

NEET NUCLEI — MASS–ENERGY EQUIVALENCE AND BINDING ENERGY — PYQS

Max. Marks: 44

Questions: 11

Section A (MCQ) — 11 questions

Q.1 The energy equivalent of 0.5 g of a substance is :

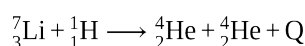
[NEET (UG) 2020]

- (1) 4.5×10^{13} J (2) 1.5×10^{13} J
 (3) 0.5×10^{13} J (4) 4.5×10^{16} J

Scan or tap for the
full solution



Q.2 The binding energy per nucleon of ${}^7_3\text{Li}$ and ${}^4_2\text{He}$ nuclei are 5.60 MeV and 7.06 MeV respectively. In the nuclear reaction



the value of energy Q released is [AIPMT 2014]

- (1) 19.6 MeV (2) -2.4 MeV
 (3) 8.4 MeV (4) 17.3 MeV

Scan or tap for the
full solution



Q.3 The power obtained in a reactor using ${}^{235}_{92}\text{U}$ disintegration is 1000 kW. The mass decay of ${}^{235}_{92}\text{U}$ per hour is [AIPMT 2011 (Prelims)]

- (1) 10 microgram (2) 20 microgram
 (3) 40 microgram (4) 1 microgram

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Q.4 The binding energy per nucleon in deuterium and helium nuclei are 1.1 MeV and 7.0 MeV, respectively. When two deuterium nuclei fuse to form a helium nucleus the energy released in the fusion is [AIPMT 2010 (Mains)]

- (1) 23.6 MeV (2) 2.2 MeV
 (3) 28.0 MeV (4) 30.2 MeV

Scan or tap for the
full solution



Q.5 The mass of a ${}^7_3\text{Li}$ nucleus is 0.042 u less than the sum of the masses of all its nucleons. The binding energy per nucleon of ${}^7_3\text{Li}$ nucleus is nearly [AIPMT 2010 (Prelims)]

- (1) 46 MeV (2) 5.6 MeV
 (3) 3.9 MeV (4) 23 MeV

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Q.6 If $M(A, Z)$, M_p and M_n denote the masses of the nucleus ${}^A_Z\text{X}$, proton and neutron respectively in units of u ($1 \text{ u} = 931.5 \text{ MeV}/c^2$) and BE represents its binding energy in MeV, then [AIPMT 2008]

- (1) $M(A, Z) = ZM_p + (A - Z)M_n - \text{BE}$
 (2) $M(A, Z) = ZM_p + (A - Z)M_n + \text{BE}/c^2$
 (3) $M(A, Z) = ZM_p + (A - Z)M_n - \text{BE}/c^2$
 (4) $M(A, Z) = ZM_p + (A - Z)M_n + \text{BE}$

Scan or tap for the
full solution



Q.7 A nucleus ${}^A_Z\text{X}$ has mass represented by $M(A, Z)$. If M_p and M_n denote the mass of proton and neutron respectively and B.E. the binding energy in MeV, then [AIPMT 2007]

- (1) B.E. = $[ZM_p + (A - Z)M_n - M(A, Z)]c^2$
 (2) B.E. = $[ZM_p + AM_p - M(A, Z)]c^2$
 (3) B.E. = $M(A, Z) - ZM_p - (A - Z)M_n$
 (4) B.E. = $[M(A, Z) - ZM_p - (A - Z)M_n]c^2$

Scan or tap for the
full solution



Q.8 The binding energy of deuteron is 2.2 MeV and that of ${}^4_2\text{He}$ is 28 MeV. If two deuterons are fused to form one ${}^4_2\text{He}$ then the energy released is [AIPMT 2006]

- (1) 30.2 MeV (2) 25.8 MeV
 (3) 23.6 MeV (4) 19.2 MeV

Scan or tap for the
full solution



Q.9 If $M(A, Z)$, M_p and M_n denote the masses of the nucleus ${}^A_Z\text{X}$, proton and neutron respectively in units of u ($1 \text{ u} = 931.5 \text{ MeV}/c^2$) and BE represents its binding energy in MeV, then [AIPMT 2004]

- (1) $M(A, Z) = ZM_p + (A - Z)M_n - \text{BE}$
 (2) $M(A, Z) = ZM_p + (A - Z)M_n + \text{BE}/c^2$
 (3) $M(A, Z) = ZM_p + (A - Z)M_n - \text{BE}/c^2$
 (4) $M(A, Z) = ZM_p + (A - Z)M_n + \text{BE}$

Scan or tap for the
full solution



Q.10 The mass of proton is 1.0073 u and that of neutron is 1.0087 u ($u = \text{atomic mass unit}$). The binding energy of ${}^4_2\text{He}$ is (Given helium nucleus mass $\approx 4.0015 \text{ u}$.)

[AIPMT 2003]

- (1) 0.0305 J (2) 0.0305 erg
(3) 28.4 MeV (4) 0.061 u

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full solution



Q.11 M_n and M_p represent the mass of neutron and proton respectively. An element having mass M has N neutrons and Z protons, then the correct relation will be

[AIPMT 2001]

- (1) $M < \{N \cdot M_n + Z \cdot M_p\}$ (2) $M > \{N \cdot M_n + Z \cdot M_p\}$
(3) $M = \{N \cdot M_n + Z \cdot M_p\}$ (4) $M = N\{M_n + M_p\}$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	4	3	1	2	3	1	3	3	3	1