CHEMISTRY

BOOKS - UNIVERSAL BOOK DEPOT 1960 CHEMISTRY (HINGLISH)

NUCLEAR CHEMISTRY

Ordinary Thinking

1. If an isotope of hydrogen has two neutrons in its atom, its atomic number and mass number will respectively be

A. 2 and 1

B. 3 and 1

C. 1 and 1

D. 1 and 3

Answer: D

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2. In the reaction $._1^2 H + ._1^3 H \rightarrow ._2^4 He + ._0^1 n$, if the binding energies of $._1^2 H$, $._1^3 H$ and $._2^4 He$ are respectively a, b and c (in MeV), then the energy (in MeV) released in this reaction is.

A. $a + b - c$

B. $c + a - b$

C. $c - a - b$

D. $a + b + c$

Answer: C

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3. Which one of the following nuclear transformation is (n,p) type ?

A. $._{3}Li^{7} + ._{1}H^{1} \rightarrow ._{4}Be^{7} + ._{0}n^{1}$

B. $._{33}As^{75} + ._{2}He^{4} \rightarrow ._{35}Br^{78} + ._{0}n^{1}$

C. $._{83}Bi^{209} + ._{1}H^{2} \rightarrow ._{84}Po^{210} + ._{0}n^{1}$

D. $._{21}Sc^{45} + ._{0}n^{1} \rightarrow ._{20}Ca^{45} + ._{1}H^{1}$

Answer: D

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4. What is X in the nuclear reaction

$._{7}N^{14} + ._{1}H^{1} \rightarrow ._{8}O^{15} + X$

A. $._{+1}e^{0}$

B. $._{0}n^{1}$

C. γ-rays

D. $._{-1} e^0$

Answer: C

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5. The positron is

A. $._{-1} e^0$

B. $._{+1} e^0$

C. $._1 H^1$

D. $._0 n^1$

Answer: B

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6. In the nuclear reaction $._{12}Mg^{24} + ._{2}He^{4} = ._{0}n^{1} +$? The product nucleus is

A. $._{13}Al^{27}$

B. $._{14}Si^{27}$

C. $._{13}Al^{28}$

D. $._{12}Mg^{25}$

Answer: B

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7. On bombarding $_{7}N^{14}$ with α-particles, the nuclei of the product formed after the release of a proton will be

A. $._{8}O^{17}$

B. $._{9}F^{18}$

C. $._{9}F^{17}$

D. $._{8}O^{18}$

Answer: A

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8. Positron has nearly the same mass as that of:

A. α-particle

B. Protons

C. Neutron

D. Electron

Answer: D

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9. Which of the following is an (n , p) reaction ?

A. $._5 C^{13} + ._1 H^1 \rightarrow ._6 C^{14}$

B. $._7 N^{14} + ._1 H^1 \rightarrow ._8 O^{15}$

C. $._{13} A,^{27} + ._0 n^1 \rightarrow ._{12} Mg^{27} + ._1 H^1$

D. $._{92} U^{235} + ._0 n^1 \rightarrow ._{54} Xe^{140} + ._{38} Sr^{93} + 3._0 n^1$

Answer: C

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10. Hydrogen and deuterium differ in:

A. Reactivity with oxygen

B. Reactivity with chlorine

C. Melting point

D. Reducing action

Answer: C

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11. Binding energy of a nucleus is.

A. Mass defect

B. Energy of protons

C. Energy of neutrons

D. Total energy of nucleons

Answer: A

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12. Deuterons when bombarded on a nuclide produce Ar_{18}^{38} and neutrons. The target is:

A. $._{17}Cl^{35}$

B. $._{19}K^{27}$

C. $._{17}Cl^{37}$

D. $._{19}K^{39}$

Answer: C

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13. A deutron contains

A. A neutron and a positron

B. A neutron and a protons

C. A neutron and two protons

D. A proton and two neutrons

Answer: B

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14. In a nuclear explosion, the energy is released in the form of

A. Kinetic energy

B. Electrical energy

C. Potential energy

D. None of these

Answer: D

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15. Which one of the following nuclear reaction is correct

A. $._{6} C^{13} + ._{1} H^{1} \rightarrow ._{7} N^{13} + \beta^{-} + v^{-}$

B. $._{11} Na^{23} + ._{1} H^{1} \rightarrow ._{10} Ne^{20} + ._{2} He^{4}$

C. $._{13} Al^{23} + ._{0} n^{1} \rightarrow ._{11} Na^{23} + e^{0}$

D. None of these

Answer: B

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16. Which of the following is the most stable?

A. Bi

B. Al

C. U

D. Pb

Answer: D

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17. Which of the following isotopes of uranium is most radioactive ?

A. 238

B. 235

C. 226

D. 248

Answer: B

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18. In nuclear reaction $._4 Be^9 + ._2 He^4 \rightarrow ._6 C^{12} + X, X$ will be

A. 4

B. 9

C. 7

D. 6

Answer: B

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19. In the nuclear fission $._1 H^2 + ._1 H^2 \rightarrow ._2 He^4$ the masses of $._1 H^2$ and $._2 he^4$ are 2.014 mu and 4.003 mu respectively. The energy released/atom of helium formed is ....MeV

A. 16.76

B. 26.38

C. 13.26

D. 23.275

Answer: D

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20. Identify the nuclear reaction that differs from the rest

A. Positron emission

B. K-capture

C. $\beta -$ decay

D. $\gamma -$ decay

Answer: D

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21. The atomic mass and atomic number of lead are 208 and 82. The atomic mass and atomic number of bismuth are 209 and 83. The $\text{neutron}/\text{proton}$ ratio in an atom

A. Higher of lead

B. Higher of bismuth

C. Same

D. None of these

Answer: A

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22. In the decay process:

$A \xrightarrow{-\alpha} B \xrightarrow{-\beta} C \xrightarrow{-\beta} D$ a)A and B are isodiaphers b)A and C are isotones c)A and C are isotopes d)B, C and D are isobars

A. X and W

B. Y and Z

C. X and Z

D. None of these

Answer: A

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23. The reaction $._5 B^8 \rightarrow ._4 Be^8 + ._1 e^0$ is due to

A. Loss of α-particles

B. Loss of $\beta -$ particles

C. Loss of positron

D. Electron loss

Answer: C

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24. Stable nuclides are those whose n/p ratio is

A. $n/p = 1$

B. $n/p = 2$

C. $n/p > 1$

D. $n/p < 1$

Answer: A

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25. In the sequence of the following nuclear reaction,

$$X_{98}^{238} \xrightarrow{-\alpha} Y \xrightarrow{-\beta} L \xrightarrow{n\alpha} ._{90} M^{218}$$

What is the value of n?

A. 3

B. 4

C. 5

D. 6

Answer: B

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26. Which of the following does not contain number of neutrons equal to that of $._{18}^{40}Ar$

A. $._{19}^{41}K$

B. $._{21}^{43}Sc$

C. $._{21}^{40}Sc$

D. $._{20}^{42}Ca$

Answer: C

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27. The symbol x in the following equation is

$$_{11}Na^{23} + {}_1H^1 \rightarrow {}_{12}Mg^{23} + x$$

A. Neutron

B. Deutron

C. $\alpha -$ particles

D. Positron

Answer: A

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28. $._6\,C^{14}$ in upper atmosphere is generated by the nuclear reaction

A. $._{7}N^{14} + ._{1}H^{1} \rightarrow ._{6}C^{14} + ._{+1}e^{0} + ._{1}H^{1}$

B. $._{7}N^{14} \rightarrow ._{6}C^{14} + ._{+1}e^{0}$

C. $._{7}N^{14} + ._{0}n^{1} \rightarrow ._{6}C^{14} + ._{1}H^{1}$

D. $._{7}N^{14} + ._{1}H^{3} + ._{0}n^{1} \rightarrow ._{6}C^{14} + ._{2}He^{4}$

Answer: C

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29. Which one of the following statement is incorrect ?

A. Mass defect is related with binding energy

B. Meson' was discovered by Yukawa

C. The size of the nucleus is of the order of $10^{-12} - 10^{-13}cm$

D. Magnetic quantum number is a measure of 'orbital angular momentum' of the electron

Answer: D

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30. The instability of a nucleus is due to

A. High proton: electron ratio

B. High proton : neutron ratio

C. Low proton : electron ratio

D. Low proton : neutron ratio

Answer: D

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31. Positron was so named by

A. Pauling

B. Anderson

C. Yukawa

D. Segar

Answer: B

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32. Formation of nucleus from its nucleons is accompanied by

A. Decrease in mass

B. Increase in mass

C. No change of mass

D. None of them

Answer: A

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33. The radioactive nuclide $._{90}^{234}Th$ shows two successive $\beta-$ decay followed by one $\alpha-$ decay. The atomic number and mass number respectively of the resulting atom is:

A. 92 and 234

B. 94 and 230

C. 90 and 230

D. 92 and 230

Answer: C

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34. For the nuclear reaction

$^{24}_{12}Mg + d \to \alpha + ?$ The missing nuclide is

A. $._{11}^{22} Na$

B. $._{11}^{23} Na$

C. $._{12}^{23} Mg$

D. $._{12}^{26} Mg$

Answer: A

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35. The binding energy of $._8 O^{16}$ is 127 MeV. Its binding energy per nucleon is

A. 0.794 MeV

B. 1.5875 MeV

C. 7.94 MeV

D. 15.875 MeV

Answer: C

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36. Which of the following is the heavist metal

A. Hg

B. Pb

C. Ra

D. U

Answer: D

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37. An element $._{96}X^{227}$ emits 4α and 5β particles to form new element Y. Then atomic number and mass number of Y are

A. 93, 211

B. 211,93

C. 212,88

D. 88,212

Answer: A

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38. Which of the following particles is emitted in the nuclear reaction: $._{13}Al^{27} + ._{2}He^{4} \rightarrow ._{14}P^{30+} \ldots . ?$ a)$._{0}n^{1}$ b)$._{-1}e^{0}$ c) $._{1}H^{1}$ d)$._{1}H^{2}$

A. $._{0}n^{1}$

B. . $_{-1}e^{0}$

C. .$_{1}H^{1}$

D. .$_{1}H^{2}$

Answer: C

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39. Electromagnetic radiation with maximum wavelengths is :

A. Ultraviolet ray

B. Radiowave

C. X-ray

D. Infrared

Answer: B

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40. In the reaction, $Po \xrightarrow{-\alpha} Pb \xrightarrow{-\beta} Bi$, if Bi belongs to group 15, to which group Po belongs?

