

19.18 MULTIPLE CHOICE QUESTIONS OF PAPERS:

YEAR 2013:

(i) In radioactive decay law $N = N_0 e^{-\lambda t}$, λ represents:

- * Wavelength
- * Half Life
- * **Decay Constant**
- * None of these

YEAR 2012:

(i) After alpha decay, the nucleus has its:

- * Charge number decreased by four
- * Charge number increased by four
- * Mass number increased by four
- * **Mass number increased by four**

YEAR 2010:

(i) The Radioactive decay law is:

* $\frac{N}{N_0} = e^{-\lambda t}$

* $N = N_0 e^{\lambda t}$

* $\frac{N_0}{N} = e^{-\lambda t}$

* $N_0 = \Delta N e^{-\lambda t}$

YEAR 2009:

(i) The half-life of radium is 1600 years. After 6400 years, the simple of the surviving radium would be its:

- * 1/4
- * $\frac{1}{8}$
- * **1/16**
- * 1/2

(ii) When a nucleus emits a Beta Particle, its atomic number:

- * **Increases**
- * Decreases
- * Remains constant
- * None of them

YEAR 2008:

(i) The rate of decay of a radioactive substance:

- * Increases with increasing time
- * Remains constant with increasing time
- * **Decrease exponentially with the increasing time**
- * None of these

YEAR 2007:

(i) In radioactive decay law, $N = N_0 e^{-\lambda t}$, " λ " represents:

- * Wavelength
- * Half-life
- * Mass Radioactive Sample
- * **Decay constant**

YEAR 2006:

(i) The atomic number of a radioactive element is increased as a result of:

- * α -particle
- * γ -radiation
- * **β -radiation**
- * Pair production

(ii) In the nuclear reaction, ${}_7\text{N}^{14} + {}_2\text{He}^4 \rightarrow {}_8\text{O}^{17} + \underline{\hspace{2cm}}$, the missing particle is:

- * **Proton**
- * Neutron
- * Electron
- * α -particle

YEAR 2005:

(i) One atomic mass unit is equal to:

- * $1.6 \times 10^{-19}\text{J}$
- * $9.1 \times 10^{-27}\text{kg}$
- * **$931 \times 10^6\text{eV}$**
- * $9 \times 10^9\text{eV}$

(ii) The energy equivalent to the mass reduced in the formation of a nucleus is called:

- * Nuclear energy
- * **Binding energy**
- * Fusion energy
- * Potential energy

(iii) The atomic number of an element is increased as a result of:

- * α -radiation
- * **β -radiation**
- * Pair production
- * Photoelectric effect

19.19 MULTIPLE CHOICE QUESTIONS (SELF PRACTICE):

- Q.1 Number of Neutrons in ${}_{92}\text{U}^{235}$ is:
- a) 152
b) 148
c) 143
d) 92
- Q.2 In Nuclear Fission, ${}_{92}\text{U}^{235}$ is bombarded by:
- a) Slow Neutron.
b) Low energy neutron.
c) High energy neutron.
d) Fast neutron.
- Q.3 The time in which half of parent nuclear decay is called:
- a) Life time.
b) Decay interval.
c) Time of decay.
d) Half life.
- Q.4 Breeder Reactor is used to convert:
- a) ${}_{92}\text{U}^{238}$ into ${}_{94}\text{Pu}^{239}$
b) ${}_{92}\text{U}^{235}$ into ${}_{56}\text{Ba}^{144}$ and ${}_{36}\text{Kr}^{89}$
c) ${}_{92}\text{U}^{235}$ into ${}_{92}\text{U}^{238}$
d) ${}_{92}\text{U}^{238}$ into ${}_{56}\text{Ba}^{144}$ and ${}_{36}\text{Kr}^{89}$
- Q.5 In the nuclear reaction:
- $${}_{7}\text{N}^{14} + {}_{2}\text{He}^{4} \longrightarrow {}_{8}\text{O}^{17} + \underline{\hspace{2cm}}$$
- a) Electron.
b) α -Particle.
c) Proton.
d) Neutron.
- Q.6 The Process in which a bigger nucleus splits up into its smaller fragments with an evolution of a large amount of energy is called:
- a) Nuclear Fission.
b) Nuclear Fusion.
c) Nuclear disintegration.
d) Nuclear Decay.
- Q.7 In the process of gamma emission from a nucleus, which of the following will change :
- a) Both mass and Charge number.
b) No change occurs.
c) Mass number.
d) Charge number.
- Q.8 LMFBR is the abbreviation of:
- a) Liquid metal fast breeder reactor.
b) None of these.
c) Lithium metal Fission breeder reactor.
d) Lithium metal of Fission and Bomb Radiation.
- Q.9 In β^{+} decay, a Parent nucleus converts into a daughter nucleus accompanied with:
- a) Alpha Particle.
b) Beta Particle.
c) Electron.
d) Positron.

