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EdLoop EAPCET

PHYSICS · EAPCET (EAMCET)

Nuclei

Previous Year Questions with answers

170 questions · **134** papers · **2011–2026** · newest paper first

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What is in this PDF: every Nuclei question we hold from past AP and TS EAPCET (called EAMCET until 2020 in Andhra Pradesh and 2023 in Telangana) papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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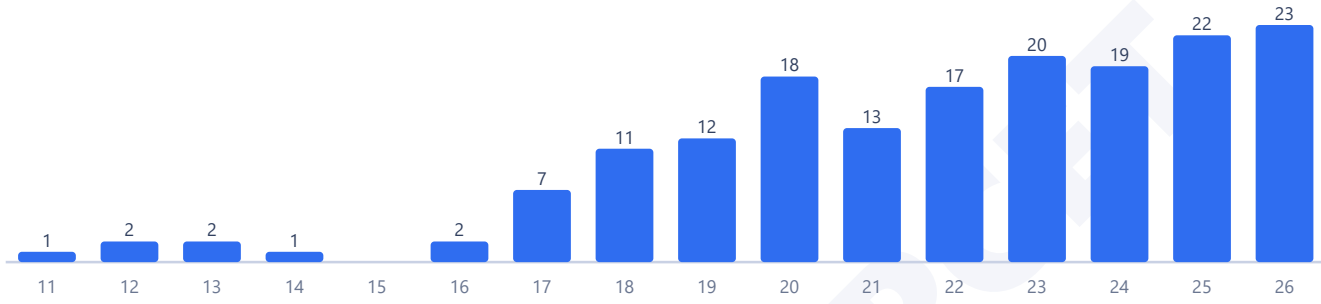
Chapter at a glance

3.3%	170	73 of 77	170 / 0
of Physics questions, 2022–2026	questions, 2011–2026	papers asked it, 2022–2026	MCQ / numerical, 2011–2026

Trend. Steady: 1.4 questions per paper in 2024–2026 against 1.2 in 2022–2023.

Questions per year



Counts are the questions we hold: 170 in 134 papers. 2 questions in this chapter came back in more than one paper.

Most-asked topics in this chapter (2011–2026)

Radioactivity	83
Nuclear Structure	51
Nuclear Reactions	36

How often it comes up

Nuclear physics occupies an active position in Class 12 modern physics for regional entrance exams. Across the AP and TS EAPCET papers held in our archive between 2022 and 2026, Nuclei contributed 101 questions across 77 papers. This corresponds to an average rate of 1.3 questions per sitting, representing 3.3% of the physics questions in that five-year span. Taking the full historical archive from 2010 to 2026 into account, the chapter delivered 170 questions across 149 papers, maintaining an average of 1.1 questions per paper and a 2.9% subject share. During the early segment from 2010 to 2021, our database shows 69 questions in 72 papers (2.4% share). For the three most recent testing years from 2024 to 2026, the topic supplied 64 questions across 46 papers, registering a 3.5% share. The share of the subject in the last three years compared to early papers is up, while compared to the recent five-year window it is about the same.

State-wise records show that Telangana examinations weight this topic almost twice as heavily as Andhra Pradesh. Between 2022 and 2026, AP EAPCET papers in our set contributed 47 questions across 48 papers, with 44 papers containing questions (1.0 per paper, 2.4% share). TS EAPCET contributed 54 questions across 29 papers in our set, with all 29 papers carrying questions (1.9 per paper, 4.7% share). Nuclei has appeared every year since 2022, though across all 77 recent papers in our collection, four AP papers omitted it, meaning it did not feature in all 77 sittings. By volume of questions between 2022 and 2026, the chapter stands 16th of 28 physics chapters. Sittings in 2026 were the busiest in our archive, delivering 23 questions across 16 papers.

Most-asked topics

Questions distribute across three major themes:

- **Radioactivity**: This leading area brought 46 questions between 2022 and 2026, contributing to 83 questions across all years in our archive. It tests radioactive decay law N(t) = N_zero exp(- λ t), half-life, mean life τ = 1 / λ, activity A = λ N, alpha decay, beta decay, and successive decay chains.

- **Nuclear Structure**: This area contributed 35 questions in the recent five-year period, out of 51 throughout our complete archive. Key concepts cover nuclear radius scaling with the cube root of mass number A, constant nuclear density, mass defect Δm, binding energy per nucleon, and the short-range saturated nature of nuclear forces.
- **Nuclear Reactions**: A pool of 20 questions appeared in the recent five-year span, out of 36 questions overall. Questions test Q-value calculations, fission of heavy uranium isotopes, fusion of light nuclei such as deuterons into helium, and conservation of mass-energy and nucleon number.

What the questions look like

Radioactive decay chains and half-life arithmetic are standard staples. A classic question examines the radioactive transmutation of a heavy parent nucleus into a stable daughter, such as uranium-238 decaying into lead-206, asking students to determine the exact number of alpha and beta particles emitted by balancing mass and charge numbers. Another common setup provides the decay activity at two successive time intervals and asks for the half-life or the sample's mean life.

Binding energy calculations represent the other major category. Students are given binding energy per nucleon for a heavy fissile nucleus and its intermediate fission fragments, requiring them to compute the total net energy released per fission event. Nuclear structure problems regularly ask students to verify that nuclear matter density is constant across the periodic table, or ask at what inter-nucleon separation distance the strong nuclear force changes from strongly repulsive to powerfully attractive.

How to practise it

Start by mastering radioactive decay kinetics. The rate of decay is dN/dt = - λ N, where activity is A = λ N. The half-life is T_half = ln two / λ = zero point six nine three / λ. The mean life is τ = 1 / λ. The fraction of initial nuclei remaining undecayed after n half-lives is N / N_zero = (1/two)^n, where n = t / T_half. When two radioactive isotopes with decay constants λ_1 and λ_2 decay simultaneously, effective decay constant is λ_eff = λ_1 + λ_2.

Next, study nuclear dimensions and binding energy. Nuclear radius scales with mass number A as R = R_zero A^(one third), where constant R_zero is approximately one point two fermi. Because volume scales linearly with A, nuclear matter density ρ = M / V is strictly independent of mass number A. Mass defect for a nucleus of Z protons and (A - Z) neutrons is Δm = [Z m_p + (A - Z) m_n] - M_nucleus. Total binding energy is E_b = Δm c^2 = Δm × nine hundred thirty-one point five MeV.

Finally, master reaction energetics. In any nuclear reaction A + a → B + b, the disintegration energy is Q = [m_reactants - m_products] c^2 = [E_b(products) - E_b(reactants)]. An exothermic reaction exhibits positive Q value, releasing kinetic energy, while an endothermic reaction requires threshold incident kinetic energy.

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Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

The type of radioactive decay that involves the emission of a positron is

(A) α decay
(B) β^+ decay
(C) β^- decay
(D) γ decay

Answer: (B) β^+ **decay** · The council's preliminary key

Q2 AP EAPCET 2026 · 18 May · Shift 2 MCQ

Energy released in the fission of a single ${}_{92}\mathrm{U}^{235}$ nucleus is 200 MeV. The fission rate of ${}_{92}\mathrm{U}^{235}$ fueled reactor operating at a power level of 5W is

(A) $1.56 \times 10^{10}\ \mathrm{s}^{-1}$
(B) $1.56 \times 10^{11}\ \mathrm{s}^{-1}$
(C) $1.56 \times 10^{16}\ \mathrm{s}^{-1}$
(D) $1.56 \times 10^{-17}\ \mathrm{s}^{-1}$

Answer: (B) $1.56 \times 10^{11}\ \mathrm{s}^{-1}$ · The council's preliminary key

Q3 AP EAPCET 2026 · 15 May · Shift 1 MCQ

The radioactivity of a certain radioactive element drops to 1/64 of its initial value in 30 sec. Its half-life is

(A) 2 Sec
(B) 4 Sec
(C) 5 Sec
(D) 6 Sec

Answer: (C) 5 Sec · The council's preliminary key

Q4 AP EAPCET 2026 · 15 May · Shift 2 MCQ

The range of strong nuclear force is in the order of

(A) Infinity
(B) $\sim 10^{-16}\ m$
(C) Zero
(D) $\sim 10^{-15}\ m$

Answer: (D) $\sim 10^{-15}\ m$ · The council's preliminary key

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Q5 AP EAPCET 2026 · 15 May · Shift 2 MCQ

During the decay of an unstable nucleus, if its neutron number and mass number decrease by 5 and 12 respectively, then the particles released in the decay are

(A) One alpha particle and six positrons
(B) One alpha particle and six electrons
(C) Three alpha particles and one positron
(D) Three alpha particles and one electron

Answer: (C) Three alpha particles and one positron · The council's preliminary key

Q6 AP EAPCET 2026 · 14 May · Shift 1 MCQ

The half-life of a certain radio isotope is 4 minutes. The number of radioactive nuclei at a given instant of time is 10^6. Then the number of radioactive nuclei left 2 minutes later would be

(A) $\frac{10^6}{2}$
(B) 10^3
(C) $\frac{10^6}{\sqrt{2}}$
(D) $\sqrt{2} \times 10^6$

Answer: (C) $\frac{10^6}{\sqrt{2}}$ · The council's preliminary key

Q7 AP EAPCET 2026 · 14 May · Shift 2 MCQ

If the radius of a nucleus having 13 protons and 14 neutrons is 3.6 fm, then the ratio of the volume to surface area of nucleus having 53 protons and 72 neutrons is

(A) 12 fm
(B) 3 fm
(C) 6 fm
(D) 2 fm

Answer: (D) 2 fm · The council's preliminary key

Q8 AP EAPCET 2026 · 13 May · Shift 1 MCQ

Binding energy per nucleon of deuteron and Helium nuclei are 1.1 MeV and 7 MeV respectively. If a single Helium nucleus was formed by adding two Deuterons, the energy released is

(A) 23.6 MeV
(B) 32.4 MeV
(C) 28.6 MeV
(D) 13.6 MeV

Answer: (A) 23.6 MeV · The council's preliminary key

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Q9 AP EAPCET 2026 · 13 May · Shift 2 MCQ

The activities of a sample of radioactive material are A_1 and A_2 at times t_1 and t_2 respectively ($t_2 > t_1$). If its mean life time is T, then

(A) $A_2 = A_1 e^{(t_2 - t_1)/T}$
(B) $A_2 = A_1 e^{(t_1 - t_2)/T}$
(C) $A_2 = A_1 e^{(t_1 - t_2)T}$
(D) $A_2 = A_1 e^{(t_2 - t_1)T}$

Answer: (B) $A_2 = A_1 e^{(t_1 - t_2)/T}$ · The council's preliminary key

Q10 AP EAPCET 2026 · 12 May · Shift 2 MCQ

What is the energy released in the following fission reaction?

