

NEET PHYSICS

Topic: Radioactivity & Nuclear Physics

Radioactivity

- Q.1** Radioactivity is a -
- (1) nuclear process (2) atomic process
(3) chemical process (4) physical process
- Q.2** The value of decay constant of last element of radioactive series is -
- (1) infinite
(2) much less
(3) zero
(4) equal to the decay constant of first element
- Q.3** If the pressure on a radioactive material is increased three times, then the mean life of the element -
- (1) does not change
(2) will become three times
(3) will become $\frac{1}{3}$ rd
(4) will depend on the initial pressure
- Q.4** A radioactive material emits 20 β -particles per sec at 10°C. If the temperature is increased to 20°C then the emission rate of β -particles per sec is -
- (1) 20 (2) 40
(3) 30 (4) 1

- Q.5** What will be the effect of dissolving a radioactive material in HNO_3 ?
- (1) Its radioactive properties will remain unchanged
 - (2) Its radioactive properties will change
 - (3) The state of material cannot be predicted
 - (4) None of these
- Q.6** The particles emitted by a radioactive substance are deflected in a magnetic field. The particle may be-
- (1) neutrons
 - (2) electrons
 - (3) protons
 - (4) hydrogen atoms
- Q.7** What will happen when a radioactive substance with mean life 2×10^5 years is dissolved in H_2SO_4 ?
- (1) it will dissociate into H^+ and SO_4^{2-} ions
 - (2) it will be converted into SO_2 gas
 - (3) it will be converted into H_2 gas
 - (4) it will remain unchanged
- Q.8** The half life of a radioactive material is 20 days. If it is heated to 10000 K, then its half life will become -
- (1) 20×10000 days
 - (2) $20/10000$ days
 - (3) 9800 days
 - (4) 20 days
- Q.9** The following is not an application of radioactive material -
- (1) to locate cracks in welding or castings
 - (2) to find the thickness of material
 - (3) in cigarette factory
 - (4) in photography

Q.10 SI unit of radioactivity is -

- (1) curie (2) rutherford
(2) rontgen (4) bacqueral

Q.11 The graph between remaining radioactive atoms and time for a radioactive decay is -

- (1) straight line (2) parabola
(3) exponential (4) ellipse

Q.12 Number of active atoms in m gram material is :

(M → atomic weight)

- (1) $Mm \times 6.02 \times 10^{23}$
(2) $(M/m) \times 6.02 \times 10^{23}$
(3) $6.02 \times 10^{23}/Mm$
(4) $(m/M) \times 6.02 \times 10^{23}$

Q.13 The activity of a radioactive element (decay constant λ) becomes $\frac{1}{3}$ of initial activity A_0 in 9 years then the decay constant after 9 years will -

- (1) λ (2) $\lambda/3$
(3) $\lambda/9$ (4) $2\lambda/3$

Q.14 A radioactive sample contains two elements P and Q. The mass of each is 10^{-3} kg. The ratio of their atomic weights is 1 : 3. Their half lives are 4s and 8s respectively. The mass of P and Q after 16s will respectively be -

- (1) 1.25×10^{-5} kg and 2.5×10^{-4} kg
(2) 6.25×10^{-5} kg and 2.5×10^{-4} kg
(3) 6.25×10^{-5} kg and 1.25×10^{-4} kg
(4) 2.25×10^{-5} kg and 6.25×10^{-4} kg

- Q.15** A fraction of $\frac{5}{9}$ of a radioactive substance decays in time t . What fraction of the substance would have been active after time $\frac{t}{2}$ -
- (1) $1/2$ (2) $2/3$
(3) $3/4$ (4) $4/5$

Nuclear Physics

- Q.16** In the reaction ${}^2_1\text{H} + {}^3_1\text{H} \rightarrow {}^4_2\text{He} + {}^1_0\text{n}$. If the binding energies of ${}^2_1\text{H}$, ${}^3_1\text{H}$ and ${}^4_2\text{He}$ are respectively a , b and c (in MeV), then the energy (in MeV) released in this reaction is-
- (1) $a + b + c$ (2) $c + a - b$
(3) $c - a - b$ (4) $a + b + c$
- Q.17** In any fission process the ratio $\frac{\text{mass of fission products}}{\text{mass of parent nucleus}}$ is -
- (1) Greater than 1
(2) Depends on the mass of the parent nucleus
(3) Equal to 1
(4) Less than 1
- Q.18** Fission of nuclei is possible because the binding energy per nucleon in them -
- (1) Decreases with mass number at low mass numbers
(2) Increases with mass number at low mass number
(3) Decreases with mass number at high mass number
(4) Increases with mass number at high mass number

Q.19 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 -

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

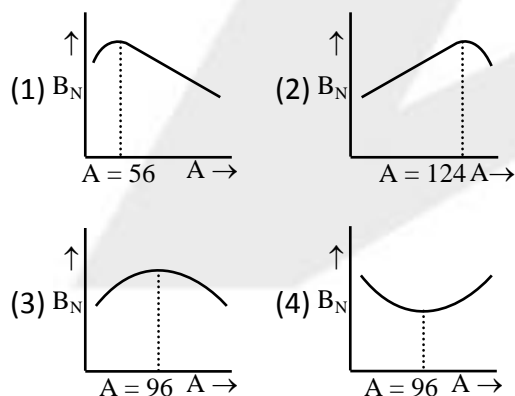
Q.20 The radius of Germanium (Ge) nuclide is measured to be twice the radius of ${}^9_4\text{Be}$. The number of nucleons in Ge are -

- (1) 73 (2) 74
(3) 75 (4) 72

Q.21 Nuclear fusion is possible -

- (1) only between light nuclei
(2) only between heavy nuclei
(3) between both light and heavy nuclei
(4) only between nuclei which are stable against β -decay.

Q.22 The dependence of binding energy per nucleon (B_N) on the mass number (A), is represented by-

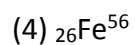
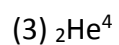
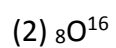
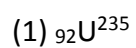


Q.23 The operation of a nuclear reactor is said to be critical, if the multiplication factor (k) has a value -

- (1) 1 (2) 1.5
(3) 2.1 (4) 2.5

- Q.24** The number of β -particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an -
- (1) isotope of parent (2) isobar of parent
(3) isomer of parent (4) isotone of parent
- Q.25** Which one of the following is used as a moderator in nuclear reaction ?
- (1) Uranium (2) Heavy water
(3) Cadmium (4) Plutonium
- Q.26** The reaction responsible for the production of light energy from the sun will be -
- (1) fission (2) fusion
(3) nuclear (4) none of these
- Q.27** Consider the following nuclear reaction
- $$X^{200} \rightarrow A^{110} + B^{90} + \text{Energy}$$
- If the binding energy per nucleon for X, A and B are 7.4 MeV, 8.2 MeV and 8.2 MeV respectively, the energy released will be-
- (1) 90 MeV (2) 110 MeV
(3) 200 MeV (4) 160 MeV
- Q.28** In each fission of ${}_{92}\text{U}^{235}$ releases 200 MeV, how many fissions must occur per second to produce power of 1 kW ?
- (1) 1.25×10^{18} (2) 3.125×10^{13}
(3) 3.2×10^{18} (4) 1.25×10^{13}
- Q.29** The function of heavy water in a nuclear reactor to-
- (1) slow down the neutrons
(2) increase the neutrons
(3) stop the electrons
(4) none of the above

Q.30 Which one of the following has the highest neutrons ratio ?



ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	1	3	1	1	1	2	4	4	4	4
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	3	4	1	2	2	3	4	3	2	4
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	1	1	1	1	2	2	4	2	1	1