Resonance

1. (d) Choice (a), (b), (c) are the resonance structures of CO_2.

2. (b) In NH_3 nitrogen has one lone pair of electron.

3. **(b) Delocalization of π electrons**

Explanation:
Resonance occurs when π electrons (or lone pairs in conjugation) are delocalized over two or more adjacent atoms through overlapping p–orbitals. This delocalization stabilizes the molecule without changing the positions of the atoms.

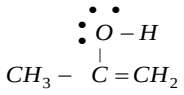
4. **(b) Electronic arrangements**

Explanation:
In resonance structures, the **positions of electrons** (π bonds and lone pairs) differ, while the **positions of atoms remain the same**. Therefore, only the electronic arrangement changes — not the atomic arrangement or functional groups.

5. (b) In CN^- ion formal negative charge is on nitrogen atom due to lone pair of electrons.

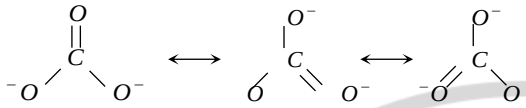
6. **(b) Electronic arrangements**

Explanation:
In resonance structures, the **positions of electrons** (π bonds and lone pairs) differ, while the **positions of atoms remain the same**. Therefore, only the electronic arrangement changes — not the atomic arrangement or functional groups.

7. (a)  has 9σ, 1π and 2 lone pairs.

8. (c) In resonance structure there should be the same number of electron pairs.

9. (b) There are three resonance structure of CO_3^{2-} ion.



(I) (II) (III)

10. (c)

Explanation (Word format):

The nitrate ion (NO_3^-) has three equivalent resonance structures, each containing one N=O double bond and two N–O single bonds.

Because of resonance, the negative charge is **delocalized equally** over all three oxygen atoms.

Thus, the **effective charge on each oxygen atom is –1/3**, and the resonance hybrid can be represented as:

$O^{-1/3} - N = O^{-1/3} \leftrightarrow O^{-1/3} = N - O^{-1/3}$

11. (abcd) It has all the characteristics.