ANSWER ALL THE QUESTIONS

The filling up of Molecular orbital takes place according to *

- ○ Fajan's rule
- ○ Huckel's rule
- ◉ Hund's rule
- ○ Pauli's exclusion principle

Which of the following molecule does not exist due to its zero bond order? *

- ○ H2−
- ○ H2+
- ◉ He2
- ○ He2+

Which of the following molecule is NOT homonuclear? *

- ○ N2
- ○ O2
- ○ H2
- ◉ NO

Which of the following is known as the Schrödinger equation? *

- ○ λ = h/p
- ○ E = mc2
- ◉ $\hat{H}\psi = E\psi$
- ○ $\frac{-\hbar^2}{2m}\nabla^2$
- ○ Other:

Organic compounds which contain more than one benzene rings are termed *

- ○ Benzenes
- ○ Aryls
- ◉ Arenes
- ○ Acyls

For a homonuclear diatomic molecule the bonding orbital is *

- ◉ σg of lowest energy
- ○ πu of lowest energy
- ○ πg of lowest energy
- ○ σu of second lowest energy

Identify the INCORRECT statement regarding aromaticity *

- ○ Cyclic delocalization takes place
- ○ It is the extra stability possessed by a molecule
- ◉ It does not follow Huckel's rule
- ○ p-orbitals must be planar and overlap

CO has 10 bonding electrons and 4 anti-bonding electrons and its bond order is *

- (●) 3
- ( ) 1
- ( ) 5/2
- ( ) 7

Two electrons occupying the same orbital are distinguished by *

- ( ) Orbital quantum number
- ( ) Azimuthal quantum number
- ( ) Magnetic quantum number
- (●) Spin quantum number

What does bond order refer to? *

- (●) How many bonds there are between two atoms
- ( ) How many bonds each atom makes
- ( ) How many electrons each atom absorbs
- ( ) How many electrons each atom shares

The probability of finding a particle per unit volume is known as *

- ○ particle density
- ○ orthogonalization
- ◉ probability density
- ○ normalization

According to Heisenberg the product of uncertainty in the position & moment run of the body is *

- ◉ ≥ h/4 π
- ○ Equal to E-V
- ○ Equal to h/p
- ○ ≥E-V

The de- broglie hypothesis is associated with *

- ○ wave nature of electrons only
- ○ wave nature of radiation
- ○ wave nature of protons only
- ◉ wave nature of all material particles

The interaction will be attractive between the orbital [Provided x is the principal axis] *

- ○ 1s-2s
- ○ 2px-2py
- ◉ 2s-2px
- ○ 2py-2pz

On the basis of molecular orbital theory, select the most appropriate option. *

- ○ The bond order of O2 is 1.5 and it is paramagnetic
- ◉ The bond order of O2 is 2 and it is paramagnetic
- ○ The bond order of O2 is 2.5 and it is paramagnetic
- ○ The bond order of O2 is 2 and it is diamagnetic

If the sign of the wave function is unchanged when the orbital is reflected about its centre, the orbital is *

- ○ Ungerade
- ◉ Gerade
- ○ Gerade as well as Ungerade
- ○ Anti-Symmetric

Molecular orbitals are filled NOT according to *

- (●) Huckel's rule
- ( ) Pauli Exclusion Principle
- ( ) Hund's rule
- ( ) Aufbau Principle

The s-orbital does not show preference to any direction because _____ *

- (●) It is spherically symmetric
- ( ) It is the smallest orbital
- ( ) It is the first orbital
- ( ) It is present in every atom

Electrons residing in the same orbital will have _____. *

- ( ) Same spin
- (●) Opposite spin
- ( ) No spin
- ( ) Negative spin

Select the INCORRECT statement *

- (●) Two sigma bonds make up a double bond
- ( ) One lone pair will be counted as two pi electrons according to Huckel's equation
- ( ) Delocalizing one lone pair causes aromaticity
- ( ) A resonance may sometimes cause sp3 atoms to become sp2 hybridized

Give the symmetry symbols for dx2-y2 and dz2 *

- ( ) u1g
- ( ) t2g
- ( ) a1g
- (●) eg

In Crystal Field Theory, the valence d orbitals of the central metal ion are split in energy in an octahedral ligand field, which orbitals are raised least in energy? *

- ( ) dxz and dyz
- (●) dxy, dxz and dyz
- ( ) dxz, dyz and dz2
- ( ) dxy and dx2-y2

The de Broglie equation applies to *

- (●) All the material objects in motion
- ( ) Neutrons only
- ( ) Protons only
- ( ) Electrons only

For a particle in one dimensional box, potential energy V =_____inside the box *

- ( ) 1
- ( ) -1
- ( ) ∞
- (●) 0

The shape of a p orbital is *

- ( ) Cuboid
- (●) Dumbbell
- ( ) Sphere
- ( ) Pear-shaped lobe

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