Exercise # 1

Q.1 Half-life of a 5 gram radioactive substance is 14 hours, then what should be the half-life of its 20 grams?

(1) 14 hours   (2) 56 hours   (3) 3.5 hours   (4) 25 hours

Q.2 If a radioactive isotope disintegrates 75% in two hours, then its half-life will be

(1) 1 hour   (2) 45 minutes   (3) 30 minutes   (4) 15 minutes

Q.3 Which of the following isotopes is used in the therapy of cancer?

(I) Co^{60} (2) C^{12} (3) I^{131} (4) P^{31}

Q.4 With time, the rate of radioactive disintegration

(1) decreases.   (2) increases.   (3) remains constant.   (4) can increase.

Q.5 If half-life of a radioactive substance is 140 days, then how much amount from 1 gram substance will disintegrate after 560 days?

(1) 0.5 g   (2) 0.25 g   (3) 1.8 g   (4) 1/16 g

Q.6 One amu is equal to

(1) 1.49×10^{-3} erg   (2) 1.49×10^{-2} erg   (3) 1.49×10^{-10} erg   (4) None of these

Q.7 What is the order of a radioactive disintegration reaction?

(I) First   (2) Second   (3) Third   (4) Zero

Q.8 Which of the following radiations has maximum penetrating power?

(1) α rays   (2) 'γ rays   (3) β rays   (4) Cathode rays

Q.9 What should be the end-product of disintegration series (4n + 3)?

(1) $_{82}Pb^{206}$ (2) $_{82}Pb^{207}$ (3) $_{82}Pb^{208}$ (4) $_{82}Bi^{209}$

Q.10 Ratio of $\dfrac{N}{P}$ for β particle emission

(1) increases.   (2) decreases.   (3) remains unchanged.   (4) None of the above.

Q.11 Half-life of $_{90}Th^{238}$ is 1.3×10^{10} year. In how much time, its 1×10^{-3} kg will become 5×10^{-4} kg after disintegration?

(1) 1.3×10^5 year   (2) 1.3×10^4 year   (3) 2.6×10^{10} year   (4) 1.3×10^{10} year

Q.12 Radioactivity of a wood sample (half-life period - 6000 years) obtained from a broken house is approximately half of the fresh wood. How many year old is the broken house?

(1) 9000 year   (2) 3000 year   (3) 6000 year   (4) 12000 year

Q.13 Half-life of a radioactive substance is 10 years, then what percentage of the substance will be left behind after 40 years?

(1) 12.5%   (2) 6.25%   (3) 100%   (4) 25%

Q.14 $_{88}Ra^{226}$ and $_{89}Ac^{227}$ are

(1) isotones   (2) isobars   (3) isotopes   (4) isoelectronic

Q.15 Half-life of a radioisotope is 20 hours, then how much part of this isotope will be left behind after 60 minutes?

(1) $\dfrac{1}{8}$ (2) $\dfrac{1}{4}$ (3) $\dfrac{1}{3}$ (4) $\dfrac{1}{2}$

Q.16 If amount of a radioactive element is increased two times, then what should be the change in disintegration per unit time?

(1) Decreases half   (2) Remains unchanged

(3) Becomes two times   (4) Increases $\sqrt{2}$ times

Q.17 In an atomic reactor, graphite is used in the form of

(1) lubricant (2) fuel

(3) moderator (4) in the inner coating of the reactor

Q.18 From a radioactive substance, $\frac{3}{4}$ disintegration occurs in two hours, then its half-life will be

(1) 30 minutes (2) 15 minutes (3) 60 minutes (4) 90 minutes

Q.19 Bond energy of an element is 64 MeV. If bond energy is 6.4 MeV, then number of nucleons will be

(1) 10 (2) 64 (3) 16 (4) 6

Q.20 Nucleus is unstable at what ratio of $\frac{N}{P}$?

(1) 1.0 (2) 1.2 (3) 2.0 (4) 1.6

Q.21 What should be the number of a and b particles emitted in a nuclear reaction $_{90}Th^{228} \rightarrow _{83}Bi^{212}$?

(1) 4 α and 1 β (2) 3 α and 7 β (3) 8 α and 1β (4) 1α and 4β

Q.22 Mass defect for a nuclear reaction is 0.01864 amu, then its energy in MeV will be

(1) 931.1 (2) 186.4 (3) 4.655 (4) 17.34

Q.23 After radioactive reaction, an element changes to its isotope of four units less atomic weight. What should be the number of α and β particles emitted in this reaction?

(1) 1α and 2β (2) 1α and 1β (3) 0 α and 2 β (4) 1 α and 0 β

Q.24 Relationship between half-life of a radioactive element (T) and its disintegration constant (λ) can be exhibited by which of the following formulae?

(1) $\lambda = 0.693 \times T$ (2) $\lambda = 0.693 \times \lambda$ (3) $\lambda = \frac{0.693}{T}$ (4) $\lambda = \frac{693}{T}$

Q.25 Atom bomb is based on which of the following processes?

(1) Artificial transfonnation (2) Nuclear fission (3) Nuclear fusion (4) None of the above

Q.26 Haif-life of a radioactive element is 20 days. If 100 g of this element is taken, then how much amount will be left behind after 40 days?

