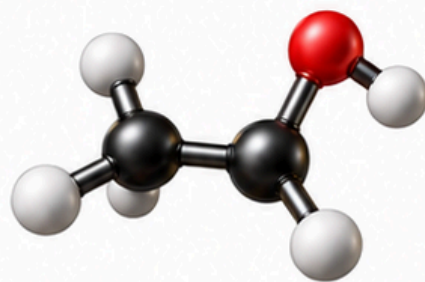


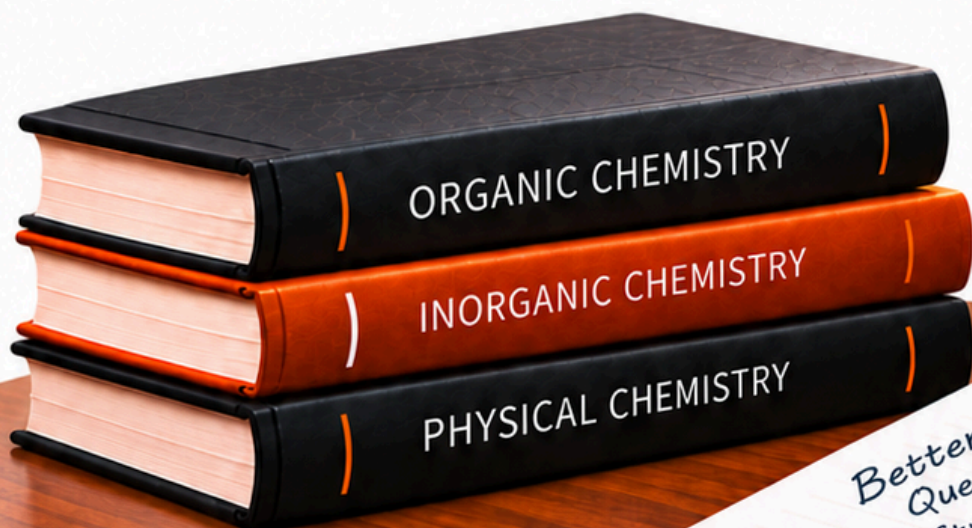
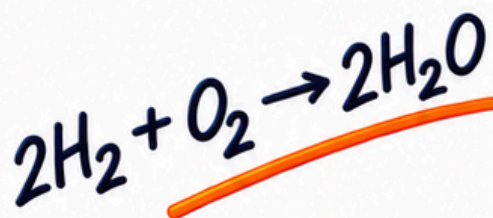
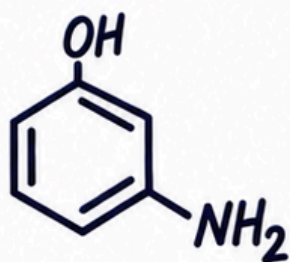


REACTIONS
CONCEPTS
QUESTIONS
HIGHER GOALS



JEE Main Chemistry

Heisenberg uncertainty principle PYQ



Better
Questions
Stronger
Concepts
Brighter Future

Subject: Chemistry

Years: 2025-2002

Total Questions: 9

About this PYQ collection

What is inside

A complete topic-wise set of **9 previous year questions** on **Heisenberg uncertainty principle** from **JEE Main (2025-2021)** and its predecessor **AIEEE (2009-2002)**, across **7 exam years**. **6 questions** are from 2019 onwards, so most of the set reflects the recent NTA pattern.

Questions are arranged to reduce unused page space, with newest-first priority and continuous numbering from 1. Each carries an exam date and shift tag to trace the original paper.

Topic-wise questions

TOPIC	QS	%
Heisenberg uncertainty principle	9	100%

Question types

TYPE	QS	%
Single-correct MCQ	4	44%
Numerical value	5	56%

Numerical-value questions have no options; all 5 are from 2021 onwards.

How these questions help you

- **Know where the marks are:** heisenberg uncertainty principle make up **9 of 9 questions (about 100%)**.
- **Build speed and accuracy:** practice the concepts and question styles used in previous papers.
- **Learn the patterns:** the same question styles return year after year.
- **Strengthen other chapters:** these concepts support further study in Chemistry.