Q.10 Binding fraction is the:

- a) Binding energy Per mass defect.
- b) Mass defect Per binding energy.
- c) Mass defect Per nucleon.
- d) Binding energy Per nucleon.

Q.11 Half life of radioactive elements is given by:

- a) $\frac{0.693}{\lambda}$
- b) 0.693
- c) 0.693λ
- d) $\frac{\lambda}{0.693}$

Q.12 Mass deficit is the difference of:

- a) Increased mass and decreased mass.
- b) Mass of Nuclear Constituents in free state and in combined state.
- c) Inertial mass and non-inertial mass
- d) Nuclear mass and atomic mass.

Q.13 Activity of Radioactive nuclei is given by:

- a) $\frac{N}{N_0}$
- b) $\frac{N_0}{N}$
- c) $\frac{\lambda}{N}$
- d) λN

Q.14 A material consisting of the fissionable isotopes of Uranium is called the:

- a) Reactor fuel.
- b) Atom bomb fuel.
- c) Nuclear fuel.
- d) Atomic fuel.

Q.15 The process of converting non-fissionable uranium into fissionable is called:

- a) Disintegration.
- b) None of these.
- c) Breeding.
- d) Decay Process.

Q.16 Half life of ${}_{94}\text{Pu}^{239}$ is:

- a) 2.44×10^4 years.
- b) 1662 years.
- c) 3.80 days.
- d) One week.

Q.17 Decay process in radioactive nuclei takes place:

- a) Conditionally.
- b) Exponentially.
- c) Linearly.
- d) Smoothly.

Q. 18 Critical mass of fissionable isotope of Uranium is:

- a) 7.07%.
- b) 77.07%.
- c) 0.7%.
- d) 0.07%.

Q.19 $1\text{ u} = \underline{\hspace{2cm}}$ MeV:

- a) 9.315.
- b) 0.9315.
- c) 931.5.
- d) 93.15.

Q.20 In periodic table most stable nuclei are those whose:

- a) Mass number is greater than two.
- b) Charge number is greater than two.
- c) Mass number lies between 30 and 60.
- d) Charge number lies between 30 and 60.

Q.21 Which one of the following is not true for Nuclear reactors.

- a) They are the source of making atom bomb.
- b) They provide neutrons which are the basic tool of nuclear studies.
- c) They are the source of power generation.
- d) They provide certain radioactive isotopes which are used in medicine.

Q.22 The rate of decrease of decay in parent nuclei is directly proportional to the:

- a) Activity.
- b) Relative activity.
- c) Number of parent nuclei.
- d) Half life.

Q.23 The process of beta emission from a nucleus involves the change in:

- a) Both mass and charge number
- b) No change occurs.
- c) Mass number.
- d) Charge number.

Q.24 According to the law of radioactive decay, number of parent nuclei is equal to:

- a) $e^{-\lambda t}$.
- b) None of those.
- c) N_0 .
- d) $N_0 e^{-\lambda t}$.

Q.25 The process in which heavier nucleus is formed from the combination of lighter nuclei is called:

- a) Radioactivity.
- b) Mass defect.
- c) Fission.
- d) Fusion.

KEY

(1) 143	(2) Slow Neutron
(3) Half life	(4) ${}_{92}\text{U}^{238}$ into ${}_{94}\text{Pu}^{239}$
(5) Proton	(6) Nuclear Fission
(7) No change occurs	(8) Liquid metal fast breeder reactor
(9) Positron	(10) Mass defect Per nucleon
(11) $\frac{0.693}{\lambda}$	(12) Mass of Nuclear Constituents in free state and in combined state
(13) λN	(14) Nuclear fuel
(15) Breeding	(16) 2.44×10^4 years
(17) Exponentially	(18) 0.7%
(19) 931.5	(20) Mass number lie between 30 and 60
(21) They are the source of making atom bomb	(22) Number of parent nuclei
(23) Charge number	(24) $N_0 e^{-\lambda t}$
(25) Fusion	