



# CHEMISTRY

## BOOKS - MODERN PUBLISHERS

### CHEMISTRY (HINGLISH)

#### MOCK TEST -1

#### Section A

1.  $MO's$  are formed by the overlap of  $A'O_s$

Two  $AO's$  combine to form two  $MO's$  called

bonding molecular orbital (*BMO*) and

antibonding molecular orbital (*ABMO*)

Different *AO*'s of one atom combine with

these *AO*'s of the second atom which have

comparable energies and proper orientation

Further, if the overlapping is head on, the *MO*

is called 'pi' The *MO*'s are filled with

electrons following the same rules as followed

for filling of atomic orbitals However the order

of filling is not the same for all molecules or

their ions Bond order is one of the most

important parameter to compare a number of

their characteristics

Which one of the following statements is correct .



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2. Which type of atomic orbitals can overlap to form molecular orbitals ?



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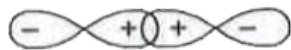
3. Which type of atomic orbitals can overlap to form molecular orbitals ?



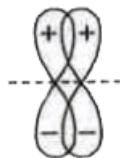
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4. Molecular orbitals are formed by the overlap of atomic orbitals. The combining orbitals must have proper orientation so that they can overlap to a considerable extent. Two atomic orbitals combine to form two molecular orbitals called bonding molecular orbital and antibonding molecular orbital. Bonding molecular orbital is stable and antibonding molecular orbital is unstable.  $\sigma$  MO is formed by head on overlap while  $\pi$  MO

is formed by sidewise overlap.



head on overlap



sidewise overlap

The MOs are filled with electrons according to the same rules as followed for filling atomic orbitals. Bond order is one of the most important parameters to compare the bond strength and bond length of bonds.

Why has  $N_2$  a larger dissociation energy than  $N_2^+$  whereas  $O_2$  has a lower dissociation energy than  $O_2^+$ ?



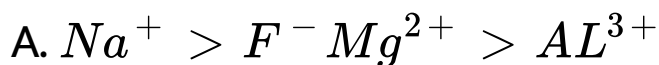
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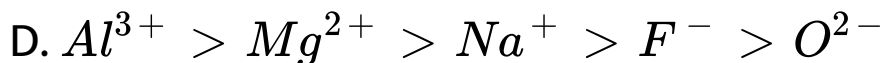
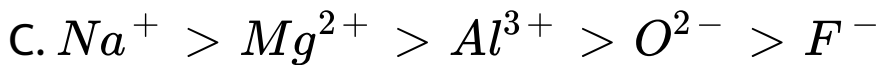
5. Which type of atomic orbitals can overlap to form molecular orbitals ?



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6. The correct sequence which shows decreasing order of the ionic radii of the elements is





**Answer:**



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7. The orbital angular momentum of a p-electron is

A.  $\frac{\sqrt{3}}{2} \frac{h}{\pi}$

B.  $\sqrt{6} \frac{h}{2\pi}$

C.  $\frac{h}{\sqrt{2\pi}}$

D.  $\sqrt{3}\frac{h}{2\pi}$

**Answer:**



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8. Calculate the entropy change in surroundings when 1.00 mol of  $H_2O(l)$  is formed under standard conditions,

$$\Delta_r H^\ominus = -286 \text{ kJ mol}^{-1}.$$



A.  $959.7 JK^{-1} mol^{-1}$

B.  $1008.6 JK mol^{-1}$

C.  $826.3 JK mol^{-1}$

D.  $722.2 JK mol^{-1}$

**Answer:**



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**9.** The pH of 0.1 M monobasic acid is 4.50. The acidity constant ( $K_a$ ) of the monobasic acid is

A. 5.2

B. 7.2

C. 8.0

D. 4.6

**Answer:**



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**Section D**

1. A point charge of  $10^{-7}\text{C}$  is situated at the centre of a cube of side 1m. Calculate the electric flux through its surface.



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2. The ionisation constant of benzoic acid ( $PhCOOH$ ) is  $6.46 \times 10^{-5}$  and  $K_{sp}$  for silver benzoate is  $2.5 \times 10^{-3}$ . How many times is silver benzoate more soluble in a buffer of

$pH 3.19$  compared to its solubility in pure water?



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