Questions – Heisenberg uncertainty principle

1. Given below are two statements :

Statement (I): It is impossible to specify simultaneously with arbitrary precision, both the linear momentum and the position of a particle.

Statement (II) : If the uncertainty in the measurement of position and uncertainty in measurement of momentum are equal for an electron, then the uncertainty in the measurement of velocity is $\geq \sqrt{\frac{h}{\pi}} \times \frac{1}{2m}$.

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

(29 Jan 2025 | Shift 2)

- (A) **Statement I** is false but **Statement II** is true (B) Both **Statement I** and **Statement II** are true
(C) Both **Statement I** and **Statement II** are false (D) **Statement I** is true but **Statement II** is false

2. Based on Heisenberg's uncertainty principle, the uncertainty in the velocity of the electron to be found within an atomic nucleus of diameter 10^{-15} m is _____ $\times 10^9$ ms⁻¹ (nearest integer)

[Given : mass of electron = 9.1×10^{-31} kg, Plank's constant (h) = 6.626×10^{-34} Js]

(Value of $\pi = 3.14$)

(9 Apr 2024 | Shift 2)

3. The minimum uncertainty in the speed of an electron in an one dimensional region of length $2a_0$ (Where a_0 = Bohr radius 52.9 pm) is _____ km s⁻¹.

(Given : Mass of electron = 9.1×10^{-31} kg, Planck's constant $h = 6.63 \times 10^{-34}$ Js)

(29 Jul 2022 | Shift 1)

4. If the uncertainty in velocity and position of a minute particle in space are, 2.4×10^{-26} (m s⁻¹) and 10^{-7} (m) respectively. The mass of the particle in g is _____. (Nearest integer)

(Given : $h = 6.626 \times 10^{-34}$ Js)

(27 Jun 2022 | Shift 1)

5. A ball weighing 10 g is moving with a velocity of 90 ms⁻¹. If the uncertainty in its velocity is 5%, then the uncertainty in its position is _____ $\times 10^{-33}$ m. (Rounded off to the nearest integer)

[Given : $h = 6.63 \times 10^{-34}$ Js]

(26 Feb 2021 | Shift 2)

6. An accelerated electron has a speed of $5 \times 10^6 \text{ ms}^{-1}$ with an uncertainty of 0.02%. The uncertainty in finding its location while in motion is $x \times 10^{-9} \text{ m}$. The value of x is _____. (Nearest integer)

[Use mass of electron = $9.1 \times 10^{-31} \text{ kg}$, $h = 6.63 \times 10^{-34} \text{ Js}$, $\pi = 3.14$]

(25 Jul 2021 | Shift 2)

7. In an atom, an electron is moving with a speed of 600 m/s with an accuracy of 0.005%. Certainty with which the position of the electron can be located is ($h = 6.6 \times 10^{-34} \text{ kg m}^2\text{s}^{-1}$, mass of electron, $e_m = 9.1 \times 10^{-31} \text{ kg}$)

(26 Apr 2009 | Single sitting)

- (A) $5.10 \times 10^{-3} \text{ m}$ (B) $1.92 \times 10^{-3} \text{ m}$
(C) $3.84 \times 10^{-3} \text{ m}$ (D) $1.52 \times 10^{-4} \text{ m}$

8. Uncertainty in the position of an electron (mass = $9.1 \times 10^{-31} \text{ kg}$) moving with a velocity 300 ms^{-1} , accurate upto 0.001% will be ($h = 6.63 \times 10^{-34} \text{ Js}$)

(30 Apr 2006 | Single sitting)

- (A) $1.92 \times 10^{-2} \text{ m}$ (B) $3.84 \times 10^{-2} \text{ m}$
(C) $19.2 \times 10^{-2} \text{ m}$ (D) $5.76 \times 10^{-2} \text{ m}$

9. Uncertainty in position of a minute particle of mass 25 g in space is 10^{-5} m . What is the uncertainty in its velocity (in ms^{-1}) ($h = 6.6 \times 10^{-34} \text{ Js}$)

(19 May 2002 | Single sitting)

- (A) 2.4×10^{-34} (B) 0.5×10^{-34}
(C) 2.1×10^{-28} (D) 0.5×10^{-23}