$^{236}_{z}U \rightarrow {}^{117}_{a}X + {}^{117}_{(z-a)}Y + 2\left({}^{1}_{0}n\right)$

Given that the binding energy per nucleon of X and Y is 8.8 MeV and that of $^{236}_{z}U$ is 7.5 MeV

(A) 256.4 MeV
(B) 248.6 MeV
(C) 274.2 MeV
(D) 289.2 MeV

Answer: (D) 289.2 MeV · The council's preliminary key

Q11 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If a thorium nucleus of mass number 232 and atomic number 90 emits six alpha particles and four β^- particles, then the ratio of the number of protons and the number of neutrons in the resulting final nucleus is

(A) $39 : 65$
(B) $41 : 63$
(C) $41 : 104$
(D) $63 : 104$

Answer: (B) $41 : 63$ · The council's preliminary key

Q12 TS EAPCET 2026 · 11 May · Shift 2 MCQ

If the mean life of a radioactive substance is $\frac{20}{\ln(4)}$ minutes, then the ratio of the number of atoms remaining undecayed and the number of atoms decayed of the substance at a time of 30 minutes is

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(A) $3:8$
(B) $7:8$
(C) $1:7$
(D) $1:8$

Answer: (C) $1:7$ · The council's preliminary key

Q13 TS EAPCET 2026 · 11 May · Shift 2 MCQ

If a graph is drawn between the binding energy per nucleon and the mass number of nucleus, then the mass number of the nucleus for which the binding energy per nucleon has a maximum value is

(A) 56
(B) 35
(C) 106
(D) 115

Answer: (A) 56 · The council's preliminary key

Q14 TS EAPCET 2026 · 10 May · Shift 1 MCQ

In β-decay, when a proton converts into a neutron, the particles emitted are

(A) Electron, neutrino
(B) Positron, neutrino
(C) Positron, antineutrino
(D) Electron, antineutrino

Answer: (B) Positron, neutrino · The council's preliminary key

Q15 TS EAPCET 2026 · 10 May · Shift 1 MCQ

The number of disintegrations per year of 15.3 mg sample of $^{60}_{27}\mathrm{Co}$ is

(Mean life of $^{60}_{27}\mathrm{Co}$ is 7.65 years and Avogadro's number $= 6.024 \times 10^{23}\ \mathrm{mol}^{-1}$)

(A) 3624×10^{16}
(B) 798×10^{15}
(C) 2008×10^{16}
(D) 1258×10^{16}

Answer: (C) 2008×10^{16} · The council's preliminary key

Q16 TS EAPCET 2026 · 10 May · Shift 2 MCQ

The range of the weak nuclear force is of the order of

(A) 10^{26} Å
(B) 10^{-6} Å
(C) 10^{18} Å
(D) 10^{-2} Å

Answer: (B) 10^{-6} Å · The council's preliminary key

Q17 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If the activities of a radioactive substance at times $t = 0$ and $t = 3T$ are A and B respectively, then the activity of the substance at a time $t = 9T$ is

(A) $\frac{A^3}{B^2}$
(B) $\frac{A^2}{B}$
(C) $\frac{B^2}{A}$
(D) $\frac{B^3}{A^2}$

Answer: (D) $\frac{B^3}{A^2}$ · The council's preliminary key

Q18 TS EAPCET 2026 · 10 May · Shift 2 MCQ

If the masses of proton and neutron are m_p and m_n respectively, the experimental masses of ${}_2\mathrm{He}^4$ and ${}_8\mathrm{O}^{16}$ nuclei are M_1 and M_2 respectively, then

(A) $M_2 = 8(m_p + m_n)$
(B) $M_2 < 8(m_p + m_n)$
(C) $M_1 = 2(m_p + m_n)$
(D) $M_1 > 2(m_p + m_n)$

Answer: (B) $M_2 < 8(m_p + m_n)$ · The council's preliminary key

Q19 TS EAPCET 2026 · 9 May · Shift 1 MCQ

Law of conservation of mass was regarded as another basic conservation law of nature until the advent of

(A) Bose-Einstein statistics
(B) Theory of relativity
(C) Chandrasekhar limit
(D) Uncertainty principle

Answer: (B) Theory of relativity · The council's preliminary key

Q20 TS EAPCET 2026 · 9 May · Shift 1 MCQ

The number of alpha and beta decays occurred when ${}_{92}\mathrm{U}^{238}$ element changes to ${}_{82}\mathrm{Pb}^{206}$ element are respectively

(A) 8, 3
(B) 8, 6
(C) 4, 6
(D) 4, 3

Answer: (B) 8, 6 · The council's preliminary key

Q21 TS EAPCET 2026 · 9 May · Shift 1 MCQ

If a radioactive substance decays by 40 % and 70 % in 10 and 30 minutes respectively, then the time taken for the substance to decay by 50 % (in minutes) is

(A) 20
(B) 16
(C) 18
(D) 22

Answer: (A) 20 · The council's preliminary key

Q22 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If the nuclear force between a proton and a neutron is attractive, then the distance between them can be

(A) 0.12 fm
(B) 10^{-3} fm
(C) 1.1 fm
(D) 0.3 fm

Answer: (C) 1.1 fm · The council's preliminary key

Q23 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If the radius of $_{13}Al^{27}$ nucleus is 3.6 fm, then the number of neutrons in a nucleus of atomic number 29 and radius 4.8 fm is

(A) 64
(B) 35
(C) 42
(D) 49

Answer: (B) 35 · The council's preliminary key

Q24 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If the binding energy per nucleon of deuteron ($_1H^2$) is 1.15 MeV and an α-particle has a binding energy of 7.1 MeV per nucleon, then the energy released per nucleon in the given reaction is

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$$_1H^2 + _1H^2 \rightarrow _2He^4 + Q$$

(A) 23.8 MeV
(B) 26.1 MeV
(C) 5.95 MeV
(D) 28.9 MeV

Answer: (C) 5.95 MeV · The council's preliminary key

Q25 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If the half-life of a radioactive material is 10 years, then the percentage of the material decayed in 30 years is

(A) 87.5
(B) 78.5
(C) 58.7
(D) 85.7

Answer: (A) 87.5 · The council's preliminary key

Q26 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If the surface areas of two nucleii are in the ratio $9:49$, then the ratio of their mass numbers is

(A) $27:343$
(B) $9:49$
(C) $3:7$
(D) $49:81$

Answer: (A) $27:343$ · The council's preliminary key

Q27 AP EAPCET 2025 · 24 May · Shift 1 MCQ

The half life of a radioactive substance is 10 minutes. If n_1 and n_2 are the number of atoms decayed in 20 and 30 minutes respectively, then $n_1 : n_2$ =

(A) $7:8$
(B) $1:2$
(C) $6:7$
(D) $3:4$

Answer: (C) $6:7$ · The council's preliminary key

Q28 AP EAPCET 2025 · 23 May · Shift 1 MCQ

The ratio of the orders of the spacings of nuclear energy levels and atomic energy levels is

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(A) 10^3
(B) 10^6
(C) 10^9
(D) 10^{12}

Answer: (B) 10^6 · The council's preliminary key

Q29 AP EAPCET 2025 · 23 May · Shift 2 MCQ

The density (in $\mathrm{kg\ m^{-3}}$) of nuclear matter is of the order of

(A) 10^{21}
(B) 10^{17}
(C) 10^{12}
(D) 10^8

Answer: (B) 10^{17} · The council's preliminary key

Q30 AP EAPCET 2025 · 22 May · Shift 1 MCQ

If the time taken for a radioactive substance to decay 8% to 77% is 12 minutes, then the half life of the substance in minutes is

(A) 24
(B) 18
(C) 12
(D) 6

Answer: (D) 6 · The council's preliminary key

Q31 AP EAPCET 2025 · 22 May · Shift 2 MCQ

Each nuclear fission of $^{235}\mathrm{U}$ releases 200 MeV of energy. If a reactor generates 1 MW power, then the rate of fission in the reactor is

(A) 3.125×10^6
(B) 3.125×10^8
(C) 3.125×10^{10}
(D) 3.125×10^{16}

Answer: (D) 3.125×10^{16} · The council's preliminary key

Q32 AP EAPCET 2025 · 21 May · Shift 1 MCQ

An element X of a half-life of 1.4×10^9 years decays to form another stable element Y. A sample is taken from a rock that contains both X and Y in the ratio $1 : 7$. If at the time of formation of the rock, Y was not present in the sample, then the age of the rock in years is

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(A) 4.2×10^9
(B) 1.4×10^9
(C) 0.35×10^9
(D) 2.8×10^9

Answer: (A) 4.2×10^9 · The council's preliminary key

Q33 AP EAPCET 2025 · 21 May · Shift 2 MCQ

If the half-life of a radioactive element is 12.5 hours, then the time taken to disintegrate 256 g of the substance into 1 g is (in hours)

(A) 12.5
(B) 25
(C) 37.5
(D) 100

Answer: (D) 100 · The council's preliminary key

Q34 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If 87.5% of atoms of a radioactive element decay in 6 days, then the fraction of atoms of the element that decay in 8 days is

