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NEET NUCLEI — ALPHA, BETA AND GAMMA DECAY — PYQS

Max. Marks: 56 **Questions:** 14

Section A (MCQ) — 14 questions

1. Consider the following nuclear reaction

$^{238}U \longrightarrow {}^{234}Th + {}^{4}He$

Take masses of ^{238}U, ^{234}Th and ^{4}He as 238.050 u, 234.043 u and 4.003 u, respectively. The Q value for the reaction, in keV, is:

[Given: 1 u = 931.5 MeV c^{-2}] [RE-NEET (UG) 2026]

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

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2. $^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

In the nuclear emission stated above, the mass number and atomic number of the product Q respectively, are [NEET (UG) 2024]

(1) 280, 81 (2) 286, 80 (3) 288, 82 (4) 286, 81

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3. Select the correct statements among the following : Choose the most appropriate answer from the options given below :

A. Slow neutrons can cause fission in $^{235}_{92}U$ more readily than fast neutrons.

B. α-rays are Helium nuclei.

C. β-rays are fast moving electrons or positrons.

D. γ-rays are electromagnetic radiations of wavelengths larger than X-rays.

[RE-NEET (UG) 2024]

(1) A, B and C only (2) A, B and D only

(3) A and B only (4) C and D only

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4. In the given nuclear reaction, the element X is

$^{22}_{11}Na \longrightarrow X + e^+ + \nu$ [NEET (UG) 2022]

(1) $^{23}_{11}Na$ (2) $^{23}_{10}Ne$ (3) $^{22}_{10}Ne$ (4) $^{22}_{12}Mg$

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5. A radioactive nucleus

$^{A}_{Z}X \longrightarrow {}_{Z-1}B \longrightarrow {}_{Z-3}C \longrightarrow {}_{Z-2}D$,

where Z is the atomic number of element X. The possible decay particles in the sequence are :

[NEET (UG) 2021]

(1) β^-, α, β^+ (2) α, β^-, β^+

(3) α, β^+, β^- (4) β^+, α, β^-

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6. A nucleus of uranium decays at rest into nuclei of thorium and helium. Then [AIPMT 2015]

(1) The helium nucleus has more momentum than the thorium nucleus.

(2) The helium nucleus has less kinetic energy than the thorium nucleus.

(3) The helium nucleus has more kinetic energy than the thorium nucleus.

(4) The helium nucleus has less momentum than the thorium nucleus.

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7. α-particles, β-particles and γ-rays are all having same energy. Their penetrating power in a given medium in increasing order will be

[NEET 2013 (Karnataka)]

(1) γ, α, β (2) α, β, γ (3) β, α, γ (4) β, γ, α

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8. A nucleus $^{m}_{n}X$ emits one α particle and two β particles. The resulting nucleus is

[AIPMT 2011 (Prelims)]

(1) $^{m-6}_{n-4}Z$ (2) $^{m-6}_{n}Z$ (3) $^{m-4}_{n}X$ (4) $^{m-4}_{n-2}Y$

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9. In the nuclear decay given below

$^{A}_{Z}X \longrightarrow {}^{A}_{Z+1}Y \longrightarrow {}^{A-4}_{Z-1}B^* \longrightarrow {}^{A-4}_{Z-1}B$,

the particles emitted in the sequence are

[AIPMT 2009]

(1) γ, β, α (2) β, γ, α (3) α, β, γ (4) β, α, γ

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10. The number of beta particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an

[AIPMT 2009]

(1) isomer of parent (2) isotone of parent
(3) isotope of parent (4) isobar of parent

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11. In a radioactive decay process, the negatively charged emitted β-particles are [AIPMT 2007]
(1) the electrons produced as a result of the decay of neutrons inside the nucleus
(2) the electrons produced as a result of collisions between atoms
(3) the electrons orbiting around the nucleus
(4) the electrons present inside the nucleus

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12. A nuclear reaction given by
${}_{Z}X^{A} \longrightarrow {}_{Z+1}Y^{A} + {}_{-1}e^{0} + \bar{\nu}$ represents [AIPMT 2003]
(1) β-decay (2) γ-decay
(3) fusion (4) fission

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13. Which rays contain (positive) charged particles? [AIPMT 2001]
(1) α-rays (2) β-rays (3) γ-rays (4) X-rays

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14. For the given reaction, the particle X is
${}_{6}C^{11} \longrightarrow {}_{5}B^{11} + \beta^{+} + X$ [AIPMT 2000]
(1) neutron (2) anti neutrino
(3) neutrino (4) proton

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**2**	**4**	**1**	**3**	**4**	**3**	**2**	**3**	**4**	**3**	**1**
Ques.	12	13	14								
Ans.	**1**	**1**	**3**								