A. 14

B. 15

C. 13

D. 16

Answer: D

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41. ${}_{Z}X^{M} + {}_{2}He^{4} \rightarrow {}_{15}P^{30} + {}_{0}n^{1}$ value of X is

A. $Z = 12, M = 27$

B. $Z = 13, M = 27$

C. $Z = 12, M = 17$

D. $Z = 13, M = 28$

Answer: B

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42. C_6^{14} is formed from N_7^{14} in the upper atmosphere by the action of the fundamental particle

A. Positron

B. Neutron

C. Electron

D. Proton

Answer: B

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43. " Positronium " is the name given to an aotm like combination formed between :

A. A positron and a proton

B. A positron and a neutron

C. A positron and α-particle

D. A positron and an electron

Answer: D

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44. Which of the following sub-atomic particles is not present in an atom

A. Neutron

B. Proton

C. Electron

D. Positron

Answer: D

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45. Nuclear reactivity of Na and Na^{+} is same because both have

A. Same electron and proton

B. Same proton and same neutron

C. Different electron and proton

D. Different proton and neutron

Answer: B

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46. The phenomenon of radioactivity is associated with a)Decay of nucleus b)Fussion of nucleus c)Emission of electrons or protons d)Rearragement in the in the extra nuclear electron

A. Binary fission

B. Nuclear fusion

C. Stable nuclei

D. Decay of nucles

Answer: D

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47. Of the following atoms, which one of the highest n/p ratio

A. Ne^{16}

B. O^{16}

C. F^{16}

D. N^{16}

Answer: D

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48. The nucleus of radioactive element possesses

A. Low binding energy

B. High binding energy

C. Zero binding energy

D. High potential energy

Answer: A

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49. The charge on positron is equal to the charge on which one of the following

A. Proton

B. Electron

C. $\alpha -$ particles

D. Neutron

Answer: A

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50. In the carbon cycle from which stars hotter than the sun obtain their energy the $._6 C^{12}$ isotope

A. Completely converted into energy

B. Regenerated at the end of the cycle

C. Combined with oxygen to form carbon monoxide

D. Broken up into its constituent protons and neutrons

Answer: B

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51. Neutrino has:

A. Charge +1, mass 1

B. Charge 0, mass 0

C. Charge -1, mass 1

D. Charge 0, mass 1

Answer: B

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52. A particle having the same charge and 200 times greater mass than that of electron is

A. Positron

B. Proton

C. Neutrino

D. Meson

Answer: D

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53. The nucleus of an atom is made up of X protons and Y neutrons. For the most stable and abundant nuclei

A. X and Y are both even

B. X and Y are both odd

C. X is even and Y is odd

D. X is odd and Y is even

Answer: A

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54. Atom A possesses higher values of packing fraction than atom B. The relative stabilities of A and B are

A. A is more stable than B

B. B is more stable than A

C. A and B both are equally stable

D. Stability does not depend on packing fraction

Answer: B

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55. The binding energy per nucleon, for nuclei with atomic mass number $A > 100$, decreases with A.

The nuclear forces are weak for heavier nuclei.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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56. Assertion : Mass number of an atom is equal to total number of nucleons present in the nucleus

Reason :Mass number defines the identity of an atom

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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57. Assertion : Nuclear forces and called short range forces.

Reason :Nuclear forces operate over very small distance i.e., 10^{-15} m or 1 fermi

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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58. Assertion : For maximum stability N/P ratio must be equal to 1

Reason : Loss of $\alpha - \beta -$ particles has no role in N/P ratio

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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59. Assertion : The neutrons are better initiators of nuclear reactions, than the protons, deutrons or α particles of the same energy.

Reason :Neutrons are uncharged particles and hence, they are not repelled by positively charged nucleus.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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60. Assertion : A nuclear binding energy per nucleon is in the order

$\cdot_4^9 Be > \cdot_3^7 Li > \cdot_2^4 He$

Reason : Binding energy per nucleon increases linearly with difference in number of neutrons and protons.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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Ordinary Thinking Radioactivity And Alpha Beta And Gamma Rays

1. What happens when $\alpha-$ particle is emitted

A. Mass number decreases by 12 unit, atomic number decreases by 4 unit

B. Mass number decreases by 4 unit, atomic number decreases by 2 unit

C. Only mass number decreases

D. Only atomic number decreases

Answer: B

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2. In a radioactive decay, an emitted electron comes from

A. Nucleus of the atom

B. Inner orbital of the atom

C. Outermost orbit of the atom

D. Orbit having principal quantum number one

Answer: A

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3. India has the world's largest deposite of thorium in the form of

A. Rutile

B. Magnesite

C. Lignite

D. Monazite

Answer: D

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4. Which is not emitted by radioactive substance ?

A. α-rays

B. β − rays

C. Positron

D. Proton

Answer: D

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5. The $._{88} Ra^{226}$ is

A. n-mesons

B. u-mesons

C. Radioactive

D. Non-radioactive

Answer: C

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6. α-Particles can be detected using

A. Thin aluminum

B. Barium sulphate

C. Zinc sulphide screen

D. Gold foil

Answer: C

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7. The compound used in enrichment of uranium for nuclear power plant is

A. U_3O_8

B. UF_6

C. $UO_2(NO_3)_2$

D. UCl_4

Answer: A

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8. $._6 C^{12}$ and $._1 T^3$ are formed in nature due to the nuclear reaction of neutron with

A. $._7 N^{14}$

B. $._6 C^{13}$

C. $._{2}He^{4}$

D. $._{3}Li^{6}$

Answer: A

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9. Alpha rays consist of a stream of

A. H^{+}

B. He^{+2}

C. Only electrons

D. Only neutrons

Answer: B

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10. An α-particle is indentical with

A. Helium nucleus

B. Hydrogen nucleus

C. Electron

D. Proton

Answer: A

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11. Which of the following does not contain material particle

A. Alpha rays

B. Beta rays

C. Gamma rays

D. Canal rays

Answer: C

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12. Which is the correct statement

A. Isotopes are always radioactive

B. $\beta -$ rays are always negatively charged particles

C. $\alpha -$ rays are always negatively charged particles

D. γ-rays can be deflected in magnetic field

Answer: B

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13. Alpha particles are ...... times heavier (approximately) than neutron

A. 2

B. 4

C. 3

D. $2\frac{1}{2}$

Answer: B

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14. Which of the following properties are different for neutral atoms of isotopes of the same element

A. Mass

B. Atomic number

C. General chemical reactions

D. Number of electrons

Answer: A

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15. Which statement is incorrect

A. $\alpha -$ rays have more penetrating power than $\beta -$ rays

B. $\alpha -$ rays have less penetrating power than $\gamma -$ rays

C. $\beta -$ rays have less penetrating power than γ-rays

D. $\beta -$ rays have more penetrating power than α-rays

Answer: A

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16. The velocity of α-rays is approximately:

A. Equal to that of the velocity of light

B. 1/10 of the velocity of light

C. 10 times more than the velocity of light

D. Uncomparable to the velocity of light

Answer: B

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17. Uranium U_{92}^{235} on bombardment with slow neutrons produces

A. Deutrons

B. Fusion reaction

C. Fission reaction

D. Endothermic reaction

Answer: C

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18. Radioactivity was discovered by

A. Henry Becqueral

B. Rutherford

C. J.J. Thomson

D. Madam Curie

Answer: A

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19. Which of the following is radioactive element

A. Sulphur

B. Polonium

C. Tellurium

D. Selenium

Answer: B

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20. Choose the element which is not radioactive

A. Cm

B. No

C. Mo

D. Md

Answer: C

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21. Which leaves no track on Wilson cloud chamber

A. Electrons

B. Protons

C. α − particles

D. Neutron

Answer: D

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22. In successive emission of β and α -particles, how many α and β -particles should be emitted for the natural (4n+1 series) conversion of ${}^{241}_{94}Pu$ to ${}^{233}_{92}U$ are

A. α, β

B. $\alpha, 2\beta$

C. $2\alpha, 3\beta$

D. $2\alpha, 2\beta$

Answer: D

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23. If by mistake some radioactive substance gets inside the human body, then form the point of view of radiation damage, the most harmful will be one which emits

A. γ-rays

B. Neutrons

C. $\beta -$ particles

D. $\alpha -$ particle

Answer: A

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24. A magnet will cause the greatest deflection of

A. γ-rays

B. $\beta -$ rays

C. $\alpha -$ rays

D. Neutrons

Answer: B

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25. Which of the following radiations is most easily stopped by air?

A. α-rays

B. $\beta -$ rays

C. γ-rays

D. X-rays

Answer: A

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26. In radioactive decay, which one of the following moves the fastest ?