(1) 25 g (2) 2.5 g (3) 60g (4) 40g

Q.27 What is the second product in the following nuclear reaction?

$_{52}Te^{130} + _{1}H^{2} \rightarrow _{53}I^{131} + ?$

(1) α particle (2) Neutron (3) Proton (3) Positron

Q.28 Which of the following is the unit of radioactivity constant?

(i) Time^{-1} (2) Time (3) Mole time^{-1} (4) Time mole^{-1}

Q.29 Haif-life of a radioactive element is 6 months. How much time will be consumed to reduce its initial concentration to $\frac{1}{16}$?

(i) 1 year (2) 16 years (3) 2 years (4) 8 years

Q.30 Which of the following radiations remain unaffected by magnetic field, but they have high penetrating power?

(1) Positron (2) β rays (3) α rays (4) γ rays

Q.31 Radioactivity of a radioisotope increases with which of the following?

(1) Temperature (2) Pressure (3) Chemical atmosphere (4) None of the above

Q.32 Which of the following is used to determine the age of archeological discoveries? .

(1) $_{92}U^{235}$ (2) $_{6}C^{14}$ (3) $_{1}H^{1}$ (4) $_{26}Fe^{56}$

Q.33 After removing one β particle from $_{90}Th^{230}$, which of the following should be obtained?

(1) $_{92}U^{234}$ (2) $_{92}U^{238}$ (3) $_{91}U^{234}$ (4) $_{82}U^{204}$

Q.34 There are two isotopes of boron found in nature, whose atomic weights are 10.01 (I) and 11.01 (II). If the atomic weight of natural boron is 10.81, then what should be the percentage of the two isotopes?

(1) 10 and 90   (2) 25 and 75   (3) 20 and 80   (4) 30 and 70

Q.35 $_7N^{14} + \alpha \rightarrow$ Proton + X

What is X in the above reaction?

(1) $_8O^{16}$ (2) $_8O^{17}$ (3) $_8O^{18}$ (4) $_8O^{15}$

Q.36 Half-life of radioactive lead $_{82}Pb^{201}$ is 8 hours. Stariing from one gram of this isotope, how much of it will be left behind after 24 hours.

(1) 1/2 g   (2) 1/3 mg   (3) 1/8 mg   (4) 1/4 mg

Q.37 In $_{11}Na^{23} + _1H^1 \rightarrow _{12}Mg^{23} + X$, what is X?

(1) Neutron   (2) Deuteron   (3) Positron   (4) α particle

Q.38 Half-life of a radioactive isotope is 20 days and weight is 1 g. What should be the weight of the element left behind after 40 days?

(1) 0.5 g   (2) 0.25 g

(3) 1/6 g   (4) Nothing will be ieft.

Q.39 If half-life of 2 g isotope is 7 days, then what should be the half-life of 1 g substance?

(1) 7 days   (2) 14 days   (3) 35 days   (4) 28 days

Q.40 32 g of a radioactive isotope is initially present. If its half-life is 1.5 hours, then how much of it will be left behind after 6 hours?

(1) 32 hours   (2) 2 hours   (3) 16 hours   (4) 4 hours

Q.41 $_{15}P^{31}$ and a neutron are obtained on showering an appropriate radiation on $_{13}Al^{28}$, then the radiation conist of

(1) proton   (2) ncutron   (3) ex. particle   (4) deuteron

Q.42 What should be the numher's of α and β particles, particles, respectively, emitted in the following transformation?

$$_{92}U^{238} \rightarrow _{82}Pb^{206} + x(_2He^4) + 4(_{-1}e^0)$$

(1) 8,6   (2) 2,2   (3) 6,4   (4) 8,6

Q.43 Half-life of a radio isotope is 50 days, then how much of it will be left behind after 100 days?

(1) 50%   (2) 75%   (3) 12.5%   (4) 25%

Q.44 If half-life of the radioactive element radon (Rn) is 3.8 days, then 1/20th part of it will be left behind in how much time?

(1) 1.6,days   (2) 20 days   (3) 40 days   (4) 16.4 days

Q.45 Half-life of $_{92}U^{238}$ is 4.5×10^9 years, then after how many year's, half of the original amount of $_{92}U^{238}$ will left behind?

(1) 13.5×10^9 (2) $4.5 \times 10^{4.5}$ (3) 9×10^9 (4) 4.5×10^9

Q.46 A sample of a rock brought from moon contains uranium and lead atoms in equal amounts. If $t_{1/2}$ for uranium = 4.5×10^9 years, then what should be the age of that rock?

(I) 4.5×10^9 year   (2) 13.5×10^9 year   (3) 9×10^9 year   (4) 2.25×10^9 year

Q.47 The velocity constant of a radioactive disintegration (A $\rightarrow$ B) is 231 sec^{-1}, then its half-life will be

(1) 3×10^{-2} sec   (2) 3×10^{-3} sec   (3) 3.3×10^{-2} sec   (4) 3.3×10^{-3} sec

Q.48 3/4 part of a radioactive element disintegrates in 2 hours, then its half-life will be

(1) I hour   (2) 45 minute   (3) 30 minute   (4) 15 minute

Q.49 Radioactivity of a radioactive element becomes 1/10 of its original radioactivity in 2.303 sec, then its half-life will be

(1) 2.303 sec   (2) 0.2303 sec   (3) 0.693 sec   (4) 693 sec

Q.50 If half-life of a 8.0 gram of a radioactive isotope is 10 hours, then what should be the half-life of 2.0 gram of that substance?

