

Q1 2021 (01 Sep Shift 2)

The spin-only magnetic moment value of B_2^+

species is $____ \times 10^{-2}$ BM. (Nearest integer)

[Given : $\sqrt{3} = 1.73$]

Q2 2021 (01 Sep Shift 2)

Number of paramagnetic oxides among the following given oxides is $____$.

Li_2O , CaO , Na_2O_2 , KO_2 , MgO and K_2O

(1) 1

(2) 2

(3) 3

(4) 0

Q3 2021 (31 Aug Shift 2)

According to molecular orbital theory, the number of unpaired electron(s) in O_2^{2-} is :

Q4 2021 (27 Aug Shift 2)

The number of species having non-pyramidal shape among the following is $____$.

(A) SO_3

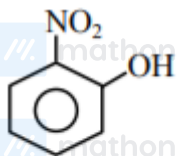
(B) NO_3^-

(C) PCl_3

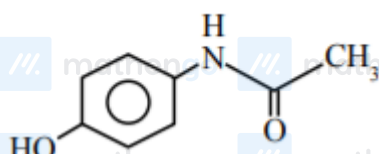
(D) CO_3^{2-}

Q5 2021 (27 Aug Shift 2)

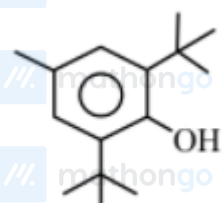
The compound/s which will show significant intermolecular H-bonding is/are :



(a)



(b)



(c)

(1) (b) only

(2) (c) only

(3) (a) and (b) only

(4) (a), (b) and (c)

Q6 2021 (26 Aug Shift 2)

The bond order and magnetic behaviour of O_2^- ion are, respectively :

(1) 1.5 and paramagnetic

(2) 1.5 and diamagnetic

(3) 2 and diamagnetic

(4) 1 and paramagnetic

Q7 2021 (26 Aug Shift 2)

The interaction energy of London forces between two particles is proportional to r^x , where r is the distance between the particles. The value of x is :

- (1) 3
- (2) -3
- (3) -6
- (4) 6

Q8 2021 (26 Aug Shift 1)

AB_3 is an interhalogen T-shaped molecule. The number of lone pairs of electrons on A is _____. (Integer answer)

Answer Key

Q1 (173)

Q2 (1)

Q3 (0)

Q4 (3)

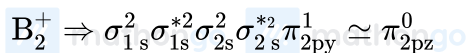
Q5 (1)

Q6 (1)

Q7 (3)

Q8 (2)

Q1 (173)

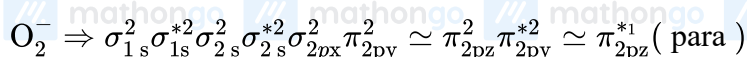
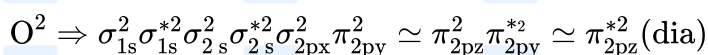
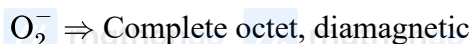
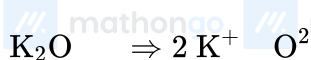
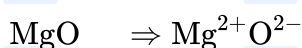
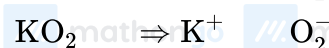
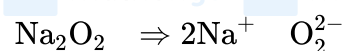
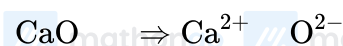
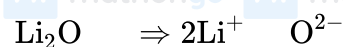


$$\mu = \sqrt{1(1+2)} = \sqrt{3} \text{ BM}$$

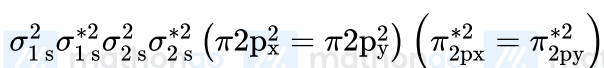
$$= 1.73 \text{ BM}$$

$$= 1.73 \times 10^{-2} \text{ BM}$$

Q2 (1)

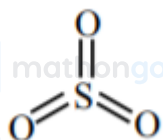


Q3 (0)

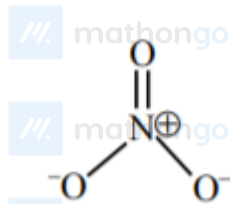
Molecular orbital configuration of O_2^{2-} is

Zero unpaired electron

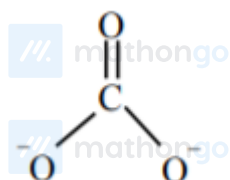
Q4 (3)



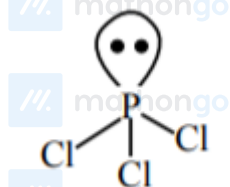
Trigonal planar



Trigonal planar



Trigonal planar



Pyramidal

Hence non-pyramidal species are SO_3 , NO_3^- and CO_3^{2-} .

Q5 (1)

(a) Shows intra molecular H-bonding

(b) Shows significant intermolecular H-bonding

(c) It do not show intermolecular H-bonding due to steric hindrance.

Q6 (1)

$$\text{O}_2^- = (\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\sigma_{2p_z})^2$$

$$\left(\pi_{2p_x}^2 = \pi_{2p_y}^2 \right) \left(\pi_{2p_x}^{*2} = \pi_{2p_y}^{*1} \right)$$

$$\text{Bond order} = \frac{10-7}{2} = 1.5$$

and paramagnetic.

Q7 (3)

For London dispersion forces.

$$E \propto \frac{1}{r^6}$$

Hence $x = -6$

Q8 (2)

T-shaped molecule means 3 sigma bond and 2 lone pairs of electron on central atom.