A. α-particle

B. $\beta -$ particle

C. γ-rays

D. Positron

Answer: C

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27. Which of the following is not deflected by magnetic field

A. Deutrons

B. Positron

C. Proton

D. Photon

Answer: D

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28. Which of the following can be used to convert $._{7}^{14}N \text{ into } ._{8}^{17}O$

A. Deutrons

B. Protons

C. $\alpha-$ particles

D. Neutron

Answer: C

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29. Uranium ultimately decays into a stable isotope of

A. Radium

B. Carbon

C. Lead

D. Neptunium

Answer: C

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30. Electrical field is used to deflect

A. $\alpha \text{ and } \beta$ particles

B. $\alpha \text{ and } \gamma$ particles

C. $\alpha, \beta \text{ and } \gamma$ -particles

D. $\beta \text{ and } \gamma$ particles

Answer: A

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31. Cadmium rods are used for which purpose

A. Emit electrons

B. Absorb neutrons

C. Emit neutrons

D. Absorb electrons

Answer: B

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32. What is the correct order of velocity of alpha (α) and , beta (β) and gamma (γ) rays

A. $\alpha > \beta > \gamma$

B. $\alpha > \gamma\beta$

C. $\gamma > \alpha > \beta$

D. $\gamma > \beta > \alpha$

Answer: D

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33. A nuclear reaction is accompanied by loss of mass equivalent to 0.01864 amu. Energy liberated is:

A. 931 MeV

B. 186.6 MeV

C. 17.36 MeV

D. 460 MeV

Answer: C

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34. Nuclear theory of the atom was put forward by

A. Rutherford

B. Aston

C. Neils Bohr

D. J.J. Thomson

Answer: A

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35. Radioactive substances emit $\gamma - rays$, which are :

A. $+ve$ charged particle

B. $-ve$ charged particle

C. Massive particle

D. Packet of energy

Answer: D

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36. $._{88}^{228}X - 3\alpha - \beta \rightarrow Y$. The element Y is:

A. $._{82}Pb^{216}$

B. $._{82}Pb^{217}$

C. . $(83)Bi^{218}$

D. $._{83}Bi^{216}$

Answer: D

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37. Which of the following has the highest value of radioactivity

A. 1 g of Ra

B. 1 g of $RaSO_4$

C. 1 g of $RaBr_2$

D. 1 g of Ra (HPO_4)

Answer: A

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38. The γ rays are

A. High energy electromagnetic waves

B. High energy electrons

C. High energy protons

D. Low energy electrons

Answer: A

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39. The amount of energy, which is required to separate the nucleons from a nucleus is called

A. Binding energy

B. Lattice energy

C. Kinetic energy

D. None of these

Answer: A

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40. Which of the following does not characterise X-rays?

A. The radiation can ionise gases

B. It casuses ZnS to fluorescence

C. Deflected by electric and magnetic field

D. Have wavelengths shortest than ultraviolet rays

Answer: C

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41. The element californium belongs to a familt of

A. Actinide series

B. Alkali metal family

C. Alkaline earth family

D. Lantnanide series

Answer: A

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42. Highest ionising power is exhibited by

A. $\alpha -$ rays

B. $\beta -$ rays

C. $\gamma -$ rays

D. X-rays

Answer: A

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43. X-rays are produced due to

A. Bombarding of electrons on solids

B. Bombarding of α-particles on solids

C. Bombarding of γ-rays on solids

D. Bombarding of neutron on solids

Answer: A

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44. The radiations having high penetrating power and not affected by electrical and magnetic field are

A. Alpha rays

B. Beta rays

C. Gamma rays

D. Neutrons

Answer: C

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45. Calculate mass defect in the following reaction:

$H_1^2 + H_1^3 \rightarrow He_2^4 + n_0^1$

(Given: mass $H^2 = 2.014 amu$, $H^3 = 3.016$amu He= 4.004,n =1.008amu)

A. 0.018 amu

B. 0.18 amu

C. 0.0018 amu

D. 1.8 amu

Answer: A

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46. During emission of $\beta -$ particles

A. one electron increases

B. One electron decreases

C. One proton increases

D. No change

Answer: C

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47. C^{14} is radioactive. The activity and the disintegration product are

A. $\beta -$ active, $._7 N^{14}$

B. $\alpha -$ active, $._7 Be^{10}$

C. Positron active, $._5 B^{14}$

D. $\gamma -$ active , C^{14}

Answer: A

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48. Consider the following nuclear reactions

$${}^{238}_{92}M \rightarrow {}^{Y}_{X}N + 2\alpha, \ {}^{Y}_{X}N \rightarrow {}^{A}_{B}L + 2\beta$$

The number of neutrons in the element L is

A. 142

B. 144

C. 140

D. 146

Answer: C

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49. Which of the following statement about radioactivity of an element is incorrect

A. It is a nuclear property

B. It does not involve any rearrangement of electrons

C. Its rate is affected by change in temperature and/or pressure

D. It remains unaffected by the pressure of other element or elements chemically combined with it

Answer: C

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50. The compound used for the preparation of UF_6 in the enrichment of $._{92}U^{235}$ is

A. AlF_3

B. CaF_2

C. HF

D. ClF_3

Answer: D

Watch Video Solution

51. Assertion : $^{22}\_(11)Na$ emits a position giving $^{22}\_(12)Mg$

Reason : In β^+ emission neutron is transformed into proton.

Watch Video Solution

52. Assertion :- Mutation play key role in the process of evolution.

Reaosn : Mutation can change the genotypic consituent.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

Watch Video Solution

53. A beam of electrons deflects more than a beam of $\alpha - \text{particles}$ in an electric field.

Electrons possess negative charge while $\alpha - \text{particles}$ possess positive charge.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

54. Assertion : The activity of 1 g pure uranium -235 will be greater than the same amount present as U_3O_8

Reaosn : In the combined state, the activity of the radioactive element decreases

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

55. Assertion : Radioactive heavy nuclei decay by a series of $\alpha-$ and / or $\beta-$ emission, to form a stable isotope of lead

Reaosn : Radioactivity is a physical phenomenon

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

56. Assertion : Breeder reactor produces $._{94}Pu^{239}$ fissile from non-fissile uranium.

Reaosn : A breeder reactor is one that produces more fissionable nuclei than it consumes

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

57. Assertion : The activiation energies for fusion reactions are very low.

Reaosn : They require very low temperature to overcome electrostatic repulsion between the nuclei.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

58. (A) The archaeological studies are based on the radioactive decay of carbon-14 isotope.

(R) The ratio of C-14 to C-12 in the animals of plants is the same as that in the atmosphere.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

Ordinary Thinking Causes Of Radioactivity And Group Displacement Law

1. After emission of one α particle followed by one β-particle from $^{238}_{92}X$, the number of neutrons in the atom will be

A. 142

B. 146

C. 144

D. 143

Answer: D

Watch Video Solution

2. Number of neutrons i8n a parent nucleus X, which gives $._{7}^{14}N$ after two sucessive $\beta-$ emission would be:

A. 9

B. 8

C. 7

D. 6

Answer: A

Watch Video Solution

3. In the following radioactive decay, ${}_{92}X^{232} \rightarrow (89)Y^{220}$, how many α and β particles are ejected from X to form Y ?

A. $3\alpha \text{ and } 3\beta$

B. $5\alpha \text{ and } 3\beta$

C. $3\alpha \text{ and } 5\beta$

D. $5\alpha \text{ and } 5\beta$

Answer: A

Watch Video Solution

4. The radioactive decay of ${}_{35}X^{88}$ by a β-emission produces an unstable nucleus which spontaneously emits a neutron. The final product is

A. . $(37)X^{88}$

B. . ${}_{35}Y^{89}$

C. . ${}_{34}Z^{88}$

D. . ${}_{36}W^{87}$

Answer: D

Watch Video Solution

5. A nuclide of an alkaine earth metal undergoes radioactive deacy by emission of the $\alpha -$ particles in sucession. The group of the periodic tablle to which the resulting daughter element would belong to:

A. $Gr.14$

B. $Gr.16$

C. $Gr.4$

D. $Gr.6$

Answer: A

Watch Video Solution

6. $._{84}^{210}Po \rightarrow_{82}^{206} Pb + ._{2}^{4} He$ in this reaciton predict the positon of group of Po when lead is the the IVB group:

A. IIA

B. IV B

C. VI B

D. VI A

Answer: C

Watch Video Solution

7. Radioactive decay exist due to

A. Stable electronic configuration

B. Unstable electronic configuration

C. Stable nucleus

D. Unstable nucleus

Answer: D

Watch Video Solution

8. The highest binding energy per nucleon will be for

A. Fe

B. H_2

C. O_2

D. U

Answer: A

View Text Solution

9. $._{92}U^{238}$ emits $8\alpha -$ particles and $6\beta -$ particles. The n/p ratio in the product nucleus is a) $\frac{62}{41}$ b) $\frac{60}{41}$ c) $\frac{61}{42}$ d) $\frac{62}{42}$

A. 60/41

B. 61/40

C. 62/41

D. 61/42

Answer: C

Watch Video Solution

10. If U_{92}^{236} nucleus emits one α-particle, the remaining nucleus will have

A. 119 neutrons and 119 protons

B. 142 neutrons and 90 protons

C. 144 neutrons and 92 protons

D. 146 neutrons and 90 protons

Answer: B

Watch Video Solution

11. The end product of $(4n+2)$ disintegration series is a). $_{82}Pb^{204}$ b). $_{62}Pb^{208}$ c). $_{52}Pb^{208}$ d). $_{52}Pb^{209}$

A. $._{82}Pb^{208}$

B. $._{62}Pb^{206}$

C. $._{82}Pb^{207}$

D. $._{83}Bi^{209}$

Answer: B

Watch Video Solution

12. The end product of $4n$ series is a). $_{82}Pb^{208}$ b). $_{82}Pb^{207}$ c). $_{82}Pb^{209}$ d). $_{82}Pb^{204}$

A. $._{82}Pb^{208}$

B. $._{82}Pb^{207}$

C. $._{82}Pb^{209}$

D. None of the above

Answer: A

Watch Video Solution

13. $._{92}^{235}U$ belongs to $IIIB$ group of the periodic table, It loses one $\alpha-$ particle, the new element will belong to the group.

