PhysicsByAaryan

CSIR NET . GATE . JEST . BARC - Physics

Nuclear properties - CSIR NET Physics PYQs

Nuclear and Particle Physics . All PYQs (2015-2025) with answer key

3 questions . Answer key included

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Q1. [Dec 2016] . 5.0 marks

Nuclear and Particle Physics > Nuclear properties

CSIR NET	2016 Dec	5M

What should be the minimum energy of a photon for it to split an α-particle at rest into a tritium and a proton?

(The masses of ${}_2^4\mathrm{He}$, ${}_1^3\mathrm{H}$ and ${}_1^1\mathrm{H}$ are 4.0026 amu, 3.0161 amu and 1.0073 amu, respectively, and $1\mathrm{amu} \approx 938\mathrm{MeV}$.)

1. 32.2 MeV
2. 3 MeV
3. 19.3 MeV
4. $931.5\mathrm{MeV}$

Q2. [Dec 2025] . 5.0 marks

Nuclear and Particle Physics > Nuclear properties

CSIR NET	2025 Dec	5M	NPP

For a spherical nucleus, consider the interior charge distribution to be

$$\rho(r) = \frac{\rho_0}{1 + \exp[(r - R)/a]}$$

where ρ_0, R and a are constants of appropriate dimensions. In the limit $a \to 0^+$, the number of protons (charge e) inside a sphere of radius $2R$ is given by

1. $\frac{2\rho_0}{e}\left(\frac{4}{3}\pi R^3\right)$
2. $\frac{\rho_0}{e}\left(\frac{4}{3}\pi R^3\right)$
3. $\frac{8\rho_0}{e}\left(\frac{4}{3}\pi R^3\right)$
4. $\frac{4\rho_0}{e}\left(\frac{4}{3}\pi R^3\right)$

Q3. [June 2025] . 5.0 marks

Nuclear and Particle Physics > Nuclear properties

CSIR NET	2025 June	5M	NPP

If the binding energies per nucleon of the nuclei $X(A = 240)$ and $Y(A = 120)$ are 7.6 MeV and 8.5 MeV respectively, the energy released in the symmetric fission, $X \rightarrow Y + Y$ is

1. 94 MeV
2. 9.4MeV
3. 108 MeV
4. 216 MeV

Answer Key

3 questions . Subject and topic for quick revision

Q. No	Subject	Topic	Answer
Q1	Nuclear and Particle Physics	Nuclear properties	**1**
Q2	Nuclear and Particle Physics	Nuclear properties	**2**
Q3	Nuclear and Particle Physics	Nuclear properties	**4**

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