

46. (d) MA_3

Explanation:

- The element **M** (2,8,3) has **3 valence electrons**, so its **valency is 3**.
- The element **A** (2,8,7) has **7 valence electrons**, so its **valency is 1**.
- To satisfy the valencies, one atom of M combines with three atoms of A.

Therefore, the chemical formula of the compound is MA_3 .

(Example: Aluminum (2,8,3) and Chlorine (2,8,7) form $AlCl_3$.)



47. (d) Bond dissociation energy decreases with increase in size. So D is smallest.
48. (b) Molecule X is nitrogen because nitrogen molecule has triple bond. Its configuration will be $1s^2, 2s^2 2p^3$.
49. (a) PCl_5 does not follow octet rule, it has 10 electrons in its valence shell.
50. (a) The compound will be A_2B_3 (By criss cross rule).
51. (b) Each nitrogen share 3 electrons to form triple bond.
52. (d) Urea solution does not conduct electricity because it is a covalent compound.
53. (c) N

Explanation:

- As we move left to right across a period in the periodic table, the **nuclear charge increases**, pulling the electrons closer to the nucleus.
- This causes the **covalent radius to decrease**.
- Among the given elements (B, C, N in Period 2 and Si in Period 3), **nitrogen** lies farthest to the right in Period 2.

Hence, **nitrogen (N)** has the **smallest covalent radius** among the given elements.

54. (d) Due to the small size and higher ionization energy, boron forms covalent compound.
55. (d) XY_2

Explanation: X has $4s^2$ (two valence electrons) \rightarrow valency = 2.

(Probably the question intended Y to be a $3p^5$ species with valency 1 — a common



exam type is $3p^6$ written instead of $3p^5$. If Y has valency 1, one X (valency 2) combines with two Y (valency 1) to give XY_2 , e.g., CaCl_2 .)
So the most chemically reasonable formula is XY_2 .

56. (d) Covalent molecules are held by weak Vander Waals's force of attraction

Explanation: In molecular (covalent) substances the discrete molecules are held together by weak intermolecular forces (London dispersion, dipole-dipole, hydrogen bonding). These weak forces lead to low melting and boiling points compared with ionic or network solids.

57. (a) Covalent bonds

Explanation: Semiconductors like Si and Ge have a covalent lattice. Doping this covalent lattice with donor or acceptor impurities creates n-type or p-type behaviour (extra electrons or holes) while the underlying bonding remains covalent.

58. (a) BF_3 contain 6 electron so it is lewis acid.

59. (d) Among the given species. The bond dissociation energy of $c-o$ bond is minimum in case of co_3^{2-} by which $c-o$ bond become more weaker in co_3^{2-} or the bond order of co_3^{2-} (1.33) is minimum so the bond become weaker.

60. (a) Valency of $Na_2S_2O_3$ is supposed to be x, then $2 + 2x + (-6) = 0$, $2x - 4 = 0$, $x = 2$.