A. I B

B. I A

C. III B

D. V B

Answer: A

Watch Video Solution

14. The number of α-and β-particles emitted in the nuclear reaction, $\cdot_{90} Th^{228} \rightarrow \cdot_{83} Bi^{212}$, respectively are

A. 4 , 1

B. 3 , 7

C. 8, 1

D. 4, 7

Answer: A

Watch Video Solution

15. A radium Ra_{88}^{224} isotope, on emission of an α-particle gives rise to a new element whose mass number and atomic number will be:

A. 220 and 86

B. 225 and 87

C. 228 and 88

D. 224 and 86

Answer: A

Watch Video Solution

16. The element with atomic number 84 and mass number 218 change to other element with atomic number 84 and mass number 214. The number of α and β-particles emitted are respectively:

A. 1, 3

B. 1, 4

C. 1, 2

D. 1, 5

Answer: C

Watch Video Solution

17. An element with atomic number 84 and mass number 218 loses one $\alpha -$ particle and two $\beta -$ particles in three successive stages, the resulting element will have

A. At. No. 84 and mass number 214

B. At. No. 82 and mass number 214

C. At. No. 84 and mass number 218

D. At. No. 82 and mass number 218

Answer: A

Watch Video Solution

18. The nuclear binding energy for Ar (39.962384 amu) is : (given mass of proton and neuron are 1.007825 amu and 1.008665amu respectively)

A. 343.62 MeV

B. 0.369096 MeV

C. 931 MeV

D. None of these

Answer: A

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19. In the given reaction $._{92}U^{235} \xrightarrow{-\alpha} (A) \xrightarrow{-\beta} (B) \xrightarrow{-\beta} (C)$ isotopes are

A. A and C

B. $._{92}U^{235}$ and C

C. A and B

D. A, B and C

Answer: B

Watch Video Solution

20. The number of $\alpha\beta -$ particles emitted in the nucleus reaction $._{92}U^{238} \rightarrow ._{90}Th^{234} \rightarrow ._{91}Pa^{234}$ are respectively

A. 1 and 1

B. 1 and 2

C. 2 and 1

D. 2 and 2

Answer: A

Watch Video Solution

21. An artifical radioactive isotope gave $_{7}^{14}N$ after two successive β-particle emissions. The number of neutrons in the parent nucleus must be

A. 9

B. 14

C. 5

D. 7

Answer: A

Watch Video Solution

22. All the nuclei from the initial element to the final element constitute a series which is called

A. g-series

B. b-series

C. b-g series

D. Disintegration series

Answer: D

Watch Video Solution

23. The number of α and β-particles emitted during the transformation of $._{90}Th^{232}$ to $._{82}Pb^{208}$ are respectively

A. 4, 2

B. 2, 2

C. 8, 6

D. 6, 4

Answer: D

Watch Video Solution

24. During the transformation of $.^{b}X_{a} \rightarrow .^{d}Y_{c}$ the number of β-particles emitted is

A. $\dfrac{(b-d)}{4}$

B. $(c-a)+\dfrac{1}{2}(b-d)$

C. $(a-c)-\dfrac{1}{2}(b-d)$

D. $(b-d)+2(c-a)$

Answer: B

View Text Solution

25. The mass of helium atom is 4.0026 amu, while that of the neutron and proton are 1.0087 and 1.0078 amu respectively on the same scale. Hence, the nuclear binding energy per nucleon in the helium atom is about

A. 5 MeV

B. 12 MeV

C. 14 MeV

D. 7 MeV

Answer: D

Watch Video Solution

26. $._{72}^{108}X \xrightarrow{2\alpha} \xrightarrow{\beta} \xrightarrow{\gamma} ._{Z}^{A}X'$. Z and A are

A. 691,72

B. 172,69

C. 180,70

D. 182,68

Answer: A

View Text Solution

27. The number of neutrons in the parent nucleus which gives N^{14} on β-emission and the parent nucleus is

A. $8, C^{14}$

B. $6, C^{12}$

C. $4, C^{13}$

D. None of these

Answer: A

Watch Video Solution

28. When a radioactive element emits an electron the daughter element formed will have

A. Mass number one unit less

B. Atomic number one unit less

C. Mass number one unit more

D. Atomic number one unit more

Answer: D

Watch Video Solution

29. The disintegration of an isotope of sodium $._{11} Na^{24} \rightarrow ._{12} Mg^{24} + ._{-1} e^{0}$ shown is due to

A. The emission of $\beta -$ radiation

B. The formation of a stable nuclide

C. The fall in the neutron : proton ratio

D. None of these

Answer: A::B::C

Watch Video Solution

30. If a noble gas emits one $\alpha -$ particle then it will be shifted in group

A. 2

B. 3

C. 16

D. 17

Answer: C

Watch Video Solution

31. $Ac_{89}^{231} gives Pb_{82}^{207}$ after emission of some α and β-particles. The number of such and -particles are respectively:

A. 5, 6

B. 6, 5

C. 7, 5

D. 5, 7

Answer: B

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32. Which element is the end product of each natural radioactive series

A. Sn

B. Bi

C. Pb

D. C

Answer: C

Watch Video Solution

33. Which of the following does not take place by α-decay

A. $._{92}U^{238} \rightarrow ._{90}Th^{234}$

B. $._{90}Th^{232} \rightarrow ._{88}Ra^{238}$

C. $._{88}Ra^{226} \rightarrow ._{86}Rn^{222}$

D. $._{83}Bi^{213} \rightarrow ._{84}Po^{213}$

Answer: D

Watch Video Solution

34. Which one of the following is not correct

A. $._{3}Li^{7} + ._{1}H^{1} \rightarrow ._{4}Be^{7} + ._{0}n^{1}$

B. $._{21}Sc^{45} + ._{0}n^{1} \rightarrow ._{20}Ca^{45} + ._{0}n^{1}$

C. $._{33}As^{75} + ._{2}He^{4} \rightarrow ._{35}Br^{78} + ._{0}n^{1}$

D. $._{83}Bi^{209} + ._{1}H^{2} \rightarrow ._{84}Po^{210} + ._{0}n^{1}$

Answer: B

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35. Which one of the following notations shows the product incorrectly ?

A. $._{96}^{242} Cm(\alpha, 2n)._{97}^{243} Bk$

B. $._{5}^{10} B(\alpha, n)._{7}^{13} N$

C. $._{7}^{14} N(n, p)._{6}^{14} C$

D. $._{14}^{28} Si(d, n)._{15}^{29} P$

Answer: A

Watch Video Solution

36. $._{95} Am^{241}$ and $._{90} Th^{234}$ belongs respectively to

A. $4n + 4n + 1$ radioactive disintegration series

B. $4n + 1$ and $4n + 2$ radioactive disintegration series

C. $4n + 1$ and $4n + 3$ radioactive disintegration series

D. $4n + 1$ and $4n$ radioactive disintegration series

Answer: B

View Text Solution

37. The end product of $(4n + 1)$ radioactive disintegration series is

A. $._{83}Bi^{209}$

B. $._{84}Po^{210}$

C. $._{82}Pb^{208}$

D. $._{82}Pb^{207}$

Answer: A

View Text Solution

38. In the following nuclear reactions

$._{7}N^{14} + ._{2}He^{4} \rightarrow ._{8}O^{17} + X_1$ and $._{13}Al^{27} + ._{1}D^{2} \rightarrow ._{14}Si^{28} + X_2$

X_1 and X_2 are respectively

A. $._{1}H^{1}$ and $._{0}n^{1}$

B. $._{0}n^{1}$ and $._{1}H^{1}$

C. $._{2}He^{4}$ and $._{0}n^{1}$

D. $._{0}n^{1}$ and $._{2}he^{4}$

Answer: A

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39. What is the symbol for the nucleus remaining after $._{20}Ca^{42}$ undergoes $\beta -$ emission

A. $._{21}Ca^{42}$

B. $\cdot_{20} Sc^{42}$

C. $\cdot_{21} Sc^{42}$

D. $\cdot_{21} Sc^{41}$

Answer: C

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40. β-particle is emitted in radioactivity by

A. Conversion of proton to neutron

B. From outermost orbit

C. Conversion of neutron to proton

D. $\beta -$ particle is not emitted

Answer: C

Watch Video Solution

41. The radioactive series whose end product is $._{83}^{209}Bi$ is

A. Thorium series

B. Fourier series

C. Actinium series

D. Neptunium series

Answer: D

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42. Radioactive disintegration differs from a chemical change inbeing a)An exothermic change b)A spontaneous process c)A nuclear process d)A unimolecular first-order reaction

A. An exothermic change

B. A spontaneous process

C. A nuclear process

D. A unimolecular first order reaction

Answer: C

Watch Video Solution

43. Tritium undergoes radioactive decay giving -

A. α – particle

B. β – particle

C. Neutrons

D. None of these

Answer: B

Watch Video Solution

44. A radioactive element belongs to the group 14 of the periodic table, it undergoes $\beta -$ emission, the product obtained belongs to the following group of the periodic table

A. Group 12

B. Group 13

C. Group 15

D. Group 16

Answer: C

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45. When a radioactive element emits an alpha particle, the daughter element is placed in the periodic table

A. Two positions to the left of the parent element

B. Two positions to the right of the parent element

C. One position to the right of the parent element

D. In the same position as the parent element

Answer: A

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46. The isotope ${}_{y}A^{x}$ undergoes a series of $m\alpha$ and $n\beta$ disintegrations to form a stable isotope ${}_{y-10}B^{x-32}$. The values of m and n are

A. 6 and 8

B. 8 and 10

C. 5 and 8

D. 8 and 6

Answer: D

Watch Video Solution

47. The number of $\alpha -$ and $\beta -$ particles emitted when a radioactive element $._{90} E^{322}$ changes into $._{86} G^{220}$ will be

A. 5 and 4

B. 2 and 3

C. 3 and 2

D. 4 and 1

Answer: C

Watch Video Solution

48. Which emits β-particles ?

A. $._{1}H^{3}$

B. $._{6}C^{14}$

C. $._{19}K^{40}$

D. All

Answer: D

Watch Video Solution

49. $._{84}Pb^{219}$ is a member of actinium series. The other member of this series is

A. $._{89}Ac^{225}$

B. $._{90}Th^{232}$

C. $._{15}P^{35}$

D. $._{92}U^{235}$

Answer: D

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50. Consider the follwing nuclear reactions:

