

# Worksheet: Conjugation and Resonance Structures



**Q1:** Which of the following species has the greatest number of resonance structures?

A Sulfite

B Nitrite

C Nitrous oxide

D Benzene

E Acetate

**Q2:** Hydrogen sulfide is produced from metallic zinc in two reaction steps.

► Write a balanced molecular equation for the first step, a reduction–oxidation reaction.

A  $\text{Zn} + \text{S} \longrightarrow \text{ZnS}$

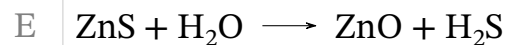
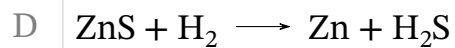
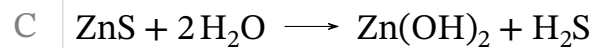
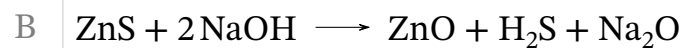
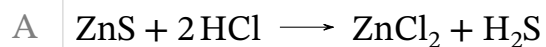
B  $\text{Zn} + \text{Na}_2\text{S} \longrightarrow 2\text{Na} + \text{ZnS}$

C  $\text{Zn} + 3\text{SO}_2 \longrightarrow \text{ZnS} + 2\text{SO}_3$

D  $2\text{Zn} + 2\text{H}_2\text{SO}_4 \longrightarrow 2\text{ZnS} + 2\text{H}_2\text{O} + 3\text{O}_2$

E  $\text{Zn} + \text{SO}_2 \longrightarrow \text{ZnS} + \text{O}_2$

► Write a balanced molecular equation for the second step, an acid–base reaction.



**Q3:** In which of the following species are the  $\pi$  electrons **not** delocalized?



**Q4:** Which of the following arrows is used to indicate resonance?

A  $\rightleftharpoons$

B  $\curvearrowright$

C  $\leftrightarrow$

D  $\rightarrow$

E  $\rightarrow$

**Q5:** Which of the following is always true for a molecule displaying two resonance structures?

A The resonance structures can have different molecular geometries.

B The resonance structures have the same molecular orbital diagram.

C The atomic charges in the molecule alternate between those in the resonance structures.

D The actual bond order is halfway between the bond orders in the resonance structures.

E Resonance is an equilibrium process.

Q6: Which

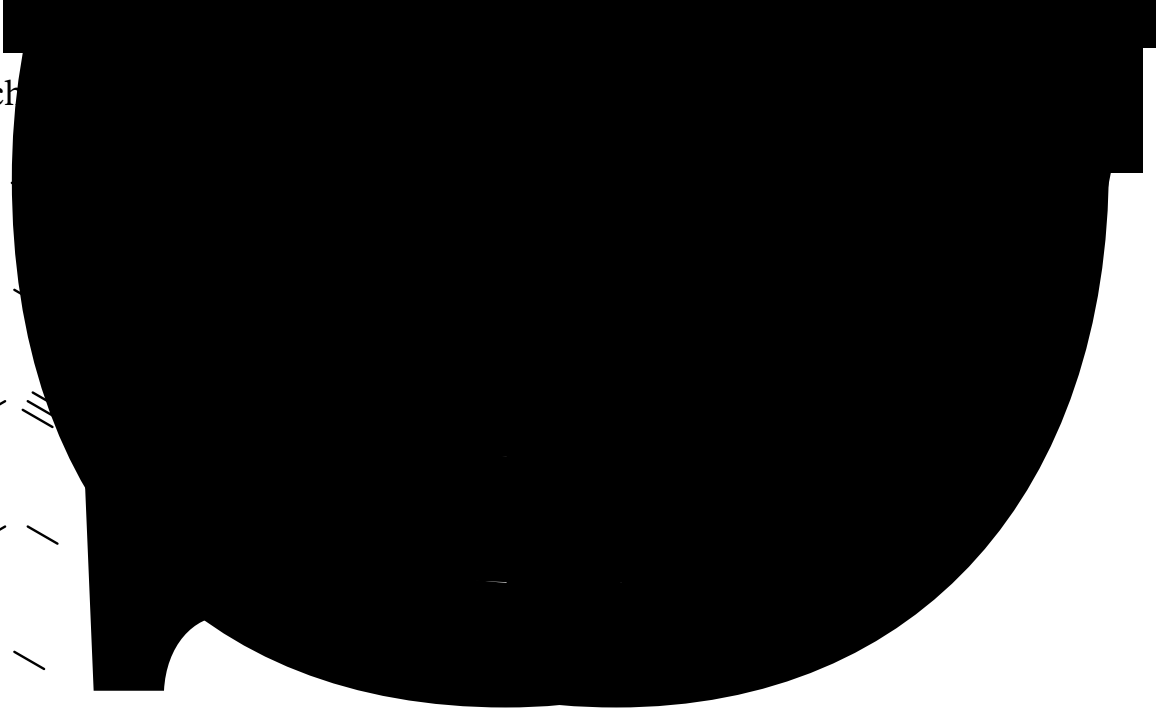
A 

B 

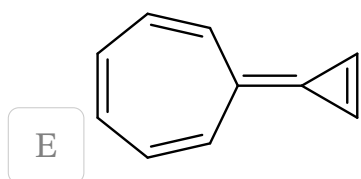
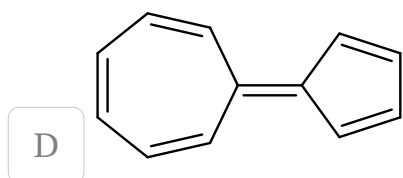
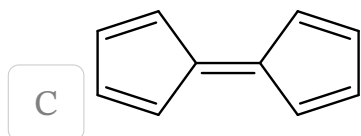
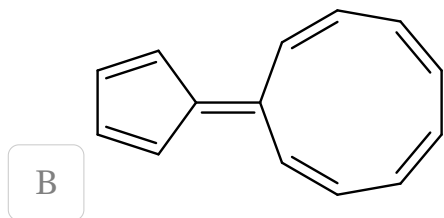
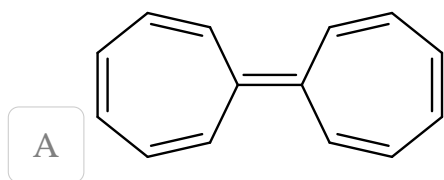
C 

D 

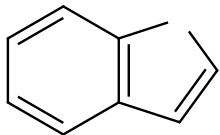
E 



**Q7:** Which of the following molecules requires the least energy to rotate around the C-C bond linking the two rings?

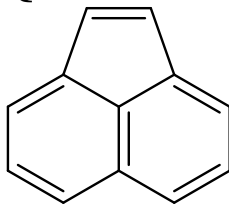


Q8: How many delocalized electrons are present in the shown molecule?



- A 10
- B 8
- C 14
- D 6
- E 12

Q9: How many delocalized electrons are present in the shown molecule?



- A 14
- B 18
- C 12
- D 10
- E 16