(1) 2.5 hours   (2) 5 hours   (3) 10 hours   (4) 40 hours

Q.51 Half-life of a radioactive isotope of sodium (Na – 24) is 15 hours. Sodium forms NaOH and H_2 on reacting with water. If 1 gram Na-24 is added to water, then

(1) its half-life will remain unchanged   (2) its half-life will become 30 hours

(3) its radioactivity will vanish   (4) its half-life will become 10 years.

Q.52 Which of the following can be disintegrated by slow speed neutrons?

(1) $_{92}U^{235}$ (2) $_{92}U^{238}$ (3) $_{82}Ra^{226}$ (4) $_{82}Pb^{207}$

Q.53 Half-life of a radioactive sample is 1500 years. Its 1 gram sample is kept in a fused tube, then how much amount will be left behind after 3000 years?

(1) 1 g   (2) 0.5 g   (3) 0.25 g   (4) Nothing will be left

Q.54 Half-life of a radioactive isotope is 3 days. Its 3 gram is left behind on keeping some amount for 12 days, then what was the initial amount of the radioactive isotope?

(1) 24 g   (2) 12 g   (3) 36 g   (4) 48 g

Q.55 Radioactivity of C^{14} present in a piece of wood of an old grave is found to be half of the radioactivity of C_{14} of wood of a new grave. Half-life of C_{14} is approximately 6000 years, then how much old is the old grave?

(1) 2000 years   (2) 9000 years   (3) 12000 years   (4) 6000 years

Answer Key - 1

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ans.	1	1	1	1	4	1	1	2	2	2	4	3	2	1	1	4	3	3	1	1	1	4	1	3	2
Qus.	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Ans.	1	2	1	3	4	4	2	3	3	2	3	2	2	2	2	2	2	3	4	4	1	2	1	3	3
Qus.	51	52	53	54	55																				
Ans.	1	1	3	4	4																				

Exercise # 2

Q.1 Radium gets changed to radon, then radon is the member of which of the following groups?

(1) 6   (2) 9   (3) 10   (4) 0

Q.2 In nuclear fission, energy gets released in the form of

(1) kinetic energy   (2) potential energy   (3) electrical energy   (4) None of the above.

Q.3 Which of the following is the source of solar and stellar energy?

(1) Fusion of hydrogen nuclei.   (2) Fission of hydrogen nuclei.

(3) Continuous combustion of hydrogen nuclei.   (4) None of the above.

Q.4 Which of the following elements is formed on emission of b particle from $_{11}Na^{24}$?

(1) Mg   (2) Na   (3) P   (4) N

Q.5 Microcurie is equivalent to

(1) 1 microbecquerel   (2) 3.7×10^4 becquerel   (3) 3.7×10^{10} becquerel   (4) 3.7×10^2 becquerel

Q.6 If one proton is released on showering a particles on $_7N^{14}$, then which of the following will be formed?

(1) $_9F^{17}$ (2) $_8O^{17}$ (3) $_8O^{18}$ (4) $_9F^{18}$

Q.7 Wavelength of gamma rays is

(1) $10^{-7}m$ (2) $10^{-10}m$ (3) $10^{-8}\,m$ (4) $10^{-12}\,m$

Q.8 Which of the following types of isotopes have low stability?

(1) Positron-releasing   (2) a Particle-releasing   (3) Electron-releasing   (4) All of the above.

Q.9 Total binding energy of a. particles is

(1) 2.83 MeV   (2) 28.3 MeV   (3) 20.5 MeV   (4) 0.28 MeV

Q.10 Which of the following substances is used as fuel in a nuclear reactor?

(1) Tn   (2) Zr   (3) Pu   (4) Be

Q.11 Magic number of neutrons is present in which of the following elements?

(1) $_{83}Bi^{209}$ (2) $_{13}A^{127}$ (3) $_{92}U^{238}$ (4) $_{26}Fe^{56}$

Q.12 Magic number of protons as well as neutrons is present in which of the following elements?

(1) $_{82}Pb^{208}$ (2) $_{50}Sn^{118}$ (3) $_{82}Pb^{206}$ (4) $_{50}Sn^{123}$

Q.13 Packing fraction is related to which of the following?

(1) Atomic number   (2) Mass defect   (3) Nuclear spin   (4) None of the above

Q.14 Which of the following is most unstable?

(1) $_{30}Zn^{63}$ (2) $_{30}Zn^{71}$ (3) $_{30}Zn^{67}$ (4) $_{30}Zn^{64}$

Q.15 Which of the following separation of isotopes?

(1) Exchange reaction   (2) Diffusion of gases

(3) Electromagnetic separation   (4) X-ray method

Q.16 $_{13}Al^{27} + _2He^4 \circledR _{14}Si^{30} + _1H^1$

The above reaction is

(1) a nuclear fission   (2) a nuclear fusion   (3)an artificial transformation(4) a chemical reaction

Q.17 Which of the following is not a radioactive element?