$._{92}^{238}M \rightarrow ._{y}^{x}N + 2._{2}He^{4}$

$._{y}^{x}N \rightarrow ._{B}^{A}L + 2\beta^{+}$

A. 140

B. 144

C. 142

D. 146

Answer: B

Watch Video Solution

51. A photon of hard gamma radiations knocks out a proton for $._{12}^{24}Mg$ nucleaus to from:

A. The isotope of parent nucleus

B. The isobar of parent nucleus

C. The nuclide $._{11}^{230Na}$

D. The isobar of $._{11}^{23}Na$

Answer: C

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52. Loss of β-particles is equivalent to

A. Increase of one neutron only

B. Decrease of one neutron only

C. Both (a) and(b)

D. None of these

Answer: B

Watch Video Solution

53. The activity of a radioactive nuclide is 2×10^7 disintegrations per minute (dpm). After 23.03 minutes, its activity is reduced to 2×10^6 dpm. What is the average life (in min) of this nuclide

A. 1000

B. 10

C. 1

D. 0.1

Answer: B

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54. The product p of the nuclear reaction

$._{92}^{235}U + ._{0}^{1}n \rightarrow p + ._{36}^{92}Kr + 3._{0}^{1}n$ is

A. $._{56}^{141}Sr$

B. $._{56}^{141}La$

C. $._{56}^{141}Ba$

D. $._{56}^{141}Cs$

Answer: C

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55. If $._{92}U^{235}$ assumed to decay only by emitting two α-and one β-particles, the possible product of decays is a).$_{89}Ac^{231}$ b).$_{89}Ac^{235}$ c) $._{89}Ac^{236}$ d).$_{89}Ac^{227}$

A. $._{89}^{235} Ac$

B. $._{89}^{227} Ac$

C. $._{89}^{230} Ac$

D. $._{89}^{231} Ac$

Answer: B

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56. Identify [A] and [B] in the following:

$$._{89}^{227} Ac \xrightarrow{-\beta} [A] \xrightarrow{-\alpha} [B] \xrightarrow{-\alpha} Rn$$

A. Po, Rn

B. Th, Po

C. Ra, Th

D. Th, Ra

Answer: D

Watch Video Solution

57. Nitrogen has several isotopes where atomic masses ranging from 10 to 25. Out of which $._7 N^{17}$ is radioactive and is converted into $._8 O^{17}$ by emission of

A. Alpha particle

B. Positron

C. Beta particle

D. Neutron

Answer: C

Watch Video Solution

58. Neutrons are obtained by

A. Bombardment of Ra with $\beta -$ particles

B. Bombardment of Be and α-particles

C. Radioactive disintegration of uranium

D. None of these

Answer: B

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59. Radioacity of naptunium stops, when it is converted to:

A. Bi

B. Rn

C. Th

D. Pb

Answer: A

Watch Video Solution

60. $Nd(Z = 60)$ is a member of group 3 in periodic table. An isotope of it is $\beta -$ active. The daughter nuclei will be a member of

A. Group -3

B. Group -4

C. Group -1

D. Group -2

Answer: A

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61. A deutron is bombarded on $._{8}O^{16}$ nucleus and $\alpha-$ particle is emitted. The product nucleus is.

A. $._{9}F^{18}$

B. $._{9}F^{17}$

C. $._{8}O^{17}$

D. $._{7}N^{14}$

Answer: D

Watch Video Solution

62. A radioactiv element has atomic number A and mass number M. It emits one α - particle .The atomic number and mass number of new element will be

A. $A-2, M-4$

B. $A - 2, M$

C. $A, M - 2$

D. $A - 4, M - 2$

Answer: A

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63. Starting from radium, the radioactive disintegration process terminates when the following is obtained a)radon b)lead c)uranium d)thorium

A. Lead

B. Radon

C. Radium A

D. Radium B

Answer: A

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64. The appreciable radioactivity of uranium minerals is mainly due to:

A. An uranium isotope of mass number 235

B. A thorium isotope of mass number 232

C. Actinium

D. Radium

Answer: D

Watch Video Solution

65. For the fission reaction

$$._{92}U^{235} + ._{0}n^{1} \rightarrow ._{56}Ba^{140} + ._{y}E^{x} + 2._{0}n^{1}$$

The value of x and y will be

A. $x = 93 \text{ and } y = 34$

B. $x = 92 \text{ and } y = 35$

C. $x = 89 \text{ and } y = 44$

D. $x = 94 \text{ and } y = 36$

Answer: D

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66. Statement-1 : $._{56}^{133}Ba + e^{-} \rightarrow ._{55}^{133}Cs +$ X-ray

Because

State-2 : Atomic number of daughter nuclide decreses by one unit in

K-electron capture.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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Ordinary Thinking Rate Of Decay And Half Life

1. The radioisotope , tritium $\left({}_1^3H\right)$ has a half-life of 12.3 years. If the initial amount of tritium is 32 mg , how many milligrams of it would remain after 49.2 years ?

A. 8 mg

B. 1 mg

C. 2 mg

D. 4 mg

Answer: C

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2. Wooden artifact and freshly cut tree give 7.7 and $15.4\,\text{min}^{-1}g^{-1}$ of carbon $\left(t_{\frac{1}{2}} = 5770\text{ years}\right)$ respectively. The age of the artifact is

A. 5770 years

B. $5760 \times \dfrac{15.2}{7.6}$ years

C. $5760 \times \dfrac{7.6}{15.2}$ years

D. $5760 \times (15.2 - 7.6)$ years

Answer: A

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3. The amount of radioactive $_{52}I^{123}\left(t_{1/2} = 25\right.$ minutes) left after 50 minutes will be :

A. One-half

B. One-third

C. One-fourth

D. Nothing

Answer: C

Watch Video Solution

4. The half-life of the ratio element $._{83} Bi^{210}$ is 5 days. Starting with 20 g of this isotope, the amount remaining after 15 days is

A. 10 g

B. 5 g

C. 2.5 g

D. 6.66 g

Answer: C

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5. Radium has atomic weight 226 and a half-life of 1600 Yr. The number of disintegrations produced per second from one gram are

A. 4.8×10^{10}

B. 9.2×10^{6}

C. 3.7×10^{10}

D. Zero

Answer: C

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6. A radioactive substance has $t_{1/2}$ 60 minutes. After 3 hrs, what precentage of radioactive substance will remain

A. 0.5

B. 0.75

C. 0.25

D. 0.125

Answer: D

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7. The half life period of a radioactive substance is 10 hours. How much will be left after 4 hours in 1g atom sample ?

A. 45.6×10^{23} atoms

B. 4.56×10^{23} atoms

C. 4.56×10^{24} atoms

D. 4.56×10^{25} atoms

Answer: B

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8. Disintegration constant for a radioactive substance is $0.58hr^{-1}$. If half-life period

A. 8.2 hr

B. 5.2 hr

C. 1.2 hr

D. 2.4 hr

Answer: C

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9. What is the half-life of a radioactive substance if 75% of a given amount of the substance disintegrates in 30 minutes

A. 7.5 minutes

B. 25 minutes

C. 20 minutes

D. 15 minutes

Answer: D

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10. If ^{235}U is bombarded with neutron, the atom will split into

A. $Sr+Pb$

B. $Cs+Rb$

C. $Kr+Cd$

D. $Ba+Kr$

Answer: D

Watch Video Solution

11. The half life of a radioactive element is 30 min. One sixteenth of the original quantity of element will be left after

a. 1 hr b. 16 hr c. 4 hr d. 2 hr

A. 60 minutes

B. 120 minutes

C. 70 minutes

D. 75 minutes

Answer: B

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12. Radioactivity of a radioactive element remains $1/10$ of the original radioactivity after 2.303 seconds. The half life period is

A. 2.303

B. 0.2303

C. 0.693

D. 0.0693

Answer: C

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13. Half $-$ life of a radioactive disintegration $(A \rightarrow B)$ having rate constant $231s^{-1}$ is a)$3.0 \times 10^{-2}s$ b)$3.0 \times 10^{-2}s$ c)$3.3 \times 10^{-2}s$ d) $3.3 \times 10^{-3}s$

A. $3.0 \times 10^{-2}s$

B. $3.0 \times 10^{-3}s$

C. $3.3 \times 10^{-2}s$

D. $3.3 \times 10^{-3}s$

Answer: A

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14. If $3/4$ quantity of a radioactive element disintegrates in two hours, its half life would be

A. 1 hours

B. 45 minutes

C. 30 minutes

D. 15 minutes

Answer: A

Watch Video Solution

15. 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

A. 9.0×10^{9} years

B. 13.5×10^9 years

C. $.45 \times 10^9$years

D. $4.5 \times 10^{4.5}$ years

Answer: C

View Text Solution

16. A radioactive isotope having a half life of 3 days was received after 12 days. It was found that there were 3 gm of the isotopes in the container. The initial weight of the isotope when packed was a)12 gm b)24gm c)36 gm d)48 gm

A. 12 g

B. 24 g

C. 36 g

D. 48 g

Answer: D

Watch Video Solution

17. What is the value of decay constant of a compound having half life time of 2.95 days?

A. $2.7 \times 10^{-5} s^{-1}$

B. $2.7 \times 10^{6} s^{-1}$

C. $2.9 \times 10^{-6} s^{-1}$

D. $3 \times 10^{5} s^{-1}$

Answer: C

Watch Video Solution

18. An element has half-life 1600 years. The mass left after 6400 years will be

A. $1/16$

B. $1/12$

C. $1/4$

D. $1/32$

Answer: A

Watch Video Solution

19. The C^{14} to C^{12} ratio in a wooden article is 13% that of the fresh wood. Calculate the age of the wooden article. Given that the half-life of C^{14} is 5770 years

A. 16989 years

B. 16858 years

C. 15675 years

D. 17700 years

Answer: A

Watch Video Solution

20. The radioaisotope of hydrogen has a half-life of 12.33 y. What is the age of an old bottle of wine whose $._1^3H$ radiation is 10% of that present in a new bottle of wine