(A) $\frac{1}{8}$
(B) $\frac{7}{8}$
(C) $\frac{1}{16}$
(D) $\frac{15}{16}$

Answer: (D) $\frac{15}{16}$ · The council's preliminary key

Q35 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If the ratio of the mass numbers of two nuclei is 27:125, then the ratio of their surface areas is

(A) 3:5
(B) 9:25
(C) 27: 125
(D) 1:1

Answer: (B) 9:25 · The council's preliminary key

Q36 TS EAPCET 2025 · 4 May · Shift 2 MCQ

When an element $^{232}_{90}\mathrm{Th}$ decays into $^{208}_{82}\mathrm{Pb}$, the number of α and β^- particles emitted respectively are

(A) 4, 8
(B) 8, 2
(C) 6, 2
(D) 6, 4

Answer: (D) 6, 4 · The council's preliminary key

Q37 TS EAPCET 2025 · 4 May · Shift 2 MCQ

During the disintegration of a radioactive nucleus of mass number 208 at rest, two alpha particles each with kinetic energy E are emitted. The total kinetic energy of the emitted alpha particles and the daughter nucleus after the disintegration is

(A) $\frac{51E}{25}$
(B) $\frac{51E}{50}$
(C) $\frac{52E}{25}$
(D) $\frac{26E}{25}$

Answer: (C) $\frac{52E}{25}$ · The council's preliminary key

Q38 TS EAPCET 2025 · 3 May · Shift 1 MCQ

A radioactive material of half-life 2.5 hours emits radiation that is 32 times the safe maximum level. The time (in hours) after which the material can be handled safely is

(A) 10
(B) 25
(C) 5
(D) 12.5

Answer: (D) 12.5 · The council's preliminary key

Q39 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If the number of uranium nuclei required per hour to produce a power of 64 kW is 7.2×10^{18}, then the energy released per fission is

(A) 0.64×10^{-10} J
(B) 3.2×10^{-13} J
(C) 0.32×10^{-10} J
(D) 3.2×10^{-10} J

Answer: (C) 0.32×10^{-10} J · The council's preliminary key

Q40 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If a radioactive substance decays 10% in every 16 hours, then the percentage of the radioactive substance that remains after 2 days is

(A) 82.2
(B) 18.8
(C) 27.1
(D) 72.9

Answer: (D) 72.9 · The council's preliminary key

Q41 TS EAPCET 2025 · 3 May · Shift 2 MCQ

If a nucleus P converts into a nucleus Q by the decay of one alpha particle and two β^- particles, then the nuclei P and Q are

(A) Isotopes
(B) Isobars
(C) Isotones
(D) Isomers

Answer: (A) Isotopes · The council's preliminary key

Q42 TS EAPCET 2025 · 2 May · Shift 1 MCQ

The average energy of a neutron produced in the fission of $^{235}_{92}\mathrm{U}$ is

(A) 160×10^{-13} J
(B) 320×10^{-15} J
(C) 320×10^{-13} J
(D) 160×10^{-15} J

Answer: (B) 320×10^{-15} J · The council's preliminary key

Q43 TS EAPCET 2025 · 2 May · Shift 1 MCQ

If 96.875% of a radioactive substance decays in 10 days, then the half life of the substance is (in days)

(A) 10
(B) 5
(C) 4
(D) 2

Answer: (D) 2 · The council's preliminary key

Q44 TS EAPCET 2025 · 2 May · Shift 2 MCQ

In β^- decay, a neutron transforms into a proton within the nucleus according to the equation:

$\mathrm{neutron} \rightarrow \mathrm{proton} + \beta^- + x$

In this equation the particle represented by 'x' is

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(A) Neutrino
(B) Anti neutrino
(C) Positron
(D) Meson

Answer: (B) Anti neutrino · The council's preliminary key

Q45 TS EAPCET 2025 · 2 May · Shift 2 MCQ

Two radioactive substances A and B have same number of initial nuclei. If the half-lives of A and B are 1.5 days and 4.5 days respectively, then the ratio of the number of nuclei remaining in A and B after 9 days is

(A) 1:16
(B) 1:1
(C) 1:4
(D) 1:8

Answer: (A) 1:16 · The council's preliminary key

Q46 AP EAPCET 2024 · 23 May · Shift 1 MCQ

In a nuclear reactor, the fuel is consumed at the rate of $1 \times 10^{-3}\ \mathrm{gs}^{-1}$. The power generated in kW is

(A) 9×10^{14}
(B) 9×10^{7}
(C) 9×10^{8}
(D) 9×10^{12}

Answer: (B) 9×10^{7} · The council's preliminary key

Q47 AP EAPCET 2024 · 22 May · Shift 1 MCQ

The half-life period of a radioactive element A is 62 years. It decays into another stable element B. An archaeologist found a sample in which A and B are in $1 : 15$ ratio. The age of the sample is

(A) 248 years
(B) 186 years
(C) 124 years
(D) 310 years

Answer: (A) 248 years · The council's preliminary key

Q48 AP EAPCET 2024 · 22 May · Shift 2 MCQ

Which physical quantity is measured in barn

(A) Radius of the nuclei
(B) Pressure in a liquid drop
(C) Scattering cross-section
(D) Rate of flow of liquid

Answer: (C) Scattering cross-section · The council's preliminary key

Q49 AP EAPCET 2024 · 21 May · Shift 1 MCQ

If the energy released per fission of a $^{235}_{92}\mathrm{U}$ nucleus is 200 MeV, the energy released in the fission of 0.1 kg of $^{235}_{92}\mathrm{U}$ in kilowatt – hour is.

(A) 22.8×10^5
(B) 22.8×10^7
(C) 11.4×10^5
(D) 820×10^{10}

Answer: (A) 22.8×10^5 · The council's preliminary key

Q50 AP EAPCET 2024 · 21 May · Shift 2 MCQ

The surface areas of two nuclei are in the ratio $9 : 25$. The mass numbers of the nuclei are in the ratio

(A) $27 : 125$
(B) $9 : 25$
(C) $3 : 5$
(D) $1 : 1$

Answer: (A) $27 : 125$ · The council's preliminary key

Q51 AP EAPCET 2024 · 20 May · Shift 1 MCQ

A nucleus with atomic mass number 'A' produces another nucleus by loosing 2 alpha particles. The volume of the new nucleus is 60 times that of the alpha particle. The atomic mass number A of the original nucleus is

(A) 228
(B) 238
(C) 248
(D) 244

Answer: (C) 248 · The council's preliminary key

Q52 AP EAPCET 2024 · 20 May · Shift 2 MCQ

One mole of radium has an activity of $\frac{1}{3.7}$ kilo curie. Its decay constant is

(Avagadro number = $6 \times 10^{23}\ \mathrm{mol}^{-1}$)

(A) $\frac{1}{6} \times 10^{-10}\ \mathrm{s}^{-1}$
(B) $10^{-10}\ \mathrm{s}^{-1}$
(C) $10^{-11}\ \mathrm{s}^{-1}$
(D) $10^{-8}\ \mathrm{s}^{-1}$

Answer: (A) $\frac{1}{6} \times 10^{-10}\ \mathrm{s}^{-1}$ · The council's preliminary key

Q53 AP EAPCET 2024 · 19 May · Shift 2 MCQ

The decrease in each day in the Uranium mass of the material in a Uranium reactor operating at a power of 12 MW is (Energy released in one $_{92}\mathrm{U}^{235}$ fission is about 200 MeV)

(A) 12.64×10^{-2} kg
(B) 11.50×10^{-2} g
(C) 12.64 kg
(D) 12.64 g

Answer: (D) 12.64 g · The council's preliminary key

Q54 AP EAPCET 2024 · 18 May · Shift 1 MCQ

A mixture consists of two radioactive materials A_1 and A_2 with half lives of $20\,\mathrm{s}$ and $10\,\mathrm{s}$ respectively. Initially the mixture has $40\,\mathrm{g}$ of A_1 and $160\,\mathrm{g}$ of A_2. The amount of the two in the mixture will become equal after

(A) $60\,\mathrm{s}$
(B) $80\,\mathrm{s}$
(C) $20\,\mathrm{s}$
(D) $40\,\mathrm{s}$

Answer: (D) $40\,\mathrm{s}$ · The council's preliminary key

Q55 TS EAPCET 2024 · 11 May · Shift 1 MCQ

If the ratio of the radii of nuclei $_{52}\mathrm{X}^{\mathrm{A}}$ and $_{13}\mathrm{Al}^{27}$ is 5:3, then the number of neutrons in the nucleus X is

(A) 52
(B) 63
(C) 27
(D) 73

Answer: (D) 73 · The council's preliminary key

Q56 TS EAPCET 2024 · 11 May · Shift 1 MCQ

Half-life periods of two nuclei A and B are T and 2T respectively. Initially A and B have same number of nuclei. After a time of 4T, the ratio of the remaining number of nuclei of A and B is

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(A) $1:16$
(B) $1:4$
(C) $1:1$
(D) $1:2$

Answer: (B) $1:4$ · The council's preliminary key

Q57 TS EAPCET 2024 · 10 May · Shift 1 MCQ

The operation of a nuclear reactor is said to be critical when the value of neutron multiplication factor K is

(A) $K=0$
(B) $K>1$
(C) $K=1$
(D) $0<K<1$

Answer: (C) $K=1$ · The council's preliminary key

Q58 TS EAPCET 2024 · 10 May · Shift 1 MCQ

An α – particle of energy 'E' is liberated during the decay of a nucleus of mass number 236. The total energy released in this process is

(A) $58\,\mathrm{E}$
(B) $59\,\mathrm{E}$
(C) $\frac{58\mathrm{E}}{59}$
(D) $\frac{59\mathrm{E}}{58}$

