

## Arjuna JEE 2.0 2026

## Chemistry

## Chemical Bonding and Molecular Structure

DPP: 6

Total Duration-36 Mins.

- Q1** A molecule  $MX_4$  has a square planar shape. The number of non-bonding pair of electrons is  
(A) 2 (B) 1  
(C) 3 (D) 0
- Q2** The percentage of  $s$ -character in the hybridized orbitals of B in  $BF_3$  is  
(A) 25 (B) 50  
(C) 75 (D) 33.3
- Q3** In which of the following pairs both the species have  $sp^3$  hybridization?  
(A)  $SiF_4$ ,  $BeH_2$   
(B)  $NF_3$ ,  $H_2O$   
(C)  $NF_3$ ,  $BF_3$   
(D)  $H_2S$ ,  $BF_3$
- Q4** Which of the following statements is correct?  
(A)  $sp^3$  hybrid orbitals have equal  $s$  and  $p$  character.  
(B) The bond angle decreases with the decrease of  $s$  character of the hybridized orbital.  
(C) Resonance decreases the stability of a molecule.  
(D) Resonance is due to the delocalization of sigma electrons.
- Q5** The percentage  $s$ -character of the hybrid orbitals in methane, ethene and ethyne are respectively  
(A) 25, 33, 50  
(B) 25, 50, 75  
(C) 50, 75, 100  
(D) 10, 20, 40
- Q6** The percentage of  $p$ -character of the hybrid orbitals in graphite and diamond are respectively  
(A) 33 and 25 (B) 50 and 75  
(C) 67 and 75 (D) 33 and 75
- Q7** Pick out the incorrect statement from the following  
(A)  $sp$  hybrid orbitals are equivalent and are at an angle of  $180^\circ$  with each other.  
(B)  $sp^2$  hybrid orbitals are equivalent and bond angle between any two of them is  $120^\circ$   
(C)  $sp^3d^2$  hybrid orbitals are equivalent and are oriented towards corners of a regular octahedron.  
(D)  $sp^3d^3$  hybrid orbitals are not equivalent.
- Q8** The hybridization of carbon in molecule  $CO_2$  is  
(A)  $sp$   
(B)  $sp^2$   
(C)  $sp^3$   
(D)  $sp^3d$
- Q9** What is the type of hybridisation found in methane?  
(A)  $sp^3$  (B)  $sp^2$   
(C)  $sp^1$  (D) None of these
- Q10** The hybridization at carbons involved in  $\overset{*}{C} - \overset{*}{C}$  bond in  $HC \equiv \overset{*}{C} - \overset{*}{C}H = CH_2$  is  
(A)  $sp^3 - sp^2$   
(B)  $sp^3 - sp^3$   
(C)  $sp - sp^2$   
(D)  $sp - sp^3$
- Q11** The hybridisation and shape of  $ClO_3^-$  is  
(A)  $sp^3$  and tetrahedral  
(B)  $sp^3$  and triangular pyramidal  
(C)  $sp^3$  and triangular planar  
(D)  $sp^3d$  and trigonal bipyramidal



**Q12** The state of hybridization of Xe in  $\text{XeF}_4$  is

- (A)  $sp^2$
- (B)  $sp^3$
- (C)  $sp^3d$
- (D)  $sp^3d^2$

**Q13**  $sp^2$ -hybridization is shown by

- (A)  $\text{BeCl}_2$
- (B)  $\text{BF}_3$
- (C)  $\text{NH}_3$
- (D)  $\text{XeF}_2$



## Answer Key

Q1 (A)  
Q2 (D)  
Q3 (B)  
Q4 (B)  
Q5 (A)  
Q6 (C)  
Q7 (D)

Q8 (A)  
Q9 (A)  
Q10 (C)  
Q11 (B)  
Q12 (D)  
Q13 (B)



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