(1) Cm   (2) Md   (3) Mo   (4) Ra

Q.18 Which of the following elements does not undergo disintegration?

(1) U^{235} (2) U^{238} (3) U^{233} (4) U^{234}

Q.19 Which of the following is an atomic-pile fuel?

(1) Thorium   (2) Sodium   (3) Uranium   (4) Petroleum

Q.20 a-Rays are clusters of which of the following particles?

(1) Electrons   (2) Protons   (3) W   (4) He^{+2}

Q.21 $_{13}Al^{27} + _2He^4 \circledR _{14}Se^{30} + _1H^1 + Q$

What should be the value of Q in the above reaction? Actual atomic weight of $_{13}Ae^{27}$ isotopc is 26.9815 amu and that of $_{14}Se^{30}$ is 29.9738 amu.

(1) 0.27 MeV   (2) 2.329 MeV   (3) 8.239 MeV   (4) 10.329 MeV

Q.22 Distance between the nucleons in an atomic nucleus is (1 fermi = 10^{-13} emf)

(1) 2 fermi   (2) 25 fermi   (3) 100 fermi   (4) 40 fermi

Q.23 75% of a first order reaction is completed in 32 minutes, then 50% of this reaction will be completed in

(1) 16 minutes   (2) 20 minutes   (3) 8 minutes   (4) 40 minutes

Q.24 If half-life of a radioactive substance is 1600 minutes, then how much part will be left behind after 6400 minutes?

(1) $\dfrac{1}{16}$ (2) $\dfrac{1}{4}$ (3) $\dfrac{1}{8}$ (4) $\dfrac{1}{2}$

Q.25 Atomic weight of radium is 226 and its half-life is 1600 years, then how much of it will get disintegrated per second from 1 gram?

(1) 4.8×10^{10} (2) 3.7×10^{10} (3) 9.2×10^6 (4) 3.7×10^8

Q.26 Mass number of a nucleoid is 216, then what should be its radius in fermi?

(1) 6.0   (2) 7.0   (3) 8.0   (4) 7.8

Q.27 The decay constant of a radioactive substance is 1.7×10^{-6} per second, then its half-life will be

(1) 5 days   (2) 5 hours   (3) 5 years   (4) 5 months

Q.28 Which of the following radioactive series is less branched?

(1) 4n+2   (2) 4n+3   (3) 4n + 1   (4) 4n

Q.29 Which of the following is used in the separation of radium?

(1) Pb   (2) Fe   (3) Ba   (4) Bi

Q.30 Which of the following scientists first performed artificial disintegration of a nuclear atom?

(1) Rutherford   (2) Mendeleef   (3) Bohr   (4) Claisen

Q.31 What time is taken by an element in getting 90%disintegrated, if half-life of the element is 1.4×10^{10} years?

(1) 4.6×10^{10} years   (2) 1.128×10^9 years   (3) 1.128×10^7 years   (4) 1.237×10^{15} years

Q.32 What is the ratio of atomic radius and nucleus?

(1) $10^4 : 1$ (2) $10^{-4} : 1$ (3) $10^{-2} : 1$ (4) $10^3 : 1$

Q.33 In $_3Li^6 + \ldots\ldots \circledR _2He^4 + _1H^3$, what should be there in the blank space?

(1) Electron   (2) Neutron   (3) Proton   (4) Deuteron

Q.34 How much temperature is needed to start a nuclear fission reaction?

(1) $10^4 K$ (2) $10^2 K$ (3) $10^6 K$ (4) $10^8 K$

Q.35 The energy of a thermal neutron is

(1) < 1 eV   (2) 1 MeV   (3) 100 eV   (4) > 1 eV

Answer Key - 2

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ans.	4	1	1	1	1	2	4	1	2	3	1	1	2	2	4	3	3	2	3	4	1	1	1	1	2

Qus.	26	27	28	29	30	31	32	33	34	35
Ans.	4	1	3	4	1	1	1	2	4	1

Exercise # 3

Q.1 In treatment of cancer, which of the following isotope is used

[Delhi PMT 1985, BHU 1995; Karnataka CET 1999; MP PET 2002; Kurukshetra CET 2002]

[1] $_{53}I^{131}$ [2] $_{15}P^{32}$ [3] $_{27}Co^{60}$ [4] $_1H^2$

Q.2 The half life period of a radioactive element is 140 days. After 560 days, one gram of the element will reduce to

[CPMT 1989; IIT 1986; EAMCET 1992; MP PET 1997; UPSEAT 1999]

[1] $\frac{1}{2}$ g   [2] $\frac{1}{4}$ g   [3] $\frac{1}{8}$ g   [4] $\frac{1}{16}$ g

Q.3 During a negative β-decay   **[MLNR 1990; IIT 1985]**

[1] An atomic electron is ejected

[2] An electron which is already present within the nucleus is ejected

[3] A neutron in the nucleus decays emitting an electron

[4] A part of the binding energy of the nucleus is converted into an electron

Q.4 Radioactive disintegration differs from a chemical change in being   **[MLNR 1991]**

