

CHEMISTRY · JEE MAIN

Nuclear & Radiochemistry

Chapter-wise previous year questions, with answer key

10

PYQS

2020–2025

PAPERS

2

TOPICS

Artificial Radioactivity

Radioactive Decay Series

- 1 Attempt each question on paper first. They're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap "Step-by-step solution" at the top right of it for the full working, where available.

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Artificial Radioactivity · 1 PYQ

Q1 JEE Main 2021 · 26 Feb · Shift 2

[Step-by-step solution](#) · [prepwisar.in/questions/WoC4kkhOuB](https://www.prepwisar.in/questions/WoC4kkhOuB)

Which of the following forms of hydrogen emits low energy β^- particles?

- (A) Tritium ${}^3_1\text{H}$ (B) Proton H^+ (C) Protium ${}^1_1\text{H}$ (D) Deuterium ${}^2_1\text{H}$

Radioactive Decay Series · 9 PYQs

Q2 JEE Main 2025 · 22 Jan · Shift 1

[Step-by-step solution](#) · [prepwisar.in/questions/gNXQB-jh1o](https://www.prepwisar.in/questions/gNXQB-jh1o)

Which of the following statement is not true for radioactive decay?

- (A) Half life is $\ln 2$ times of $\frac{1}{\text{rate constant}}$.
(B) Decay constant increases with increase in temperature.
(C) Decay constant does not depend upon temperature.
(D) Amount of radioactive substance remained after three half lives is $\frac{1}{8}$ th of original amount.

Q3 JEE Main 2024 · 1 Feb · Shift 1 **NUMERICAL**

[Step-by-step solution](#) · [prepwisar.in/questions/XF1qYLLRAh](https://www.prepwisar.in/questions/XF1qYLLRAh)

The ratio of $\frac{{}^{14}\text{C}}{{}^{12}\text{C}}$ in a piece of wood is $\frac{1}{8}$ part that of atmosphere. If half life of ${}^{14}\text{C}$ is 5730 years, the age of wood sample is _____ years.

Q4 JEE Main 2024 · 29 Jan · Shift 2 **NUMERICAL**

[Step-by-step solution](#) · [prepwisar.in/questions/9HQ-Ykcg_A](https://www.prepwisar.in/questions/9HQ-Ykcg_A)

The half-life of radioisotope bromine - 82 is 36 hours. The fraction which remains after one day is _____ $\times 10^{-2}$.

(Given $\text{antilog } 0.2006 = 1.587$)

Q5 JEE Main 2023 · 1 Feb · Shift 1 **NUMERICAL**

[Step-by-step solution](#) · [prepwisar.in/questions/PCMDNoLSgF](https://www.prepwisar.in/questions/PCMDNoLSgF)

A and B are two substances undergoing radioactive decay in a container. The half life of A is 15 min and that of B is 5 min. If the initial concentration of B is 4 times that of A and they both start decaying at the same time, how much time will it take for the concentration of both of them to be same? _____ min.

Q6 JEE Main 2022 · 29 Jul · Shift 2 **NUMERICAL**

[Step-by-step solution](#) · [prepwisar.in/questions/eTfhyz362-](https://www.prepwisar.in/questions/eTfhyz362-)

Assuming $1 \mu\text{g}$ of trace radioactive element X with a half life of 30 years is absorbed by a growing tree. The amount of X remaining in the tree after 100 years is _____ $\times 10^{-1} \mu\text{g}$.

[Given : $\ln 10 = 2.303$; $\log 2 = 0.30$]

Q7 JEE Main 2022 · 28 Jun · Shift 2 **NUMERICAL**

[Step-by-step solution](#) · [prepwisar.in/questions/A6nblpt_Dn](https://www.prepwisar.in/questions/A6nblpt_Dn)

A radioactive element has a half life of 200 days. The percentage of original activity remaining after 83 days is _____. (Nearest integer)

(Given : $\text{antilog } 0.125 = 1.333$, $\text{antilog } 0.693 = 4.93$)

Q8 JEE Main 2021 · 27 Jul · Shift 2

[Step-by-step solution](#) · [prepwisar.in/questions/T9fkTroysN](https://www.prepwisar.in/questions/T9fkTroysN)

The number of neutrons and electrons, respectively, present in the radioactive isotope of hydrogen is:

- (A) 1 and 1 (B) 3 and 1 (C) 2 and 1 (D) 2 and 2

Isotope(s) of hydrogen which emits low energy β^- particles with $t_{1/2}$ value > 12 years is/are

- (A) Protium (B) Tritium
(C) Deuterium (D) Deuterium and Tritium

During the nuclear explosion, one of the products is ^{90}Sr with half life of 6.93 years. If $1\text{ }\mu\text{g}$ of ^{90}Sr was absorbed in the bones of newly born baby in placed of Ca, how much time, in years, is required to reduce it by 90% if it is not lost metabolically? (Round off to the nearest integer)

Answer key: Nuclear & Radiochemistry

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Numbers match the question numbers above. For full working, open the solution link at the top right of each question.

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|-------------|---------------|-----------------|--------------|--------------|-------------|--------------|-------------|
| 1. A | 2. B | 3. 17190 | 4. 63 | 5. 15 | 6. 1 | 7. 75 | 8. C |
| 9. B | 10. 23 | | | | | | |

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