Answer: (D) $\frac{59\mathrm{E}}{58}$ · The council's preliminary key

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Q59 TS EAPCET 2024 · 10 May · Shift 2 MCQ

After the decay of a single 'β' particle, the parent and daughter nuclei are

(A) isotopes
(B) isobars
(C) isomers
(D) isotones

Answer: (B) isobars · The council's preliminary key

Q60 TS EAPCET 2024 · 10 May · Shift 2 MCQ

A ${}_{92}\mathrm{U}^{238}$ nucleus decays to a ${}_{82}\mathrm{Pb}^{214}$ nucleus. The number of α and β^{-} particles emitted are

(A) 6 and 2
(B) 3 and 3
(C) 2 and 6
(D) 3 and 4

Answer: (A) 6 and 2 · The council's preliminary key

Q61 TS EAPCET 2024 · 9 May · Shift 1 MCQ

The half-life of a radioactive substance is 12 minutes. The time gap between 28% decay and 82% decay of the radioactive substance is

(A) 6 minutes
(B) 18 minutes
(C) 12 minutes
(D) 24 minutes

Answer: (D) 24 minutes · The council's preliminary key

Q62 TS EAPCET 2024 · 9 May · Shift 1 MCQ

An element consists of a mixture of three isotopes A, B and C of masses m_1, m_2 and m_3 respectively. If the relative abundances of the three isotopes A, B and C is in the ratio 2:3:5, the average mass of the element is

(A) $0.2m_1 + 0.3m_2 + 0.5m_3$
(B) $2m_1 + 3m_2 + 5m_3$
(C) $0.4m_1 + 0.6m_2 + m_3$
(D) $4m_1 + 6m_2 + 10m_3$

Answer: (A) $0.2m_1 + 0.3m_2 + 0.5m_3$ · The council's preliminary key

Q63 TS EAPCET 2024 · 9 May · Shift 2 MCQ

The half lives of two radioactive materials A and B are respectively T and 2T. If the ratio of the initial masses of the materials A and B is $8 : 1$, then the time after which the ratio of the masses of the materials A and B becomes $4 : 1$ is

(A) 2T
(B) T
(C) 4T
(D) 8T

Answer: (A) 2T · The council's preliminary key

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Q64 TS EAPCET 2024 · 9 May · Shift 2 MCQ

The energy released by the fission of one uranium nucleus is 200 MeV. The number of fissions per second required to produce 128 W power is

(A) 6×10^{12}
(B) 8×10^{12}
(C) 2×10^{12}
(D) 4×10^{12}

Answer: (D) 4×10^{12} · The council's preliminary key

Q65 AP EAPCET 2023 · 19 May · Shift 1 MCQ

The process that mainly takes place in stars to produce energy

(A) nuclear fission
(B) nuclear fusion
(C) ionization
(D) annihilation

Answer: (B) nuclear fusion · The council's preliminary key

Q66 AP EAPCET 2023 · 18 May · Shift 1 MCQ

A radioactive decay forms an isotope of the original nucleus with the emission of the following particles

(A) one $\alpha-$ and four $\beta-$ particles
(B) one $\alpha-$ and one $\beta-$ particles
(C) one $\alpha-$ and two $\beta-$ particles
(D) four $\alpha-$ and one $\beta-$ particles

Answer: (C) one $\alpha-$ and two $\beta-$ particles · The council's preliminary key

Q67 AP EAPCET 2023 · 18 May · Shift 2 MCQ

The following is not used as a nuclear fuel.

(A) uranium
(B) thorium
(C) plutonium
(D) titanium

Answer: (D) titanium · The council's preliminary key

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Q68 AP EAPCET 2023 · 18 May · Shift 2 MCQ

A radioactive material whose half life period is 2 years weighs 1 g and is stored in the laboratory for 4 years. Then the amount of remaining radioactive material is

(A) 0.5 g
(B) 0.125 g
(C) 0.25 g
(D) 0.0625 g

Answer: (C) 0.25 g · The council's preliminary key

Q69 AP EAPCET 2023 · 17 May · Shift 1 MCQ

Positron is the antiparticle of

(A) proton
(B) electron
(C) neutron
(D) photon

Answer: (B) electron · The council's preliminary key

Q70 AP EAPCET 2023 · 16 May · Shift 2 MCQ

The nucleus having highest binding energy per nucleon is

(A) $^{16}_{8}\mathrm{O}$
(B) $^{56}_{26}\mathrm{Fe}$
(C) $^{208}_{84}\mathrm{Pb}$
(D) $^{4}_{2}\mathrm{He}$

Answer: (B) $^{56}_{26}\mathrm{Fe}$ · The council's preliminary key

Q71 AP EAPCET 2023 · 15 May · Shift 1 MCQ

The relation between the mean life time τ and the half life time $T_{1/2}$ of a radioactive substance is

(A) $T_{1/2} = \tau \log_e 2$
(B) $T_{1/2} = \tau \log_{10} 2$
(C) $T_{1/2} = \tau$
(D) $T_{1/2} = 2\tau \log_e 2$

Answer: (A) $T_{1/2} = \tau \log_e 2$ · The council's preliminary key

Q72 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The radius of the nucleus of an atom whose mass number is 125 is

(A) $1 \times 10^{-15}\,\mathrm{m}$
(B) $6 \times 10^{-15}\,\mathrm{m}$
(C) $10 \times 10^{-15}\,\mathrm{m}$
(D) $16 \times 10^{-15}\,\mathrm{m}$

Answer: (B) $6 \times 10^{-15}\,\mathrm{m}$ · The council's preliminary key

Q73 TS EAMCET 2023 · 14 May · Shift 1 MCQ

The half-life period of element X is same as the mean life time of element Y. Assume initially X and Y have same number of atoms. Then

(A) Initially X and Y have same decay rates
(B) Always X and Y decay at same rate
(C) Y decays faster than X
(D) X decays faster than Y

Answer: (C) Y decays faster than X · The council's preliminary key

Q74 TS EAMCET 2023 · 14 May · Shift 1 MCQ

Heavy water is used as moderator in nuclear reactor because

(A) It controls the energy released in the reactor
(B) It absorbs neutrons and stops chain reaction
(C) It cools the reactor faster
(D) It slows down the fast moving neutrons

Answer: (D) It slows down the fast moving neutrons · The council's preliminary key

Q75 TS EAMCET 2023 · 14 May · Shift 2 MCQ

Energy released in the fission of a single uranium nucleus is 200 MeV. Then the number of fissions per second to produce 5 mW power is

(A) 1.56×10^{8}
(B) 1.56×10^{13}
(C) 3.12×10^{8}
(D) 3.12×10^{13}

Answer: (A) 1.56×10^{8} · The council's preliminary key

Q76 TS EAMCET 2023 · 14 May · Shift 2 MCQ

Half-life of a radioactive substance A is two times the half-life of another radioactive substance B. Initially the number of nuclei of A and B are N_A and N_B respectively. After three half-lives of A, the number of nuclei of both are equal. Then $\frac{N_A}{N_B}$ is

(A) $\frac{1}{3}$
(B) $\frac{1}{4}$
(C) $\frac{1}{6}$
(D) $\frac{1}{8}$

Answer: (D) $\frac{1}{8}$ · The council's preliminary key

Q77 TS EAMCET 2023 · 13 May · Shift 1 MCQ

α-decay of a parent nucleus X results in a daughter nucleus Y. If m_x, m_y and m_α are the masses of the parent nucleus, the daughter nucleus and the α - particle respectively, then the net kinetic energy gained in the process is

(A) $(m_x + m_\alpha - m_y)c^2$
(B) $(m_x - m_y - m_\alpha)c^2$
(C) $(m_x + m_y + m_\alpha)c^2$
(D) $(m_x + m_y - m_\alpha)c^2$

Answer: (B) $(m_x - m_y - m_\alpha)c^2$ · The council's preliminary key

Q78 TS EAMCET 2023 · 13 May · Shift 1 MCQ

In the nuclear fission of one nucleus of U^{235} the energy released is 188 MeV. The energy released in the nuclear fission of 235 g of U^{235} is nearly
(Avogadro number = $6.02 \times 10^{23}\ \mathrm{mol}^{-1}$)

(A) 28.8×10^{12} J
(B) 23.5×10^{12} J
(C) 36.2×10^{12} J
(D) 18.11×10^{12} J

Answer: (D) 18.11×10^{12} J · The council's preliminary key

Q79 TS EAMCET 2023 · 13 May · Shift 2 MCQ

The radius of a nucleus of mass number 27 is R. Which of the following is true about a nucleus whose radius is 2R?