[1] An exothermic change   [2] A spontaneous process

[3] A nuclear process   [4] A unimolecular first order reaction

Q.5 Stable nuclides are those whose n/p ratio is   **[MP PMT 1993]**

[1] n/p = 1   [2] n/p = 2   [3] n/p > 1   [4] n/p < 1

Q.6 $_{89}Ac^{231}$ gives $_{82}Pb^{207}$ after emission of some α and β-particles. The number of such a and β particles are respectively

[MP PMT 1993; UPSEAT 2001]

[1] 5, 6   [2] 6, 5   [3] 7, 5   [4] 5, 7

Q.7 The isobars are atoms which the same number of   **[Delhi PMT 1982; CPMT 1994]**

[1] Protons   [2] Neutorns   [3] Protons and neutrons   [4] Nucleons

Q.8 Isotopes were discovered by   **[AMU 1983; AFMC]**

[1] Aston   [2] Soddy   [3] Thomson   [4] Millikan

Q.9 $_{84}Po^{210} \rightarrow {}_{82}Pb^{206} + {}_2He^4$. From the above equation deduce the position of polonium in periodic table (lead belongs to group IV A)   **[AIIMS 1980]**

[1] II A   [2] IV B   [3] VI B   [4] VIA

Q.10 The amount of $_{53}I^{128}$ ($t_{1/2}$ = 25 minutes) left after 50 minutes will be   **[AIIMS 1982; Delhi PMT 1982,83]**

[1] One-half   [2] One-third   [3] One-fourth   [4] Nothing

Q.11 The triad of nuclei that is isotonic is   **[IIT 1988; DCE 2000]**

[1] $_6^{14}C$, $_7^{15}N$, $_9^{17}F$ [2] $_6^{12}C$, $_7^{14}N$, $_9^{19}F$ [3] $_6^{14}C$, $_7^{14}N$, $_9^{17}F$ [4] $_6^{14}C$, $_7^{14}N$, $_9^{19}F$

Q.12 $_{92}U^{235}$ belongs to group IIIB of pertiodic table. If it loses one α-particle, the new element will belong to group

[MNR 1984; CPMT 2001]

[1] I B   [2] IA   [3] III B   [4] V B

Q.13 Choose the element which is not radioactive   **[CPMT 1988]**

[1] CM   [2] No   [3] Mo   [4] Md

Q.14 $_{13}Al^{27} + {}_2He^4 \rightarrow {}_{15}P^{30} + ?$ **[CPMT 1888]**

Missing particle in the above nuclear reaction is

[1] $_1e^0$ [2] $_{-1}e^0$ [3] $_0n^1$ [4] α-particle

Q.15 The half life period of a radioactive material is 15 minutes. What % of radioactivity of that material will remain after 45 minutes   **[MP PMT 1991]**

[1] 10%   [2] 12.5%   [3] 15%   [4] 17.5%

Q.16 The huge amount of energy which is released during atomic fission is due to **[CPMT 1990]**

[1] Loss of mass   [2] Loss of electrons   [3] Loss of protons   [4] Loss of α-particles

Q.17 The half life period of a radioactive element is 30 minutes. One sixteenth of the original quantity of the element will remain unchanged after **[CPMT 1983; MP PMT 1994]**

[1] 60 minutes   [2] 120 minutes   [3] 70 minutes   [4] 75 minutes

Q.18 The half life of $_{92}U^{238}$ is 4.5×10^9 years. After how many years, the amount of $_{92}U^{238}$ will be reduced to half of its present amount. **[CPMT 1990; MP PET 1999]**

[1] 9.0×10^9 years   [2] 13.5×10^9 years   [3] 4.5×10^9 years   [4] $4.5 \times 10^{4.5}$ years

Q.19 The number of α and β-particles emitted in the nuclear reaction $_{90}Th^{228} \rightarrow _{83}Br^{212}$ are respectively

[MLNR 1992]

[1] 4, 1   [2] 3, 7   [3] 8, 1   [4] 4, 7

Q.20 If an isotope of hydrogen has two neutrons in its atom, its atomic number and atomic mass number will respectively be **[CBSE 1992]**

[1] 2 and 1   [2] 3 and 1   [3] 1 and 1   [4] 1 and 3

Q.21 After the emission of one α-particle followed by one β-particle from the atom of $_{92}X^{238}$, the number of neutrons in the atom will be **[CBSE 1995]**

[1] 142   [2] 146   [3] 144   [4] 143

Q.22 Half life for radioactive C^{14} is 5760 years. In how many years 200 mg of C^{14} sample will be reduced to 25 mg

[1] 11520 years   [2] 23040 years   [3] 5760 years   [4] 17280 years

Q.23 $_{13}^{27}Al$ is a stable isotope, $_{13}^{29}Al$ is expected to disintegrate by **[IIT 1996; UPSEAT 2001]**

