

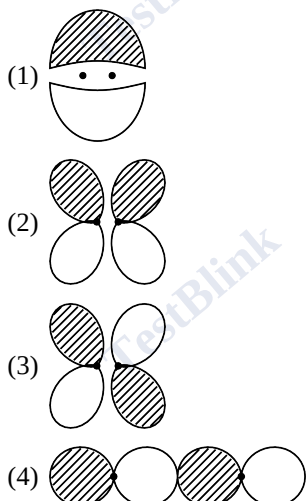
JEE MAIN CHEMICAL BONDING AND MOLECULAR STRUCTURE — MOLECULAR ORBITAL THEORY (MOT) — PYQS

Max. Marks: 24
Questions: 6

Section A (MCQ) — 5 questions

- Q.1** Which of the following pictorial diagrams most correctly represents the π^* (π antibonding) molecular orbital between two atoms if the internuclear axis is taken to be in the z-direction ($\xrightarrow{\text{z-axis}}$) ?

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- Q.2** Given below are two statements :

Statement-I: The correct sequence of bond lengths in the following species is : $\text{O}_2^+ < \text{O}_2 < \text{O}_2^- < \text{O}_2^{2-}$

Statement-II: The correct sequence of number of unpaired electrons in the following species is : $\text{O}_2 > \text{O}_2^+ > \text{O}_2^- > \text{O}_2^{2-}$

In the light of the above statements, choose the correct answer from the options given below :

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1) Both Statement-I and Statement-II are true
- (2) Both Statement-I and Statement-II are false
- (3) Statement-I is true but Statement-II is false
- (4) Statement-I is false but Statement-II is true

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- Q.3** Given below are two statements :

Statement-I: The number of species among BF_4^- , SiF_4 , XeF_4 and SF_4 , that have unequal E-F bond lengths is two. Here, E is the central atom.

Statement-II: Among O_2^- , O_2^{2-} , F_2 and O_2^+ , O_2^- has the highest bond order.

In the light of the above statements, choose the correct answer from the options given below

[JEE Main 2026 (Online) 28th January Morning Shift]

- (1) Both Statement-I and Statement-II are false
- (2) Statement-I is true but Statement-II is false
- (3) Statement-I is false but Statement-II is true
- (4) Both Statement-I and Statement-II are true

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- Q.4** Pair of species among the following having same bond order as well as paramagnetic character will be-

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- (1) O_2^- , N_2^+
- (2) O_2^+ , N_2^{2-}
- (3) O_2^- , N_2^-
- (4) O_2^+ , N_2^-

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- Q.5** Which of the following molecule(s) show/s paramagnetic behavior?

- A. O_2
- B. N_2
- C. F_2
- D. S_2
- E. Cl_2

Choose the correct answer from the options given below:

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- (1) A & C only
- (2) A & E Only
- (3) A & D Only
- (4) B Only

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Section B (Numerical) — 1 question

- Q.6** Total number of molecules/species from the following which will be paramagnetic is _____.

O_2 , O_2^+ , O_2^- , NO, NO_2 , CO, $\text{K}_2[\text{NiCl}_4]$, $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$, $\text{K}_2[\text{Ni}(\text{CN})_4]$

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ANSWER KEY**Section A (MCQ) — 5 questions**

Ques.	1	2	3	4	5						
Ans.	3	3	1	4	3						

Section B (Numerical) — 1 question

Ques.	6										
Ans.	6										