A. 41y

B. 12.3 y

C. 1.233 y

D. 410 y

Answer: A

Watch Video Solution

21. Shorter the radioactive half life

A. Greater is the number of atoms disintegrating per second

B. Smaller is the decay constant

C. Less reactive is the parent nucleus

D. Greater is the mass -energy change

Answer: A

Watch Video Solution

22. Two radioactive elements X and Y have half-lives of 6 min and 15 min respectively. An experiment starts with 8 time sas many atoms of X as Y. How long it takes for the number of atoms of X left equals the number of atoms of Y left

A. 6 min

B. 12 min

C. 48 min

D. 30 min

Answer: D

View Text Solution

23. Half-life is the time in which 50% of radioactive element disintegrates. Carbon -14 disintegrates 50% in 5770 years. Find the half-life of carbon -14

A. 5770 years

B. 11540 years

C. $\sqrt{5770}$ years

D. None of the above

Answer: A

Watch Video Solution

24. The value of one mincrocurie = ... disintegrations/second

A. 3.7×10^5

B. 3.7×10^7

C. 3.7×10^4

D. 3.7×10^{10}

Answer: C

Watch Video Solution

25. A radioactive element has a half-life of 20 minutes. How much time should elapse before the element is reduced to $\frac{1}{8}th$ of the original mass

A. 40 minutes

B. 60 minutes

C. 80 minutes

D. 160 minutes

Answer: B

Watch Video Solution

26. A radioactive isotope has a half-life of 10 day. If today there are 125 g of left, what was the original mass 40 day earlier? a)600 g b)1000 g c)1250 g d)2000 g

A. 2000g

B. 600 mg

C. 1 g

D. 1.5 g

Answer: A

Watch Video Solution

27. The half-life of Co^{60} is 7 years. If one g of it decays, the amount of the substance remaining after 28 years is

A. 0.25 g

B. 0.125 g

C. 0.0625 g

D. 0.50 g

Answer: C

Watch Video Solution

28. Half-life of a radioactive substance is 120 days. After 480 days, 4 g will be reduced to

A. 2

B. 1

C. 0.5

D. 0.25

Answer: D

Watch Video Solution

29. 75% of a first-order reaction was completed in 32 minutes, when was 50% of the reaction completed ?

A. 24 minutes

B. 16 minutes

C. 8minutes

D. 4 minutes

Answer: B

Watch Video Solution

30. A sample of rock from moon contains equal number of atoms of uranium and lead $\left(t_{1/2}f \text{ or } U = 4.5 \times 10^9\right.$year). The age of the rock would be a)4.5×10^9 year b)9×10^9 year c)13.5×10^9 year d) 2.25×10^9 year

A. 9.0×10^9 years

B. 4.5×10^9 years

C. 13.5×10^9 years

D. 2.25×10^9years

Answer: B

Watch Video Solution

31. The half lives of two radioactive nuclides A and B are 1 and 2 min. respectively . Equal weights of A and B are taken separately and allowed to disintegrate for 4 min. What will be the ratio of weigths of A and B disintegrated ?

A. $1:1$

B. $5:4$

C. $1:2$

D. $1 : 3$

Answer: B

Watch Video Solution

32. If $12g$ of a sample is taken, then $6g$ of a sample decays in $1hr$.

Find the amount of sample showing decay in next hour.

A. 3g

B. 1g

C. 2g

D. 6g

Answer: A

Watch Video Solution

33. When a radioactive substances is subjected to a vacuum, the rate of disintergration per second

A. Increases considerably

B. Is not affected

C. Suffers a slight decrease

D. Increases only if the products are gaseous

Answer: B

Watch Video Solution

34. Radioactive decay is a

A. Second order reaction

B. First order reaction

C. Zero order reaction

D. Third order reaction

Answer: B

Watch Video Solution

35. If 2.0g of a radioactive isotope has a half-life of 20 hr, the half-life of 0.5 g of the same substance is

A. 20 hr

B. 80 hr

C. 5 hr

D. 10 hr

Answer: A

Watch Video Solution

36. Radioactive lead $._{82}Pb^{201}$ has a half-life of 8 hours. Starting from one milligram of this isotope, how much will remain after 24 hours

A. 1/2 mg

B. 1/3 mg

C. 1/8 mg

D. 1/4 mg

Answer: C

Watch Video Solution

37. If the amount of radioactive substance is increased three times, the number of atoms disintegrated per ubit time would :

A. Be double

B. Be triple

C. Remain one third

D. Not change

Answer: B

Watch Video Solution

38. Half life of radioactive element is 100 yrs. The time in which it disintegrate 50% of its mass will be

A. 50 yr

B. 200 yr

C. 100 yr

D. 25 yr

Answer: C

Watch Video Solution

39. The initial mass of a radioactive element is $40g$. How many grams of it would be left after 24 years if its half $-$ life period I s of 8 years ? a)2 b)5 c)10 d)20

A. 2

B. 5

C. 10

D. 20

Answer: B

Watch Video Solution

40. The half-life period of a radioactive substance is 8 years. After 16 years, the mass of the substance will reduce from starting 16.0 g to

A. 8.0 g

B. 6.0 g

C. 4.0 g

D. 2.0 g

Answer: C

Watch Video Solution

41. The half-life of $._{38}^{90}Sr$ is 20 years. If its sample having initial activity of 800 dis/min is taken, what would be its activity after 80 years

A. 500 dis/min

B. 800 dis/min

C. 1000 dis/min

D. 1600 dis/min

Answer: A

Watch Video Solution

42. 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)

A. 0.12

B. 0.25

C. 0.5

D. 0.75

Answer: B

Watch Video Solution

43. 87.5% decomposition of a radioactive substance completes in 3 hours. What is the half-life of that substance

A. 2 hours

B. 3 hours

C. 90 minutes

D. 1 hours

Answer: D

Watch Video Solution

44. The age of a specimen, t, is related to the daughter/parent ratio D/P by the equation

A. $t = \frac{1}{\lambda} \ln \frac{D}{P}$

B. $t = \frac{1}{\lambda} \ln \left(1 + \frac{P}{D}\right)$

C. $t = \frac{1}{\lambda} \ln\left(1 + \frac{D}{P}\right)$

D. $t = \frac{1}{\lambda} \ln\left(2 + \frac{P}{D}\right)$

Answer: C

Watch Video Solution

45. If N_0 and N are the number of radioactive particles at time $t = 0$ and $t = t$, then

A. $\lambda = \frac{1}{t} \log \frac{N_0}{N}$

B. $\lambda = \frac{2.303}{t} \log \frac{N}{N_0}$

C. $\lambda = \frac{t}{2.303} \log \frac{N_0}{N}$

D. $\lambda = \frac{2.303}{t} \log \frac{N_0}{N}$

Answer: D

Watch Video Solution

46. The value of disintegration constant of radioactive isotope

A. Decreases with increasing temperature

B. Decreases with increasing pressure

C. Increases with increasing pressure

D. Is independent of temperature and pressure

Answer: D

Watch Video Solution

47. The radioactivity due to $C-14$ isotope (half-life = 6000 years) of a sample of wood form an ancient tomb was found to be nearly half that of fresh wood. The bomb is there for about how many years old? a)3000 b)6000 c)9000 d)12000

A. 3000 years old

B. 6000 years old

C. 9000 years old

D. 1200 years old

Answer: B

Watch Video Solution

48. The half-life of a radioactive element is 6 months. The time taken to reduce its original concentration to its 1.16 value is

A. 1 years

B. 16 years

C. 2 years

D. 8 years

Answer: C

Watch Video Solution

49. The decay constant of a radioactive element is $3 \times 10^{-6} \text{min}^{-1}$.

Its half-life is

A. 2.31×10^{5} min

B. 2.31×10^{6} min

C. 2.31×10^{-6} min

D. 2.31×10^{-7} min

Answer: A

Watch Video Solution

50. The half life of radium (226) is 1620 years.

The time taken to convert $10g$ of radium to $1.25g$ is

a. 810 years b. 1620 years

c. 3240 years d. 4860 years

A. 810 years

B. 1620 years

C. 3240 years

D. 4860 years

Answer: D

Watch Video Solution

51. The half-life of $.^{14}C$ is about

A. 12.3 years

B. 5730 years

C. 4.5×10^9 years

D. 2.52×10^5 years

Answer: B

Watch Video Solution

52. $1.0g$ of a radioactive isotope left $125mg$ after 24 hr. The half-life period of the isotope is

a. 8 hr b. 24 hr c. 6 hr d. 4 hr

A. 8 hours

B. 24 hours

C. 6 hours

D. 4 hours

Answer: A

Watch Video Solution

53. What will be half life period of a nucleus if at the end of 4.2 days,

N $= 0.798N_0$?

A. 15 days

B. 10 days

C. 12.83 days

D. 20 days

Answer: C

Watch Video Solution

54. If half-life of a certain radioactive nucleus is 1000s. the disintegration constant is

A. $6.93 \times 10^2 s^{-1}$

B. $6.93 \times 10^{-4} s$

C. $6.93 \times 10^{-4} s^{-1}$

D. $6.93 \times 10^3 s$

Answer: C

Watch Video Solution

55. ^{226}Ra disintegrates at such a rate that after 3160 years, only one fourth of its original amount remains . The half life of ^{226}Ra will be

A. 790 years

B. 3160 years

C. 1580 years

D. 6230 years

Answer: C

Watch Video Solution

56. If the disintegration constant of an isotope is $.1237 \times 10^{-4} \text{years}^{-1}$, then its half-life period will be

A. 280 years

B. 560 years

C. 5600 years

D. 2800 years

Answer: C

View Text Solution

57. The half life period of uranium is 4.5 billion years. After 9.0 billion years, the number of moles of heliumm liberated from the following nuclear reaction will be:

$$._{92}^{238}U \rightarrow ._{90}^{234}Th + ._{2}^{4}He$$

Initially there was I mole uranium.