(A) It is stable in nature
(B) Its mass number is 54
(C) It is likely to undergo fission reaction
(D) It is likely to undergo fusion reaction

Answer: (C) It is likely to undergo fission reaction · The council's preliminary key

Q80 TS EAMCET 2023 · 13 May · Shift 2 MCQ

The nucleus $^{120}_{50}\mathrm{X}$ undergoes the series of reactions given below:

$_{Z}^{A}\mathrm{X} \xrightarrow{\alpha\text{-decay}} \mathrm{P} \xrightarrow{\beta^{-}\text{-decay}} \mathrm{Q} \xrightarrow{\alpha\text{-decay}} \mathrm{R}$

The number of neutrons in the nucleus R is

(A) $A-5$

(B) $A-Z-5$

(C) $A-9$

(D) $A-Z-4$

Answer: (B) $A-Z-5$ · The council's preliminary key

Q81 TS EAMCET 2023 · 12 May · Shift 1 MCQ

The energy equivalent to a mass of 1 kg is

(A) 9×10^{13} J

(B) 9×10^{9} J

(C) 9×10^{16} J

(D) 9×10^{6} J

Answer: (C) 9×10^{16} J · The council's preliminary key

Q82 TS EAMCET 2023 · 12 May · Shift 1 MCQ

If S is the surface area of a nucleus of mass number A, then

(A) $S\propto A$

(B) $S\propto A^{1/3}$

(C) $S\propto A^{2}$

(D) $S\propto A^{2/3}$

Answer: (D) $S\propto A^{2/3}$ · The council's preliminary key

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Q83 TS EAMCET 2023 · 12 May · Shift 2 MCQ

In the following nuclear reaction X is

$$_{13}\mathrm{Al}^{27}+{}_{2}\mathrm{He}^{4}\rightarrow{}_{0}\mathrm{n}^{1}+\mathrm{X}$$

(A) $_{15}\mathrm{P}^{31}$

(B) $_{14}\mathrm{Si}^{30}$

(C) $_{15}\mathrm{P}^{30}$

(D) $_{15}\mathrm{Si}^{31}$

Answer: (C) $_{15}\mathrm{P}^{30}$ · The council's preliminary key

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Q84 TS EAMCET 2023 · 12 May · Shift 2 MCQ

Nuclear fission and fusion can be explained on the basis of

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(A) Einstein's theory of relativity
(B) Einstein specific heat equation
(C) Einstein mass-energy equation
(D) Einstein photoelectric equation

Answer: (C) Einstein mass-energy equation · The council's preliminary key

Q85 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

Estimate the approximate volume of aluminium nucleus (A = 27) Use $\left(R_0 \simeq 1.0 \times 10^{-15}\,\mathrm{m},\ \pi \simeq 3\right)$

(A) $1 \times 10^{-13}\left(\text{Å}\right)^3$
(B) $1 \times 10^{-10}\left(\text{Å}\right)^3$
(C) $1 \times 10^{-15}\left(\text{Å}\right)^3$
(D) $1 \times 10^{-17}\left(\text{Å}\right)^3$

Answer: (A) $1 \times 10^{-13}\left(\text{Å}\right)^3$ · The council's preliminary key

Q86 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

What will be the energy released in joule, in the process of fission by 1 mg of $^{240}_{92}\mathrm{U}$. Assume energy release per fission is 200 MeV.
[use Avogadro's number as 6×10^{23} and $1\mathrm{eV} = 1.6 \times 10^{-19}$ J]

(A) 6.2×10^7 J
(B) 7.0×10^7 J
(C) 8.0×10^7 J
(D) 8.2×10^7 J

Answer: (C) 8.0×10^7 J · The council's preliminary key

Q87 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

The radius and mass number of nucleus '1' is R_1 and A_1 respectively. The radius and mass number of nucleus '2' is R_2 and A_2 respectively. If A_2 is larger than A_1 by 2%, then R_2 is larger than R_1 by

(A) $\frac{2}{3}\%$
(B) 1%
(C) 8%
(D) $\frac{3}{2}\%$

Answer: (A) $\frac{2}{3}\%$ · The council's preliminary key

Q88 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

The range of the nuclear force is

(A) $10^{-18}\,\mathrm{m}$
(B) $10^{-16}\,\mathrm{m}$
(C) $10^{-15}\,\mathrm{m}$
(D) $10^{-13}\,\mathrm{m}$

Answer: (C) $10^{-15}\,\mathrm{m}$ · The council's preliminary key

Q89 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

What is the mass number of the nucleus having radius equal to $\frac{1}{3}$ of that of $^{189}\mathrm{Os}$?

(A) 20
(B) 7
(C) 12
(D) 14

Answer: (B) 7 · The council's preliminary key

Q90 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

As the mass number A increases, which of the following quantities related to a nucleus does not change?

(A) mass
(B) volume
(C) density
(D) binding energy

Answer: (C) density · The council's preliminary key

Q91 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

Consider a nucleus $^{60}_{30}\mathrm{X}$. It's approximate density is
(Take 1 amu=1.6×10^{-27} kg, $R_o = 1.2 \times 10^{-15}$ m.)

(A) 1.2×10^{18} kg/m^3
(B) 8.5×10^{19} kg/m^3
(C) 3.3×10^{16} kg/m^3
(D) 2.2×10^{17} kg/m^3

Answer: (D) 2.2×10^{17} kg/m^3 · The council's preliminary key

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Q92 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

A nucleus has mass number A_1 and volume V_1. Another nucleus has mass number A_2 and volume V_2. If the relation between the mass numbers is $A_2 = 3A_1$, then $\frac{V_1}{V_2} =$

(A) $3^{1/3}$
(B) $\left(\frac{1}{3}\right)^{1/3}$
(C) $\frac{1}{3}$
(D) $\frac{1}{\sqrt{3}}$

Answer: (C) $\frac{1}{3}$ · The council's preliminary key

Q93 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

A radioactive element A converts into another stable element B. Half life of A is 1.5 hrs. After time t the ratio of atoms of A and B is found to be 1 : 8, then t in hours is

(A) 6
(B) 8
(C) Between 3 to 4.5
(D) Between 4.5 to 6

Answer: (D) Between 4.5 to 6 · The council's preliminary key

Q94 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

The correct statement of the following is

(A) The Q - value of a nuclear process is the difference between final and initial kinetic energies.
(B) The nuclear mass is always higher than the total mass of its constituents
(C) Nuclides with same number of neutrons in the nucleus are known as isotopes.
(D) In nuclear fusion, a heavy nucleus breaks into two smaller fragments.

Answer: (A) The Q - value of a nuclear process is the difference between final and initial kinetic energies. · The council's preliminary key

Q95 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

A radioactive element of mass 1 kg after N years is left with only 125 g. If the half life of the element is 12.5 y, then the value of N is

(A) 37.5 years.
(B) 25.0 years.
(C) 50.0 years.
(D) 75.0 years.

Answer: (A) 37.5 years. · The council's preliminary key

Q96 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

The half life of a radioactive nuclide is

(A) Half the time needed for a sample to complete decay.
(B) Half the time a sample can be kept before it starts to decay.
(C) The time needed for half a sample to decay.
(D) The time needed for the rest of a sample to decay one half of it has already decayed.

Answer: (C) The time needed for half a sample to decay. · The council's preliminary key

Q97 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

A radioactive substance has a half life of 10^8 years and an activity of 10^4 Bq. The number of atoms of this substance present is

(A) 9.1×10^{19}
(B) 6.7×10^{8}
(C) 4.5×10^{19}
(D) 5×10^{20}

Answer: (C) 4.5×10^{19} · The council's preliminary key

Q98 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

Choose the correct statement of the following

(A) The nuclear density in general, is independent of mass number A.
(B) The radius of a nucleus is directly proportional to the mass number A of the nucleus.
(C) The binding energy of a nucleus is inversely proportional to its mass defect .
(D) Energy is absorbed when heavy nuclei undergo transmutation into light nuclei .

Answer: (A) The nuclear density in general, is independent of mass number A. · The council's preliminary key

Q99 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

An ancient discovery found a sample, where 75% of the original carbon (C^{14}) remains. Then the age of the sample is ($T_{1/2}(C^{14}) = 5730$ years, $\ln 0.5 = -0.7$, $\ln(0.75) = -0.3$)

(A) 2300 years
(B) 2456 years
(C) 2546 years
(D) 3456 years

Answer: (B) 2456 years · The council's preliminary key

Q100 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

The graph of $\ln\left(\frac{R}{R_o}\right)$ versus $\ln$ A is

where R is radius of a nucleus, A is its mass number, and R_o is constant

(A) A straight line
(B) A circle of radius R
(C) A parabola
(D) An ellipse

Answer: (A) A straight line · The council's preliminary key

Q101 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

The radius of an atomic nucleus of mass number 64 is 4.8 fermi. Then the mass number of another atomic nucleus of radius 6 fermi is

(A) 64
(B) 81
(C) 100
(D) 125

Answer: (D) 125 · The council's preliminary key

Q102 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

A star initially has 10^{42} deuterons. It produces energy via the following process: ${}_1H^2 + {}_1H^2 \longrightarrow {}_1H^3 + p$ and ${}_1H^2 + {}_1H^3 \longrightarrow {}_2He^4 + n$. If the average power radiated by the star is $10^{22}\ W$, the deuteron supply of the star will be exhausted in a time which is of the order of _____. Given masses of nuclei of H^2 is 2.014 amu, He^4 is 4.001 amu, $m(p)$ is 1.007 amu and $m(n)$ is 1.008 amu

(A) $10^{12}\ s$
(B) $10^{28}\ s$
(C) $10^{16}\ s$
(D) $10^{8}\ s$

Answer: (D) $10^{8}\ s$ · The council's preliminary key

Q103 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

1 amu is _____

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(A) $931\ \mathrm{KeV}$
(B) $931\ \mathrm{eV}$
(C) $931\ \mathrm{MeV}$
(D) $9.31\ \mathrm{MeV}$

Answer: (C) $931\ \mathrm{MeV}$ · The council's preliminary key

Q104 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

Fusion reaction is initiated with the help of _____

(A) Low temperature
(B) High temperature
(C) Neutron
(D) Any particle

Answer: (B) High temperature · The council's preliminary key

Q105 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

Which of the following values is the correct order of nuclear density?

(A) $5 \times 10^{5}\ kg.m^{-3}$
(B) $9 \times 10^{10}\ kg.m^{-3}$
(C) $3 \times 10^{21}\ kg.m^{-3}$
(D) $2 \times 10^{17}\ kg.m^{-3}$

Answer: (D) $2 \times 10^{17}\ kg.m^{-3}$ · The council's preliminary key

Q106 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

Which of the following nuclear reactions is possible?

(A) ${}_{5}\mathrm{B}^{10} + {}_{2}\mathrm{He}^{4} \longrightarrow {}_{7}\mathrm{N}^{13} + {}_{1}\mathrm{H}^{1}$
(B) ${}_{11}\mathrm{Na}^{24} + {}_{1}\mathrm{H}^{1} \longrightarrow {}_{10}\mathrm{Ne}^{20} + {}_{2}\mathrm{He}^{4}$
(C) ${}_{93}\mathrm{Np}^{239} \longrightarrow {}_{94}\mathrm{Pu}^{239} + \beta^{-} + \gamma^{-}$
(D) ${}_{7}\mathrm{N}^{11} + {}_{1}\mathrm{H}^{1} \longrightarrow {}_{6}\mathrm{C}^{12} + \beta^{-} + \gamma^{-}$

Answer: (C) ${}_{93}\mathrm{Np}^{239} \longrightarrow {}_{94}\mathrm{Pu}^{239} + \beta^{-} + \gamma^{-}$ · The council's preliminary key

Q107 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

Which of the following statement is correct?