[1] α-emission   [2] β-emission   [3] Positron emission   [4] Proton emission

Q.24 The half life of ^{14}C is about **[MP PET 1996]**

[1] 12.3 years   [2] 5730 years   [3] 4.5×10^9 years   [4] 2.52×10^5 years

Q.25 Radioactive iodine is being used to diagnose the disease of

[1] Bones   [2] Kidneys   [3] Blood cancer   [4] Thyroid

Q.26 Which of the following does not take place by a-decay **[MP PMT 1996]**

[1] $_{92}U^{238} \rightarrow _{90}Th^{234}$ [2] $_{90}Th^{232} \rightarrow _{88}Ra^{228}$ [3] $_{88}Ra^{226} \rightarrow _{86}Rn^{222}$ [4] $_{83}Bi^{213} \rightarrow _{84}Po^{213}$

Q.27 Which one of the following statements is incorrect **[MP PET 1997]**

[1] Mass defect is related with binding energy

[2] Meson was discovered by Yukawa

[3] The size of the nucleus is of the order of 10^{-12}–10^{-13} cm

[4] Magnetic quantum number is a measure of orbital angular momentum of the electron

[MP PET/PMT 1998]

Q.28 In radioactive decay which one of the following moves the fastest

[1] a-particle   [2] b-particle   [3] g-rays   [4] Positron

Q.29 Which one of the following notations shows the product incorrectly **[MP PET / PMT 1998]**

[1] $_{96}^{242}Cm\,(\alpha, 2n)\,_{97}^{243}Bk$ [2] $_{5}^{10}B(\alpha,n)\,_{7}^{13}N$ [3] $_{7}^{14}N\,(n, p)\,_{6}^{14}C$ [4] $_{14}^{28}Si\,(d, n)\,_{15}^{29}P$

Q.30 In the following nuclear reaction

$N^{14} + _2He^4 \rightarrow _8O^{17} + X_1$ and $_{13}Al^{27} + _1D^2 \rightarrow _{14}Si^{28} + X_2$

$_{285}X_1$ and X_2 are respectively

[1] $_1H^1$ and $_0n^1$ [2] $_0n^1$ and $_1H^1$ [3] $_2He^4$ and $_0n^1$ [4] $_0n^1$ and $_2He^4$

Q.31 $_{95}Am^{241}$ and $_{90}Th^{234}$ belong respectively to [MP PMT 1999]

[1] 4n and 4n + 1 radioactive disintegration series

[2] 4n + 1 and 4n + 2 radioactive disintegration sereis

[3] 4n + 1 and 4n + 3 radioactive disintegration series

[4] 4n + 1 and 4n radioactive disintegration series

Q.32 In the sequence of following nuclear reactions [MP PMT 1999]

$$_{92}X^{238} \xrightarrow{-\alpha} Y \xrightarrow{-\beta} Z \xrightarrow{-\beta} L \xrightarrow{-n\alpha} {}_{84}M^{218}$$

The value of n will be

[1] 3   [2] 4   [3] 5   [4] 6

Q.33 The number of neutrons accompanying the formation of $_{54}^{139}Xe$ and $_{38}^{94}Sr$ from the absorption of a slow neutron by $_{92}^{235}U$, followed by nyclear fission is [IIT 1999]

[1] 0   [2] 2   [3] 1   [4] 3

Q.34 Sulphur -35 (34.96903 a.m.u.) emits a b-particle but no g-ray. The product is chlorine -35 (34.96885 a.m.u.) The maximum energy emitted by the b-particle is [CBSE 1999]

[1] 16.758 MeV   [2] 1.6758 MeV   [3] 0.16758 MeV   [4] 0.016758 MeV

Q.35 In the radioactive decay $_{92}X^{232} \circledR {}_{89}Y^{220}$, how many a and b-particles are ejected from X to form Y [CBSE 1999]

[1] 3a and 3β   [2] 5a and 3β   [3] 3α and 5β   [4] 5α and 5β

Q.36 The half-life of $_6C^{14}$, if its λ is 2.31 x 10^{-4}, is [CBSE 1999]

[1] 2 x 10^2 years   [2] 3 x 10^3 years   [3] 3.5 x 10^4 years   [4] 4 x 10^3 years

Q.37 $_{20}X^{40}$ and $_{21}X^{40}$ are [CPMT 1996]

[1] Isobars   [2] Isotopes   [3] Isotones   [4] Isotereomers

Q.38 1 a.m.u. is equal to

[1] $\frac{1}{12}$ of C^{-12} [2] $\frac{1}{14}$ of O^{-16} [3] 1 gm of H_2 [4] 1.66 x 10^{-23} kg

Q.39 Half-life of 10 gm of radioactive substance is 10 days. The half-life of 20 gm is [CPMT 1996]

[1] 10 days   [2] 20 days   [3] 25 days   [4] Infinite

Q.40 Isotopes are those which contain [RPMT 1997]

[1] Same number of neutrons   [2] Same physical properties

[3] Same chemical properties   [4] Different atomic mass

Q.41 The positron is dicovered by [RPMT 1997]

[1] Pauling   [2] Anderson   [3] Yukawa   [4] Segar

Q.42 Positron is [AIIMS 1997]

