

Nuclei

NEET previous year questions · Physics

5 questions from the official papers: NEET 2026 (2), Re-NEET 2026 (1), NEET 2020 (2). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q31

Four statements are given (A is mass number). Choose the correct answer from the options given below:

Statement I: The volume of a nucleus is proportional to $A^{1/3}$.

Statement II: The volume of a nucleus is proportional to A .

Statement III: The difference in mass of an atom and its nucleus is called the mass defect.

Statement IV: The difference in mass of a nucleus and its constituents is called the mass defect.

- (1) I and III are true, but II and IV are false
(2) II and III are true, but I and IV are false
(3) I and IV are true, but II and III are false
(4) II and IV are true, but I and III are false

Answer (4)

Sol. Nuclear radius $r = r_0 A^{1/3}$, so volume $\propto r^3 \propto A$ (statement II correct, I wrong). The mass defect is the difference between the total mass of the constituent nucleons and the actual mass of the nucleus (statement IV correct, III wrong). Hence only II and IV are true.

2. NEET 2026 · Q32

An unknown nucleus has a nuclear density of $2.29 \times 10^{17} \text{ kg/m}^3$ and mass of $19.926 \times 10^{-27} \text{ kg}$. Its mass number A is approximately: (Take $R_0 = 1.2 \times 10^{-15} \text{ m}$, $4\pi = 12.56$)

- (1) 12 (2) 20 (3) 16 (4) 19

Answer (1)

Sol. Using density = mass/volume with volume $= \frac{4}{3}\pi R^3$ and $R = R_0 A^{1/3}$, we get $\frac{4}{3}\pi R_0^3 A = \frac{m}{\rho}$. Solving,

$$A = \frac{m}{\rho} \cdot \frac{3}{4\pi R_0^3} = \frac{19.926 \times 10^{-27} \times 3}{2.29 \times 10^{17} \times 12.56 \times (1.2 \times 10^{-15})^3} \approx 12.$$

3. Re-NEET 2026 · Q7

Consider the following nuclear reaction $^{238}\text{U} \rightarrow ^{234}\text{Th} + ^4\text{He}$. Take masses of ^{238}U , ^{234}Th and ^4He as 238.050 u, 234.043 u and 4.003 u, respectively. The Q value for the reaction, in keV, is: [Given: $1 \text{ u} = 931.5 \text{ MeV } c^{-2}$]

- (1) 3726 (2) 3730 (3) 3736 (4) 3740

Answer (1)

Sol. The Q value is the mass defect converted to energy:
 $\Delta m = 238.050 - (234.043 + 4.003) = 0.004 \text{ u}$.
 Multiplying by the conversion factor, $Q = 0.004 \times 931.5 = 3.726 \text{ MeV} = 3726 \text{ keV}$. The positive value confirms the decay is spontaneous. NCERT Class 12, Nuclei (mass-energy and nuclear reactions).

4. NEET 2020 · Q151

When a uranium isotope $^{235}_{92}\text{U}$ is bombarded with a neutron, it generates $^{89}_{36}\text{Kr}$, three neutrons and

- (1) $^{91}_{40}\text{Zr}$ (2) $^{101}_{36}\text{Kr}$
(3) $^{103}_{36}\text{Kr}$ (4) $^{144}_{56}\text{Ba}$

Answer (4)

Sol. The nuclear reaction is $^{235}_{92}\text{U} + ^1_0\text{n} \rightarrow ^{89}_{36}\text{Kr} + 3^1_0\text{n} + ^{144}_{56}\text{Ba}$. The mass and charge numbers must be conserved, so the remaining product is $^{144}_{56}\text{Ba}$.
 Chapter: Nuclei.

5. NEET 2020 · Q174

The energy equivalent of 0.5 g of a substance is

- (1) $4.5 \times 10^{13} \text{ J}$ (2) $1.5 \times 10^{13} \text{ J}$
(3) $0.5 \times 10^{13} \text{ J}$ (4) $4.5 \times 10^{16} \text{ J}$

Answer (1)

Sol. $E = mc^2 = 0.5 \times 10^{-3} \times (3 \times 10^8)^2 = 4.5 \times 10^{13} \text{ J}$.
 Chapter: Nuclei.

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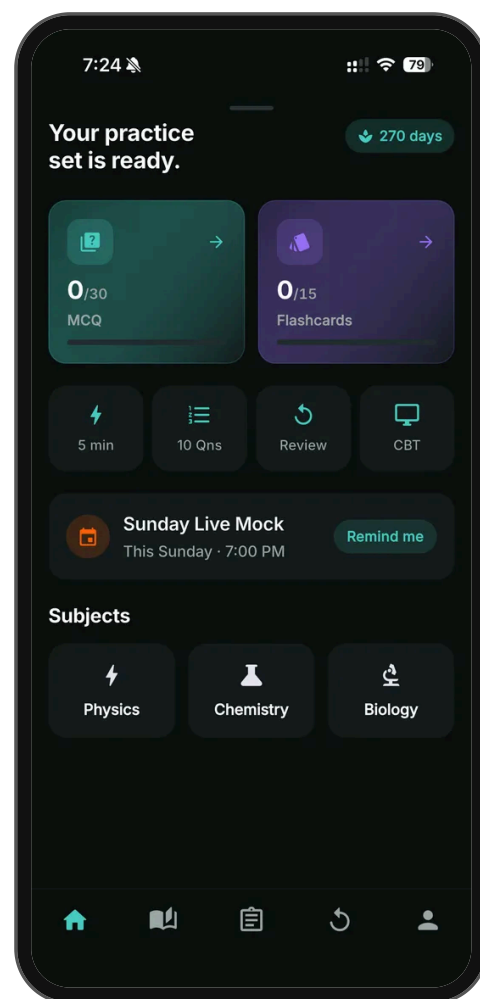
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