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(A) The rest mass of the stable nucleus is less than the sum of the rest masses of its separated nucleons
(B) The rest mass of the stable nucleus is greater than the sum of the rest masses of its separated nucleons
(C) In nuclear fission, energy is released by fusion is of two nuclei of medium mass (approximate 100amu)
(D) In nuclear fission, energy is released by fragmentation is very low atomic mass nucleus

Answer: (A) The rest mass of the stable nucleus is less than the sum of the rest masses of its separated nucleons · The council's preliminary key

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Q108 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

Which one of the following statement is correct?

(A) The mass of the nucleus must be less than the sum of the masses of the constituent neutrons and protons.
(B) The mass of the nucleus must be equal to the sum of the masses of the constituent neutrons and protons.
(C) The mass of the nucleus must be greater than the sum of the masses of the constituent neutrons and protons.
(D) The mass of the nucleus must be equal to only the masses of the constituent neutrons or protons.

Answer: (A) The mass of the nucleus must be less than the sum of the masses of the constituent neutrons and protons. · The council's preliminary key

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Q109 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The physics behind fusion test reactor is:

(A) Newton's law of motion
(B) Trapping and cooling of atoms by laser beams and magnetic fields
(C) Magnetic confinement of plasma
(D) Motion of charged particles in electromagnetic fields

Answer: (C) Magnetic confinement of plasma · The council's preliminary key

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Q110 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The mass number and the volume of a nucleus is M and V respectively. If the mass number is increased to 2 M then the volume is changed to

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(A) 4V
(B) $\frac{V}{2}$
(C) 2V
(D) 8V

Answer: (C) 2V · The council's preliminary key

Q111 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

If 5 mg of ^{235}U is completely destroyed in an atom bomb, then approximate total energy released is (given that the energy released per fission is 200 MeV)

(A) 4×10^8 J
(B) 6×10^9 J
(C) 5×10^7 J
(D) 3×10^{10} J

Answer: (A) 4×10^8 J · The council's preliminary key

Q112 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

In a nuclear reactor, the main purpose of the moderator is to

(A) Initiate the fission process by giving away its neutron
(B) Slow down the fast neutrons
(C) Cool down the excess of heat generated in the reactor
(D) Absorb excess of neutrons and control the reaction rate

Answer: (B) Slow down the fast neutrons · The council's preliminary key

Q113 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

The mass number of an iodine nucleus and a polonium nucleus is 125 and 216 respectively. The ratio of radius of iodine nucleus to that of polonium nucleus is

(A) $5 : 6$
(B) $6 : 5$
(C) $7 : 6$
(D) $5 : 7$

Answer: (A) $5 : 6$ · The council's preliminary key

Q114 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

The distance between two nucleons for which the potential energy is minimum, is

(A) 0.2 fm
(B) 0.6 fm
(C) 0.8 fm
(D) 0.1 fm

Answer: (C) 0.8 fm · The council's preliminary key

Q115 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

The half-life of a radioactive sample is 20 days this means that

(A) the substance completely disintegrates in 40 days
(B) the substance completely disintegrates in 80 days
(C) 1/8 part of the substance disintegrates in 60 days
(D) 7/8 part of the substance disintegrates in 60 days

Answer: (D) 7/8 part of the substance disintegrates in 60 days · The council's preliminary key

Q116 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

$^{232}_{90}\mathrm{Th}$ emits 6α and 4β particles and gets converted into a lead. The mass number and atomic number of lead is _____

(A) $208,\ 82$
(B) $82,\ 208$
(C) $210,\ 82$
(D) $210,\ 84$

Answer: (A) $208,\ 82$ · The council's preliminary key

Q117 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

The binding energy of a nucleus is equivalent to

(A) The mass of nucleus
(B) The mass of proton
(C) The mass of neutron
(D) The mass defect of nucleus

Answer: (D) The mass defect of nucleus · The council's preliminary key

Q118 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

If 75% of a radioactive sample disintegrates in 16 days, the half-life of the radioactive sample is _____ days

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(A) 6
(B) 4
(C) 8
(D) 12

Answer: (C) 8 · The council's preliminary key

Q119 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

The half-life of a radioactive sample is T. The fraction of the initial mass of the sample that decays in an interval $T/2$ is

(A) $\frac{1}{\sqrt{2}}$
(B) $\sqrt{2}$
(C) $\frac{(\sqrt{2}-1)}{\sqrt{2}}$
(D) $\frac{(\sqrt{2}+1)}{\sqrt{2}}$

Answer: (C) $\frac{(\sqrt{2}-1)}{\sqrt{2}}$ · Checked by our team

Q120 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

In the Uranium radioactive series, the initial nucleus is $^{238}_{92}U$ and final nucleus is $^{206}_{82}Pb$. When the Uranium nucleus decays to Lead, the number of α particles emitted is _____ and the number of β particles emitted is _____

(A) $6, 8$
(B) $8, 6$
(C) $16, 6$
(D) $32, 2$

Answer: (B) $8, 6$ · The council's preliminary key

Q121 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

In the nuclear reaction $^{11}_{6}C \longrightarrow {}^{11}_{5}B + \beta + X$, X stands for

(A) a neutron
(B) an electron
(C) a neutrino
(D) an antineutrino

Answer: (C) a neutrino · The council's preliminary key

Q122 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

A radioactive sample has an activity A in air. If the sample is kept inside water then its activity A' _____

(A) becomes less than A
(B) becomes more than A
(C) is same as A
(D) will be less than or equal to A depending on the density of water

Answer: (C) is same as A · The council's preliminary key

Q123 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

Half life of radioactive sample is 24 hours. If a newly prepared radioactive sample shows 4 times the allowed and safe value of radio activity, the minimum time after which one can work safely with the source is

(A) 48 hours
(B) 96 hours
(C) 8 hours
(D) 72 hours

Answer: (A) 48 hours · Official TGCHE final key

Q124 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

The half life of a radioactive isotope is 30 hours. How long will it take to get reduced to 12.5% of its initial amount?

(A) 120 hours
(B) 90 hours
(C) 60 hours
(D) 50 hours

Answer: (B) 90 hours · Official TGCHE final key

Q125 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

A radioactive element which can decay by two processes, has half-life t_1 for first process and half $-$ life t_2 for second process. Let $\langle t \rangle$ be the effective average $-$ life of this element. The correct statement is

(A) $\langle t \rangle < \dfrac{t_1 t_2}{t_1 + t_2}$
(B) $\langle t \rangle = \dfrac{t_1 t_2}{t_1 + t_2}$
(C) $\langle t \rangle > \dfrac{t_1 t_2}{t_1 + t_2}$
(D) $\langle t \rangle = \ln 2 \left(\dfrac{t_1 + t_2}{t_1 t_2} \right)$

Answer: (C) $\langle t \rangle > \dfrac{t_1 t_2}{t_1 + t_2}$ · Checked by our team

Q126 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

The binding energy (B.E) per nucleon for an element is 7.14 MeV. If the B.E of element is 28.6 MeV then the number of nucleons in the element is

(A) 4
(B) 8
(C) 16
(D) 32

Answer: (A) 4 · Official TGCHE final key

Q127 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

The nuclear forces are _____

(A) long range repulsive forces
(B) long range attractive forces
(C) short range attractive forces
(D) short range repulsive forces

Answer: (C) short range attractive forces · Official TGCHE final key

Q128 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

Alpha rays emitted from a radioactive substance are

(A) negatively charged particles
(B) doubly ionized helium atoms
(C) ionized hydrogen nuclei
(D) uncharged particles

Answer: (B) doubly ionized helium atoms · Official TGCHE final key

Q129 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

The half-life of a radioactive sample is 5 seconds. If the initial mass of the sample is 60 grams then the time required to reduce the sample to 7.5 grams is:

(A) 15 secs
(B) 75 secs
(C) 7.5 secs
(D) 10 secs

Answer: (A) 15 secs · Official TGCHE final key

Q130 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

The scientific principle that forms the basis of the tokamak technology is

(A) Controlled nuclear fission
(B) Motion of charged particles in electromagnetic fields
(C) Magnetic confinement of plasma
(D) Superconductivity

Answer: (C) Magnetic confinement of plasma · Official TGCHE final key

Q131 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

What is the binding energy of $^{29}_{14}\mathrm{Si}$ whose atomic mass is 28.976495 u
Mass of proton = 1.007276 u
Mass of neutron = 1.008664 u
(Neglect the electron mass) (Assume 1 u = 931.5 MeV)

(A) $237.84\ \mathrm{MeV}$
(B) $421.72\ \mathrm{MeV}$
(C) $387.21\ \mathrm{MeV}$
(D) $116.35\ \mathrm{MeV}$

Answer: (A) $237.84\ \mathrm{MeV}$ · Official TGCHE final key

Q132 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

A radioactive source has a halflife of 6h. A freshly prepared sample of the same exhibits radioactivity 32 times the permissible safe value. The minimum time after which it would be possible to work safely with the source is

(A) 30 h
(B) 24 h
(C) 18 h
(D) 12 h

Answer: (A) 30 h · Official TGCHE final key

Q133 TS EAMCET 2019 · 6 May · Shift 1 MCQ

Two radioactive materials R_1 and R_2 have decay constants 6λ and λ, respectively. The half life of R_2 is 1.4×10^{17} s. Initially they contain some number of nuclei. The time at which the ratio of the remaining nuclei of R_2 to that of R_1 will be 'e' is : (Let $ln\ 2 = 0.7$)