[1] Electron with + ve charge   [2] A helium nucleus

[3] A nucleus with two protons   [4] A nucleus with one neutron and one proton

Q.43 Which is not emitted by radioactive substance

[1] a-rays   [2] b-rays   [3] Positron   [4] Proton

Q.44 D_2O is used in

[1] Industry   [2] Nuclear reactor   [3] Medicine   [4] Insecticide

Q.45 $_{92}U^{235} + n \circledR$ fission product + neutron + 3.20 x 10^{-11} J. [CBSE 1997]

The energy undergoes fission is

[1] 12.75 x 10^8 kJ   [2] 18.60 x 10^9 kJ   [3] 8.21 x 10^7 kJ   [4] 6.55 x 10^6 kJ

Q.46 Number of neutrons in a parent nucleus X, which gives $_7N^{14}$ nucleus after two successive b emissions would be

[1] 9   [2] 8   [3] 7   [4] 6

Q.47 Which of the following atomic mass of uranium is the most radioactive   **[AFMC 1997]**

[1] 238   [2] 235   [3] 226   [4] 248

Q.48 What is the value of decay constant of a compound having half-life time $T_{1/2}$ = 2.95 days

[AFMC 1997]

[1] 2.7×10^{-5} s^{-1} [2] 2.7×10^6 s^{-1} [3] 2.7×10^{-6} s^{-1} [4] 3×10^5 x s^{-1}

Q.49 Half-life of radium is 1580 yrs. Its average life will be   **[AIIMS 1999; AFMC 1999; CPMT 1999]**

[1] 2.5×10^3 yrs   [2] 1.832×10^3 yrs   [3] 2.275×10^3 yrs   [4] 8.825×10^2 yrs

Q.50 Half-life period of a radiaoctive element is 10.6 yrs. How much time will it take in its 99% decompostion

[RPET 1999]

[1] 7046 yrs   [2] 7.046 yrs   [3] 704.6 yrs   [4] 70.4 yrs

Q.51 Ehergy required to separate neutron and proton from the nucleus is called   **[RPMT 1999]**

[1] Bond energy   [2] Nuclear energy   [3] Chemical energy   [4] Radiation energy

Q.52 Difference in $_{17}Cl^{35}$ and $_{17}Cl^{37}$ is of   **[AFMC 2000]**

[1] Atomic number   [2] Number of protons   [3] Number of neutrons   [4] Number of electrons

Q.53 When a slow neutron goes sufficiently close to a U^{235} nucleus, then the process which takes place is

[1] Fusion of U^{235} [2] Fission of U^{235} [3] Fusion of neutron   [4] First [1] and [2]

Q.54 A wood piece is 11460 years old. What is the fraction of ^{14}C activity left in the piece? (Half-life period of ^{14}C is 5730 years)   [MP PMT 2000]

[1] 0.12   [2] 0.25   [3] 0.50   [4] 0.75

Q.55 Which of the following does not contain number of neutrons equal to that of $_{18}^{40}Ar$ **[MP PMT 2000]**

[1] $_{19}^{41}K$ [2] $_{21}^{43}Sc$ [3] $_{21}^{40}Sc$ [4] $_{20}^{42}Ca$

Q.56 The half-life of $_6C^{14}$, if its decay constant is 6.31×10^{-4} is   **[CBSE PMT 2001]**

[1] 1098 yrs   [2] 109.8 yrs   [3] 10.98 yrs   [4] 1.098 yrs

Q.57 The $_{88}Ra^{226}$ is   **[AIIMS 2001]**

[1] n-mesons   [2] u-mesons   [3] Radioactive   [4] Non-radioactive

Q.58 Which of the following is used as a moderator in a nuclear reactor   **[AIIMS 2001]**

[1] D_2O [2] N_2O [3] H_2O [4] NaOH

Q.59 If half-life of a certain radioactive nucleus is 1000 s, the disintegration constant is   **[MP PET 2001]**

[1] 6.93×10^2 s^{-1} [2] 6.93×10^{-4}s   [3] 6.93×10^{-3} s^{-1} [4] 6.93×10^3 s

Q.60 Which of the following is not deflected by magnetic field   **[MP PMT 2001]**

[1] Deuteron   [2] Positron   [3] Proton   [4] Photon

Q.61 The highest binding energy per nucleon will be for   **[AIIMS 2001]**

[1] Fe   [2] H_2 [3] O_2 [4] U

Q.62 If half-life of a substance is 5 yrs, then the total amount of substance left after 15 years, when initial amount is 64 grams is   **[AIEEE 2002]**

[1] 16 grams   [2] 2 grams   [3] 32 grams   [4] 8 grams

Q.63 ^{226}Ra disintegrates at such a rate that after 3160 years only one-fourth of its original amount remains. The half-file of ^{226}Ra will be   **[MP PET 2002]**

[1] 790 yeras   [2] 3160 yeras   [3] 1580 years   [4] 6230 years

Q.64 The proper rays for radiocarbon dating are **[MP PET 2002]**

[1] UV-rays   [2] IR-rays   [3] Cosmic rays   [4] X-rays

Q.65 b-particle is emitted in radioactivity by **[AIEEE 2002]**

[1] Conversion of proton to neutron   [2] Form outermost orbit

[3] Conversion of neutron to proton   [4] b-particle is not emitted

Q.66 Which of the following are iso-electronic **[CBSE 2002]**

[1] CO_2 and NO [2] SO_2 and CO_2 [3] CN and CO [4] NO_2 and CO_2

Q.67 Which of the following does not contain material particles **[BHU 2002]**

[1] Alpha rays   [2] Beta rays   [3] Gamma rays   [4] Canal rays

Q.68 The half-life of a radioactive isotope is 3 hours. Value of its disintegration constant is **[BHU 2002]**

[1] 0.231 per hr   [2] 2.31 per hr   [3] 0.2079 per hr   [4] 2.079 per hr.