A. 0.75 mole

B. 1.0 mole

C. 11.2 mole

D. 22.4 mole

Answer: A

Watch Video Solution

58. Half life period of ${}_{53}I^{125}$ is 60 days. Percentage of radioactivity preent after 180 days is a).5 b).75 c).36 d).125

A. 0.25

B. $.125\ \%$

C. 0.5

D. 0.75

Answer: B

Watch Video Solution

59. The half-life of radioactive sodium is 15.0 hours. How many hours would it taken for 64 gms of sodium to decay one-eighth of its original value

A. 3

B. 15

C. 30

D. 45

Answer: D

Watch Video Solution

60. For a radioactive substance with half-life period 500 years, the time for complete decay of 100 milligram of it would be

A. 1000 years

B. 100×500 years

C. 500 years

D. Infinite time

Answer: D

Watch Video Solution

61. A radioactive sample decays to half of its initial concentration in 6.93 minutes. If it further decays another half in next 6.93 minutes, then the rate constant for the reaction is:

A. 0.10min^{-1}

B. 0.01min^{-1}

C. 1.0min^{-1}

D. 0.001min^{-1}

Answer: A

Watch Video Solution

62. Half life of radium is 1580 years. It remains 1/16 after the.....

A. 1580 years

B. 3160 years

C. 4740 years

D. 6320 years

Answer: D

Watch Video Solution

63. If halfe-life of a substance is 5 yrs, then the total amount of substance left after 15 years, when initial amount is 64 grams is

A. 16 grams

B. 2 grams

C. 32 grams

D. 8 grams

Answer: D

Watch Video Solution

64. The half-life of a radioisotope is four hours. If the initial mass of the isotope was 200g. The mass remaining after 24hours undecayed is:

A. 3.125 g

B. 2.084 g

C. 1.042 g

D. 4.167 g

Answer: A

Watch Video Solution

65. 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 ?

A. 1000 days

B. 300 days

C. 10 days

D. 100 days

Answer: D

Watch Video Solution

66. A radioactive element has a half life of one day. After three days the amount of the element left will be :

A. 1.2 of the original amount

B. 1.4 of the original amount

C. 1.8 of the original amount

D. 1/16 of the original amount

Answer: C

Watch Video Solution

67. A piece of wood was found to have ${}^{14}C/{}^{12}C$ ratio 0.7 times that in a living plant. Calculate the period (in years) when the plant died.

$(t_{\frac{1}{2}} \text{ for } C^{14} = 5760 yr)$

A. 2770 yr

B. 2966 yr

C. 2980 yr

D. 3070 yr

Answer: B

Watch Video Solution

68. If the half-life period of a first order reaction is 138.6 min, then the value of decay constant for the reaction will be $(\text{in } \min^{-1})$

A. 5miniute^{-1}

B. 0.5minute^{-1}

C. 0.05minute^{-1}

D. 0.005minute^{-1}

Answer: D

Watch Video Solution

69. The disintegration constant of radium with half-life 1600 yr is

A. $2.12 \times 10^{-4} \text{year}^{-1}$

B. $4.33 \times 10^{-4} \text{years}^{-1}$

C. $3.26 \times 10^{-3} \text{year}^{-1}$

D. $4.33 \times 10^{-12} \text{year}^{-1}$

Answer: B

Watch Video Solution

70. 10g of a radioactive substance is reduced to 1.25 g after 15 days. Its 1kg mass will reduce to 500g in

A. 500 days

B. 125 days

C. 25 days

D. 5 days

Answer: D

Watch Video Solution

71. If the half of an isotope X is 10 years , its decay contant is

A. $6.932yr^{-1}$

B. $0.6932yr^{-1}$

C. $0.06932yr^{-1}$

D. $0.006932yr^{-1}$

Answer: C

Watch Video Solution

72. A radioactive isotope has a half-life of 27 days. Starting with 4g of the isotope, what will be mass remaining after 75 days

A. 100g

B. 50g

C. 0.58 g

D. 1.58 g

Answer: C

Watch Video Solution

73. 8g of the radioactive isotope, cesium -137 were collected on February 1 and kept in a sealed tube. On July 1, it was found that only 0.25 g of it remained. So the half-life period of the isotope is

A. 37.5 days

B. 30 days

C. 23 days

D. 50 days

Answer: B

Watch Video Solution

74. A radioactive isotope decays to such a rate that after 96 min only 1/8th of the original amount remains. The value $t_{1/2}$ of this nuclide is

A. 12

B. 24

C. 32

D. 48

Answer: C

Watch Video Solution

75. The half-life period $t_{1/2}$ of a radioactive element is N years. The period of its complete decays is

A. N^2 years

B. 2N years

C. $\frac{1}{2}N^2$ years

D. Infinity

Answer: D

Watch Video Solution

76. If the disintegration constant is $6.93 \times 10^{-6} yr^{-1}$, then half-life of $._6 C^{14}$ will be

A. $10^2 yr$

B. $10^3 yr$

C. $10^4 yr$

D. $10^5 yr$

Answer: D

Watch Video Solution

77. In the case of a radioisotope , the value of $t_{1/2}$ and λ are identical in magnitude. The value is

A. 0.693

B. $(0.693)^{1/2}$

C. $1/0.693$

D. $(0.693)^2$

Answer: B

Watch Video Solution

78. 2 g of a radioactive sample having half-life of 15 days was synthesised on 1st Jan. 2009. What is the amount of the sample left behind on 1st March, 2009 (including both the days) in g?

A. 0.125 g

B. 1 g

C. 0.5 g

D. 0g

Answer: A

Watch Video Solution

79. If n_t number of radioatoms are present at time t, the following expression will be a constant

A. n_t / t

B. ln n_t / t

C. $d\ln n_t / dt$

D. $t.\ n_t$

Answer: C

View Text Solution

80. The half-life for decay of $.^{14}C$ by $\beta-$ emission is 5730 years. The fraction of $.^{14}C$ decays, in a sample that is 22,920 years old, would be

A. $1/8$

B. $1/16$

C. $7/8$

D. $15/16$

Answer: D

Watch Video Solution

81. Rate constant for a reaction is λ. Average life is representative by:

A. $1/\lambda$

B. $\ln 2/\lambda$

C. $\frac{\lambda}{\sqrt{2}}$

D. $\frac{0.693}{\lambda}$

Answer: A

Watch Video Solution

82. In which radiation mass number and atomic number will not change ?

A. α

B. β

C. γ

D. α and 2β

Answer: C

Watch Video Solution

83. $t_{1/2}$ of C^{14} isotope is 5770 years. time after which 72% of isotope left is:

A. 2740 years

B. 274 years

C. 2780 years

D. 278 years

Answer: A

Watch Video Solution

84. A radioactive substance takes 20 min to decay 25%. How much time will be taken to decay 75% :

A. 96.4 min

B. 68 min

C. 964 min

D. 680 min

Answer: A

Watch Video Solution

85. What kind of radioactive decay does not lead to the formation of a daughter nucleus that is an isobar of the parent nucleus

A. α − rays

B. β − rays

C. Positron

D. Electron capture

Answer: A

Watch Video Solution

86. Given that radioactive species decays according to the exponential law $N = N_0 e^{-\lambda t}$. The half life of the species is

A. λ

B. No

C. $\lambda / \ln 2$

D. $\ln 2 / \lambda$

Answer: D

Watch Video Solution

87. A radioactive isotope decays at such a rate that after 192 minutes only 1/16 of the original amount remains. The half life of the radioactive isotope is

A. 32min

B. 48 min

C. 12 min

D. 24 min

Answer: B

Watch Video Solution

88. Half - life for radioactive $.^{14}C$ is 5760 years. In how many years 200 mg of $.^{14}C$ will be reduced to 25 mg ?

A. 11520 years

B. 23040 years

C. 5760 years

D. 17280 years

Answer: D

Watch Video Solution

89. A certain nuclide has a half-life period of 30 minutes. If a sample containing 600 atoms is allowed to decay for 90 minutes, how many atoms will remain.

A. 200 atoms

B. 450 atoms

C. 75 atoms

D. 500 atoms

Answer: C

Watch Video Solution

90. For a reaction, the rate constant is $2.34s^{-1}$. The half-life period for the reaction is

A. 0.30 s

B. 0.60 s

C. 3.3 s

D. Date is insufficient

Answer: A

Watch Video Solution

91. The half-life of a radionuclide is 69.3 minutes. What is its average life (in minutes)

A. 100

B. 10^{-2}

C. $(69.3)^{-1}$

D. 0.693×69.3

Answer: A

View Text Solution

92. $._{11}Na^{24}$ half-life is 15 hours. On heating it will

A. Reduce

B. Remain unchanged

C. Depend on temperature

D. Become double

Answer: B

Watch Video Solution

93. A radioactive isotope has a half-life of 20 days. If 100 g of the substance is taken, the weight of the isotope remaining after 40 days is

A. 25 g

B. 2.5 g

C. 60 g

D. 40 g

Answer: A

Watch Video Solution

94. The decay of a radioactive element follows first order kinetic. Thus, a)Half-life period $= a$ constant $/ K$, where K is decay is independent of temperature b)The rate of decay is independent of temperature c)The rate can be altered by changing chemical conditions d)The element will be completely transformed into new element after expiry of two half-life period

A. Half-life period = constant/k, where k is the decay constant

B. Rate of decay is independent of temperature

C. Rate can be changed by changing chemical conditions

D. The element will be completely transformed into a new element after expiry of two half-life period

Answer: A

Watch Video Solution

95. 1.0 g radioactive sodium on decay becomes 0.25 g in 16 hours. How much tie 48 g of same radioactive sodium will need to become 3.0 g

A. 48hours

B. 32 hours

C. 20 hours

D. 16 hours

Answer: B

Watch Video Solution

96. The decay constant of Ra^{226} is $1.37 \times 10^{-11} s^{-1}$. A sample of Ra^{226} having an activity of 1.5 millicurie will contain

A. 4.08×10^{18}

B. 3.7×10^{17}

C. 2.05×10^{15}

D. 4.7×10^{10}

Answer: A

Watch Video Solution

97. The ratio of the amount of two element X and Y at radioactive equilibrium is $1:2 \times 10^{-6}$. If the half-life period of element Y is 4.9×10^{-4} days, then the half-life period of element X will be