(A) 2×10^{16} s
(B) 4×10^{16} s
(C) 3×10^{16} s
(D) 5×10^{16} s

Answer: (B) 4×10^{16} s · Official TGCHE final key

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Q134 TS EAMCET 2019 · 4 May · Shift 1 MCQ

A radioactive nucleus can decay in two different processes with half life 0.7 hr. and 0.3 hr. The effective average life of the nucleus in minutes approximately is (Let $\ln 2 = 0.7$)

(A) 14
(B) 18
(C) 24
(D) 26

Answer: (B) 18 · Official TGCHE final key

Q135 TS EAMCET 2019 · 4 May · Shift 2 MCQ

The half life of neutron is 693 seconds. What fraction of neutrons will decay when a beam of neutrons, having kinetic energy 0.084 eV, travells a distance of 1 km? (mass of neutron $= 1.68 \times 10^{-27}$ kg, and $\ln 2 = 0.693$)

(A) 60×10^{-5}
(B) 15×10^{-5}
(C) 25×10^{-5}
(D) 50×10^{-5}

Answer: (C) 25×10^{-5} · Official TGCHE final key

Q136 TS EAMCET 2019 · 3 May · Shift 1 MCQ

An alloy is composed of two radioactive materials A and B having equal weight. The half life of A and B are 10 yrs and 20 yrs respectively. After a time 't', the alloy was found to consist of $\left(\frac{1}{e}\right)$ kg of 'A' and 1 kg of B. If the atomic weight of A and B are same, then the value of 't' is (Assume $\ln 2 = 0.7$)

(A) $\left(\frac{200}{7}\right)$ yrs
(B) $\left(\frac{10}{7}\right)$ yrs
(C) 7 yrs
(D) 70 yrs

Answer: (A) $\left(\frac{200}{7}\right)$ yrs · Official TGCHE final key

Q137 TS EAMCET 2019 · 3 May · Shift 2 MCQ

In one average life time of a radioactive nuclei,

(A) more than half the active nuclei decay
(B) half the active nuclei decay
(C) less than half the active nuclei decay
(D) all the nuclei decay

Answer: (A) more than half the active nuclei decay · Official TGCHE final key

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Q138 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

The energy released when one nucleus of $_{92}\mathrm{U}^{235}$ undergoes fission is $188\ \mathrm{MeV}$. The energy released when $100\ \mathrm{g}$ of $_{92}\mathrm{U}^{235}$ undergoes fission is

(A) $3.55 \times 10^{12}\ \mathrm{J}$
(B) $7.71 \times 10^{12}\ \mathrm{J}$
(C) $3.55 \times 10^{13}\ \mathrm{J}$
(D) $7.71 \times 10^{13}\ \mathrm{J}$

Answer: (B) $7.71 \times 10^{12}\ \mathrm{J}$ · Official APSCHE final key

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Q139 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

A radioactive substance of half life 138.6 days is placed in a box. After n days only 20% of the substance is present, then the value of 'n' is $(\ln(5) = 1.61)$

(A) 693
(B) 138.6
(C) 277.2
(D) 322

Answer: (D) 322 · Official APSCHE final key

Q140 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

Assertion (A) : Fragments produced in the fission of $_{92}\mathrm{U}^{235}$ are radioactive
Reason (R) : The fragments in the fission of $^{235}\mathrm{U}$ have a proton to neutron ratio of 2.5

(A) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(B) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(C) (A) is correct but (R) is not correct
(D) (A) is not correct but (R) is correct

Answer: (C) (A) is correct but (R) is not correct · Official APSCHE final key

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Q141 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

The rate of disintegration of a radioactive sample is 'R' and the number of atoms present at any time 't' is 'N'. When $\frac{R}{N}$ is taken along Y-axis and 't' is taken along X-axis, the correct graph is

Question Number : 118 Question Id : 1874634118 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The rate of disintegration of a radioactive sample is 'R' and the number of atoms present at any time 't' is 'N'. When $\frac{R}{N}$ is taken along Y-axis and 't' is taken along X-axis, the correct graph is

ఒక రేడియోధార్మిక నమూనా విఘటన రేటు 'R' మరియు ఏదైనా కాలం 't' వద్ద ఉన్న పరమాణువుల సంఖ్య 'N' అయితే, $\frac{R}{N}$ ను Y-అక్షంపైన మరియు 't' ను X-అక్షంపైన తీసుకొని గీసిన గ్రాఫులలో సరైనది

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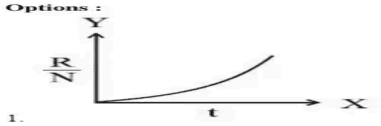
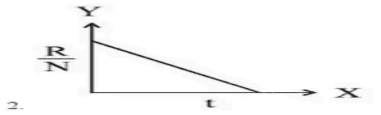
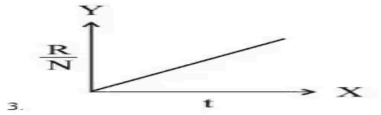
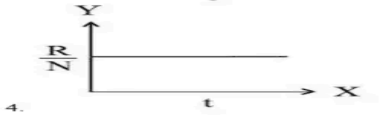
1. 

2. 

3. 

4. 

(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (D) · Official APSCHE final key

Q142 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

If the binding energy of N^{14} is 7.5 MeV per nucleon and that of N^{15} is 7.7 MeV per nucleon, then the energy required to remove a neutron from N^{15} is

(A) 5.25 MeV
(B) 0.2 MeV
(C) 10.5 MeV
(D) 0.4 MeV

Answer: (C) 10.5 MeV · Official APSCHE final key

Q143 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

In a nuclear reactor the activity of a radioactive substance is 2000/s. If the mean life of the products is 50 minutes, then in the steady power generation, the number of radio nuclides is

(A) 12×10^5
(B) 60×10^5
(C) 90×10^5
(D) 15×10^5

Answer: (B) 60×10^5 · Official APSCHE final key

Q144 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

Half-life of a radioactive substance is 18 minutes. The time interval between its 20% decay and 80% decay in minutes is

(A) 6
(B) 9
(C) 18
(D) 36

Answer: (D) 36 · Official APSCHE final key

Q145 TS EAMCET 2018 · 7 May · Shift 1 MCQ

A tokamak fusion test reactor works on :

(A) Bombardmant of thermal neutrons with Uranium-235 (sic)
(B) Magnetic confinement of plasma
(C) Electric discharge under high voltage bias
(D) Acceleration of charged particles in electromagnetic fields

Answer: (B) Magnetic confinement of plasma · The council's preliminary key

Q146 TS EAMCET 2018 · 7 May · Shift 1 MCQ

Consider a radioactive nuclide which follow decay rate given by $A(t) = A_0 2^{-(t/t_0)}$, where $A(t)$ is the fraction of radioactive material remaining after time 't' from the initial A_0 at zero time. Let A_1 be the fraction of original activity which remains after 120 hours. Likewise A_2 is the fraction of original activity remaining after 200 hours. If $\frac{A_1}{A_2} = 16$, then the half life (t_0) will be

(A) 10 hours
(B) 20 hours
(C) 40 hours
(D) 60 hours

Answer: (B) 20 hours · The council's preliminary key

Q147 TS EAMCET 2018 · 5 May · Shift 1 MCQ

The half-life of $^{209}_{84}P_o$ is 103 years. The time it takes for 100 g sample of $^{209}_{84}P_o$ to decay to 3.125 g is

(A) 3296 years
(B) $103\sqrt{2}$ years
(C) 1648 years
(D) 515 years

Answer: (D) 515 years · The council's preliminary key

Q148 TS EAMCET 2018 · 5 May · Shift 2 MCQ

A nucleus of Deuteron or Deuterium is a bound atomic system best described by

(A) Composed of a proton and a neutron
(B) Spherical shaped
(C) Contains more than two nucleons
(D) Proton and neutron are bound by electrostatic forces

Answer: (A) Composed of a proton and a neutron · The council's preliminary key

Q149 TS EAMCET 2018 · 5 May · Shift 2 MCQ

In uranium radioactive series, initial nucleus $^{238}_{92}\mathrm{U}$ decays to final nucleus $^{206}_{82}\mathrm{U}$. In this process the number of α-particles and β-particles emitted are

(A) 8 and 3
(B) 16 and 6
(C) 16 and 3
(D) 8 and 6

Answer: (D) 8 and 6 · The council's preliminary key

Q150 TS EAMCET 2018 · 4 May · Shift 1 MCQ

An active nucleus decays to one-third $(\frac{1}{3})$ in 20 Hrs. The fraction of original activity remaining after 80 Hrs is

(A) $\frac{1}{16}$
(B) $\frac{1}{81}$
(C) $\frac{1}{36}$
(D) $\frac{1}{54}$

Answer: (B) $\frac{1}{81}$ · The council's preliminary key

Q151 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

A radioactive element 'X' converts into another stable element 'Y'. Half life of X is 2 hours. Initially only X is present. After a time 't', if the ratio of atoms of X to Y is 1 : 4 then the value of 't' is

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(A) 2 hours
(B) 4 hours
(C) Between 4 hours and 6 hours
(D) 6 hours

Answer: (C) Between 4 hours and 6 hours · The council's preliminary key

Q152 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

Activity of a radioactive sample is R_1 at a time t_1 and R_2 at a time t_2. Its half life period is T. The number of atoms that have disintegrated in the time interval $(t_2 - t_1)$ is equal to $\frac{n(R_1 - R_2)T}{\ln 4}$. Then 'n' is equal to

(A) 2
(B) 1
(C) 4
(D) $\frac{1}{2}$

Answer: (A) 2 · The council's preliminary key

Q153 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

The number of half lives elapsed before 93.75% of a radioactive sample has decayed, is

(A) 6
(B) 4
(C) 2
(D) 8

Answer: (B) 4 · The council's preliminary key

Q154 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

If $200\ \mathrm{MeV}$ of energy is released in the fission of one nucleus of $^{235}_{92}\mathrm{U}$, the number of nuclei that must undergo fission to release an energy of $1000\ \mathrm{J}$ is

(A) 3.125×10^{13}
(B) 6.25×10^{13}
(C) 12.5×10^{13}
(D) 3.125×10^{14}

Answer: (A) 3.125×10^{13} · The council's preliminary key

Q155 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

The half life of $^{238}_{92}\mathrm{U}$ against α-decay is 13.86×10^{16} s. The activity of 1 g sample of $^{238}_{92}\mathrm{U}$ is _____

(A) $1.26 \times 10^{4}\ \mathrm{s}^{-1}$
(B) $1.26 \times 10^{-4}\ \mathrm{s}^{-1}$
(C) $12.6 \times 10^{4}\ \mathrm{s}^{-1}$
(D) $12.6 \times 10^{-4}\ \mathrm{s}^{-1}$

Answer: (A) $1.26 \times 10^{4}\ \mathrm{s}^{-1}$ · The council's preliminary key

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Q156 TS EAMCET 2017 · 12 May · Offline MCQ

Which of the following is emitted when $^{239}_{94}\mathrm{Pu}$ decays into $^{235}_{92}\mathrm{U}$?