Q.69 87.5% decomposition of a radioactive substance complete in 3 hours. What is the half-life of that substance

[MP PMT 2003]

[1] 2 hours   [2] 3 hours   [3] 90 minutes   [4] 1 hours

Q.70 Radioactive isotope of hydrogen is **[MP PMT 2001; MP PET 2003]**

[1] Tritium   [2] Deuterium   [3] Para hydrogen   [4] Ortho hydrogen

Q.71 Percentage of a radioactive element decayed after 20 sec when half-life is 4 sec. **[AFMC 2003]**

[1] 92.25   [2] 96.87   [3] 50   [4] 75

Q.72 An element has half-life 1600 years. The mass left after 6400 years will be **[AFMC 2003]**

[1] 1/16   [2] 1/12   [3] 1/4   [4] 1/32

Q.73 Which can be used for carrying out nuclear reaction **[AFMC 2003]**

[1] Uranium - 238   [2] Neptunium - 239   [3] Thorium - 232   [4] Plutonium - 239

Q.74 $_{23}$Na is the more stable isotope of Na. Find out the process by which $_{11}^{24}$Na Can undergo radioactive decay

[IIT Screening 2003]

[1] β- emission   [2] a emission   [3] b$^+$ emission   [4] K electron capture

Q.75 The half-life of a radioactive isotope is three hours. If the initial mass of the isotope were 256g, the mass of it remaining undecayed after 18 hours would be **[AIEEE 2003]**

[1] 4.0 g   [2] 8.0 g   [3] 12.0 g   [4] 16.0 g

Q.76 The radionucleide $_{90}^{234}$Th undergoes two successive b-decays followed by one a-decay. The atomic number and the mass number respectively of the resulting radionucleide are **[AIEEE 2003]**

[1] 92 and 234   [2] 94 and 230   [3] 90 and 230   [4] 92 and 230

Q.77 The radioisotope, tritium ($_1^3H$) has a half-life of 12.3 yers. If the inital amount of tritium is 32 mg. How many milligrams of it would remain after 92 years **[CBSE 2003]**

[1] 8 mg   [2] 1 mg   [3] 2 mg   [4] 4 mg

Q.78 The half-life of a radioisotope is four hours. If the initial mass of the isotope was 200g, the mass remaining after 24 hours undecayed is : **[AIEEE 2004]**

[1] 4.167   [2] 2.084 g   [3] 3.125 g   [4] 1.042 g

Q.79 Consider the following nuclear reactions :

$$^{238}_{92}M \circledR \ ^x_yN + 2 \ ^4_2He \qquad ; \qquad ^x_yN \circledR \ ^A_BL + 2b^+$$

The number of neutrons in the element L is : **[AIEEE 2004]**

[1] 146   [2] 144   [3] 140   [4] 142

Q.80 Hydrogen bomb is based on the principle of **[AIEEE 2005]**

[1] natural radioactivity   [2] nuclear fission   [3] artificial radioactivity   [4] nuclear fusion

Q.81 A photon of hard gamma radiation knocks a proton out of $^{24}_{12}Mg$ nucleus to form **[AIEEE 2005]**

[1] the isobar of parent nucleus   [2] the isotope of parent nucleus

[3] the isobar of $^{23}_{11}Na$ [4] the nuclide $^{23}_{11}Na$

Q.82 In the transformation of $^{238}_{92}U$ to $^{234}_{92}U$, if one emission is an α-particle, what should be the other emission(s)

[AIEEE 2006]

[1]Two β^- and one β^+ [2] One β^- and one γ [3] One β^+ and one β^- [4] Two β^-

Q.83 A radioactive element gets spilled over the floor of a room. Its half-life period is 30 days. If the initial activity is ten times the permissible value, after how many days will it be safe to enter the room ? **[AIEEE 2007]**

[1] 10 days   [2] 100 days   [3] 1000 days   [4] 300 days

Q.84 Which of the following nuclear reactions will generate an isotope ? **[AIEEE 2006]**

[1] α -particle emission   [2] β -particle emission

[3] Neutron particle emission   [4] Positron emission

Answer Key - 3

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Ans.	3	4	3	3	1	2	4	2	4	3	1	3	3	3	2	1	2	3	1	4	4	4	2
Qus.	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Ans.	4	4	3	1	1	2	2	4	3	1	2	1	1	1	4	2	1	4	2	3	1	2	3
Qus.	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Ans.	2	3	2	2	3	1	3	1	2	4	4	4	3	3	3	3	3	1	4	1	2	1	4
Qus.	76	77	78	79	80	81	82	83	84														
Ans.	3	3	3	2	4	4	4	2	3														