(A) Gamma Ray
(B) Neutron
(C) Electron
(D) Alpha particle

Answer: (D) Alpha particle · The council's preliminary key

Q157 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

The half life of a stream of radioactive particles moving along a straight path with a constant kinetic energy of 4 eV is 1 minute. The percentage of particles which decay before travelling a distance of 3.6 km is _____ .
(Mass of the radioactive particles $= 3.2 \times 10^{-21}\ \mathrm{kg}$ and charge of the electron $= 1.6 \times 10^{-19}\ \mathrm{C}$)

(A) 37.5
(B) 87.5
(C) 75
(D) 175

Answer: (B) 87.5 · The council's preliminary key

Q158 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

A heavy nucleus having mass number 200 gets disintegrated into two small fragments of mass numbers 80 and 120. If binding energy per nucleon for parent atom is 6.5 MeV and for daughter nuclei is 7 MeV and 8 MeV respectively, then the energy released in the decay will be

(A) $200\ \mathrm{MeV}$
(B) $120\ \mathrm{MeV}$
(C) $220\ \mathrm{MeV}$
(D) $180\ \mathrm{MeV}$

Answer: (C) $220\ \mathrm{MeV}$ · The council's preliminary key

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Q159 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

In the nuclear fusion reaction ${}_1H^2 + {}_1H^3 \rightarrow {}_2He^4 + n$, if the repulsive potential energy between the two nuclei is 2.07×10^{-14} J, then the temperature at which the gases must be heated to initiate the reaction is (Boltzmann constant = $1.38 \times 10^{-23}\ JK^{-1}$)

(A) 10^9 K
(B) 10^7 K
(C) 10^5 K
(D) 10^{12} K

Answer: (A) 10^9 K · The council's preliminary key

Q160 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

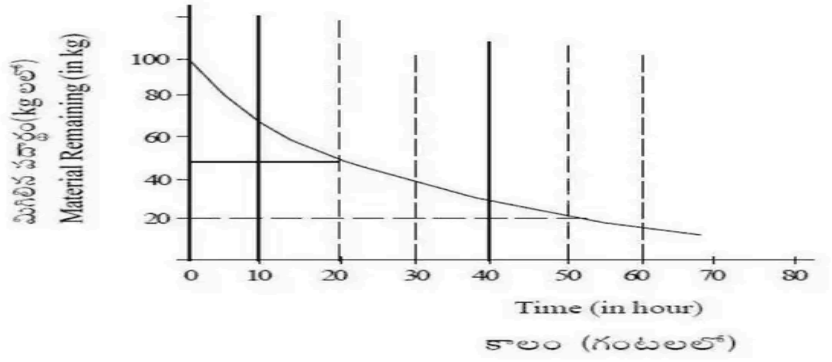
The decay of a radioactive material is shown in the graph. From the graph, the decay constant of the material is nearly

(see the figure above)

Question Number : 118 Question Id : 1017174438 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The decay of a radioactive material is shown in the graph. From the graph, the decay consta of the material is nearly

ఇవ్వబడిన గ్రాఫ్ (రేఖాపటం) ఒక రేడియోధార్మిక పదార్థం యొక్క విఘటనాన్ని సూచిస్తుంది. దీని నుం ఆ మూలక విఘటన స్థిరాంకం సుమారుగా



Options :
1. $1\times10^{-5}\ s^{-1}$
2. $0.693\times10^{-4}\ s^{-1}$
3. $2\times10^{-6}\ s^{-1}$
4. $0.5\times10^{-5}\ s^{-1}$

(A) $1 \times 10^{-5}\ s^{-1}$
(B) $0.693 \times 10^{-4}\ s^{-1}$
(C) $2 \times 10^{-6}\ s^{-1}$
(D) $0.5 \times 10^{-5}\ s^{-1}$

Answer: (A) $1 \times 10^{-5}\ s^{-1}$ · The council's preliminary key

Q161 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

Two radioactive materials Y_1 and Y_2 initially contain same number of nuclei. Their decay constants are $9\lambda\ s^{-1}$ and $6\lambda\ s^{-1}$ respectively. The time after which the ratio of number of undecayed nuclei of Y_1

and Y_2 becomes $\frac{1}{e}$ is

(A) $\frac{1}{3\lambda}$ s
(B) $\frac{1}{15\lambda}$ s
(C) $\frac{1}{10\lambda}$ s
(D) $\frac{1}{8\lambda}$ s

Answer: (A) $\frac{1}{3\lambda}$ s · The council's preliminary key

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Q162 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

In the fusion reaction, ${}_1\mathrm{H}^2 + {}_1\mathrm{H}^2 \rightarrow {}_2\mathrm{He}^4 + Q$, Q is energy released. If 'c' is the speed of light and 'm' is the mass of each deuterium nucleus then the mass of helium nucleus formed is

(A) $2m + \frac{Q}{c^2}$
(B) $\frac{Q}{mc^2}$
(C) $m + \frac{Q}{c^2}$
(D) $2m - \frac{Q}{c^2}$

Answer: (D) $2m - \frac{Q}{c^2}$ · The council's preliminary key

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Q163 TS EAMCET 2016 · 15 May · Offline MCQ

A certain radioactive element disintegrates with a decay constant of 7.9×10^{-10}/sec. At a given instant of time, if the activity of the sample is equal to 55.3×10^{11} disintegration/sec, then number of nuclei at that instant of time

(A) 7.0×10^{21}
(B) 4.27×10^{13}
(C) 4.27×10^{3}
(D) 6×10^{23}

Answer: (A) 7.0×10^{21} · Official TGCHE final key

Q164 AP EAMCET 2016 · 29 Apr · Offline MCQ

The radius of germanium (Ge) nuclide is measured to be twice the radius of ${}^{9}_{4}\mathrm{Be}$. The number of nucleons in Ge will be

(A) 72
(B) 73
(C) 74
(D) 75

Answer: (A) 72 · The council's preliminary key

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Q165 AP EAMCET 2014 · 22 May · Offline MCQ

If the radius of a nucleus with mass number 125 is 1.5 Fermi, then radius of a nucleus with mass number 64 is

(A) 0.48 Fermi
(B) 0.96 Fermi
(C) 1.92 Fermi
(D) 1.2 Fermi

Answer: (D) 1.2 Fermi · The council's preliminary key

Q166 AP EAMCET 2013 · 10 May · Offline MCQ

The radius of ${}_{72}\mathrm{Te}^{125}$ nucleus is 6 fermi. The radius of ${}_{13}\mathrm{Al}^{27}$ nucleus in meters is

(A) 3.6×10^{-12} m
(B) 3.6×10^{-15} m
(C) 7.2×10^{-8} m
(D) 7.2×10^{-15} m

Answer: (B) 3.6×10^{-15} m · The council's preliminary key

Q167 AP EAMCET 2013 · 10 May · Offline MCQ

A U^{235} nuclear reactor generates energy at a rate of 3.70×10^{7} J/s. Each fission liberates 185 MeV useful energy. If the reactor has to operate for 144×10^{4} seconds, then, the mass of the fuel needed is (Assume Avogadro's number $= 6 \times 10^{23}$ mol^{-1}, 1 eV $= 1.6 \times 10^{-19}$ J)

(A) 70.5 kg
(B) 0.705 kg
(C) 13.1 kg
(D) 1.31 kg

Answer: (B) 0.705 kg · The council's preliminary key

Q168 AP EAMCET 2012 · 12 May · Offline MCQ

The half life of Ra^{226} is 1620 years. Then the number of atoms decay in one second in 1 gm of radium (Avogadro number = 6.023×10^{23})

(A) 4.23×10^{9}
(B) 3.16×10^{10}
(C) 3.61×10^{10}
(D) 2.16×10^{10}

Answer: (C) 3.61×10^{10} · Official APSCHE final key

Q169 AP EAMCET 2012 · 12 May · Offline MCQ

The half life of a radioactive element is 10 hours. The fraction of initial radioactivity of the element that will remain after 40 hours is

(A) $\frac{1}{2}$
(B) $\frac{1}{16}$
(C) $\frac{1}{8}$
(D) $\frac{1}{4}$

Answer: (B) $\frac{1}{16}$ · Official APSCHE final key

Q170 AP EAMCET 2011 · 8 May · Offline MCQ

If 200 MeV of energy is released in the fission of one nucleus of $^{235}_{92}\mathrm{U}$, the number of nuclei that must undergo fission to release an energy of 1000 J is :

(A) 3.125×10^{13}
(B) 6.25×10^{13}
(C) 12.5×10^{13}
(D) 3.125×10^{14}

Answer: (A) 3.125×10^{13} · The council's preliminary key

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