A. 4.8×10^{-3} days

B. 245 days

C. 122.5 days

D. None of these

Answer: B

Watch Video Solution

Ordinary Thinking Artificial Transmutation

1. The age of most ancient geological formation is estimated by

A. Potassium- Argon method

B. Carbon - 14 dating method

C. Radium - Silicon method

D. Uranium -Lead method

Answer: B

Watch Video Solution

2. Carbon 14 dating method is based on the fact that

A. Carbon -14 fraction is the same in all objects

B. Carbon-14 is highly insoluble

C. Ratio of carbon -14 and carbon -12 is constant

D. All of these

Answer: C

Watch Video Solution

3. The radioactive isotope $^{60}_{27}Co$ which is used in the treatment of cancer can be made by (n,p) reaction. For this reaction the target nucleus is

A. $._{28}^{60}Ni$

B. $._{27}^{60}Co$

C. $._{28}^{59}Ni$

D. $._{27}^{59}Co$

Answer: A

Watch Video Solution

4. Which is used as moderator in nuclear reactor?

A. Cadminum

B. Uranium-235

C. Lead

D. Heavy water

Answer: D

Watch Video Solution

5. A device used for the measurement of radioactivity is

A. Mass spectrometer

B. Cyclotron

C. Nuclear reactor

D. G.M. counter

Answer: D

Watch Video Solution

6. Which of the following is used in dating archeological findings or In a method of absolute dating of fossils a radioactive element is used. It is

A. . $(2) U^{235}$

B. . $_6 C^{14}$

C. . $_6 C^{12}$

D. . $_{20} Ca^{40}$

Answer: B

Watch Video Solution

7. Artificial radioactivity was discovered by ....

A. Seaberg

B. Rutherford

C. Einstein

D. Irene Curie & Juliot

Answer: D

Watch Video Solution

8. Hydrogen bomb is based on the principle of

A. Nuclear fusion

B. Nuclear fission

C. Radioactivity

D. Fusion and fission both

Answer: B

Watch Video Solution

9. The first artificial disintegration of an atomic nucleus was achieved by

A. Geiger

B. Wilson

C. Madame curie

D. Rutherford

Answer: D

Watch Video Solution

10. Large energy released in an atomic bomb explosion is mainly due to

A. Products having a lesser mass than initial substance

B. Conversion of heavier to lighter atoms

C. Release of neutrons

D. Relase of electrons

Answer: A

Watch Video Solution

11. $._{13}Al^{28}$ when radiated by suitable projectile gives $._{15}P^{31}$ and neutron. The projectile used is

A. Proton

B. Neutron

C. Alpha particle

D. Deuteron

Answer: C

Watch Video Solution

12. The velocity of neutrons in nuclear is slowed down by

A. Heavy water

B. Ordinary water

C. Zinc rods

D. Molten caustic soda

Answer: A

Watch Video Solution

13. Hydrogen bomb is based on the principle of

A. Nuclear fission

B. Nuclear fusion

C. Nuclear explosion

D. Disintegration

Answer: B

Watch Video Solution

14. The process, ${}_1H^2 + {}_1H^3 \rightarrow {}_2He^4 + {}_0n^1$ represents the types of reaction known as

A. Nuclear fission

B. Nuclear fusion

C. Artifical disintegration

D. Transmutation of element

Answer: B

Watch Video Solution

15. The huge amount of energy which is released during atomic fission is due to

A. Loss of mass

B. Loss of electrons

C. Loss of protons

D. Loss of α-particles

Answer: A

Watch Video Solution

16. The modern basis of atomic weight is

A. Isotope $H^{1} = 1.000$

B. Oxygen $= 16.000$

C. Isotope $O^{16} = 16.000$

D. Isotope $C^{12} = 12.000$

Answer: D

Watch Video Solution

17. Name the reaction which takes place when a slow neutron beam strikes $._{92}^{235}U$ nuclei. Write the nuclear reaction involved.

A. Fusion of U^{235}

B. Fission of U^{235}

C. Fusion of neutron

D. First (a) then (b)

Answer: B

Watch Video Solution

18. Fusion bomb involves

A. Combination of lighter nuclei into bigger nucleus

B. Destruction of heavy nucleus into smaller nuclei

C. Combustion of oxygen

D. Explosion of TNT

Answer: A

Watch Video Solution

19. Which of the following is an example of nuclear fission

A. $._{1}H^{2} + ._{1}H^{2} \rightarrow ._{2}He^{4} + \gamma$

B. A + B $\rightarrow C +$ energy

C. $._{92}U^{235} + ._{0}n^{1} \rightarrow ._{56}Ba^{141} + ._{36}Ke^{92} + 3._{0}n^{1} +$ energy

D. $._{13}Al^{27} + ._{2}He^{4} \rightarrow ._{15}P^{30} + ._{0}n^{1}$

Answer: C

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20. If radium and chlorine combine to form radium chloride the compound is

A. No longer radioactive

B. Twice as radioactive as radium

C. Half as radioactive as radium

D. Thrice as radioactive as radium

Answer: D

Watch Video Solution

21. When a radioactive substances is subjected to a vacuum, the rate of disintergration per second

A. Increases considerably

B. Increases only if the products are gaseous

C. Is not affected

D. Suffers a slight decrease

Answer: C

Watch Video Solution

22. A possible material for use in nuclear reactors is

A. Thorium

B. Zirconium

C. Beryllium

D. Plutonium

Answer: D

Watch Video Solution

23. $C - 14$ is used in carbon dating of dead objects because

A. Its half-life is 10^3 years

B. Its half-life is 10^4 years

C. It is found in nature abundantly and in definite ratio

D. It is found in dead animals abundantly

Answer: C

Watch Video Solution

24. Which is least effective for artificial transmutatio

A. Deuterons

B. Neutrons

C. α-particles

D. Protons

Answer: C

Watch Video Solution

25. A radio isotope will not emit

A. Gamma and alpha rays simultaneously

B. Gamma rays only

C. Alpha and beta rays simultaneously

D. Beta and gamma rays simultaneously

Answer: B::C

Watch Video Solution

26. In a nuclear reactor, chain reaction is controlled by introducing

A. Iron rod

B. Cadmium rod

C. Graphite rod

D. Platinum rod

Answer: B

Watch Video Solution

27. In a chain reaction uranium atom gets fissioned forming two different material. The total weight of these put together is a)More than the weight of parent uranium atom b)Less than the weight of parent uranium atoms c)More of less depends upon experimental conditions d)Neither more nor less

A. More than the weight of parent uranium atom

B. Less than the weight of parent uranium atom

C. More or less depends upon experimental conditions

D. Neither more nor less

Answer: B

Watch Video Solution

28. Artificial elements have been prepared by bombardment reactions in high energy accelerators. What is the mass number of the element X produced in the following nuclear reaction $._{95}^{249}Cf + ._{7}^{15}N \rightarrow ._{105}X + 4._{0}^{1}n$

A. 261

B. 264

C. 260

D. 257

Answer: C

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29. Equation $._{17}Cl^{37} + ._{1}H^{2} \rightarrow ._{18}Ar^{38} + ._{0}n^{1}$ is

A. Nuclear fission

B. Nuclear fusion

C. Transformation of chlorine

D. Systhesis of argon

Answer: C

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30. Which of the following is an example of nuclear fusion

A. $._1 H^2 + ._1 H^2 \rightarrow ._2 He^4 +$ energy

B. $._{92} U^{235} + ._0 n^1 \rightarrow ._{56} Ba^{141} + ._{36} Kr^{92} + 3._0 n^1 +$ energy

C. $._{13} Al^{27} + ._1 H^1 \rightarrow ._{12} Mg^{24} + ._2 He^4$

D. None of these

Answer: A

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31. For artificial transmutation of nuclei, the most effective one is

A. Proton

B. Deuteron

C. Helium nuclei

D. Neutron

Answer: D

Watch Video Solution

32. The carbon dating is based on

A. $._{6}^{15}C$

B. $._{6}^{14}C$

C. $._{6}^{13}C$

D. $._{6}^{11}C$

Answer: B

Watch Video Solution

33. Which one of the following particles is used to bombard $_{13}Al^{27}$ to give $_{15}P^{30}$ and a neutron?

A. Neutron

B. α-particle

C. Proton

D. Deuteron

Answer: B

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34. n atomic reacotrs, graphite is used as a

A. Lubricant

B. Moderator to show down neutrons

C. Fuel

D. Liner of the reactor

Answer: B

Watch Video Solution

35. The unit for radioactive constant is a) time b)time $mol^{-1}c)$ time^(-1)$d)$mol time^(-1)`

A. Time^{-1}

B. Time

C. Mole - time^{-1}

D. Time - mole^{-1}

Answer: A

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36. Radioactive idoine is being used to diagnose the disease of

A. Bones

B. Kidneys

C. Blood cancer

D. Thyroid

Answer: D

Watch Video Solution

37. By which law, energy produced in nuclear reaction is given

A. Graham's law

B. Charle's law

C. Gas Lussac's Law

D. Einstein's law

Answer: D

Watch Video Solution

38. Radioactive carbon dating was discovered by

A. W.F. Libby

B. G.N. Lewis

C. J.Willard Gibbs

D. W.Nernst

Answer: A

Watch Video Solution

39. The nucler reacion,

$._{29}^{63}Cu + ._{2}^{4}He \rightarrow ._{17}^{37}Cl + 14._{1}^{1}H + 16._{0}^{1}n$ represents:

A. Spallation reaction

B. Fusion reaction

C. Fission reaction

D. Chain reaction

Answer: A

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40. The proper rays for radio carbon dating are

A. UV-rays

B. IR-rays

C. Cosmic rays

D. X-rays

Answer: C

Watch Video Solution

41. The reaction, $._{13}^{27}Al + ._{2}^{4}He \rightarrow ._{14}^{30}S + ._{1}^{1}H$:

A. Nuclear fusion

B. Nuclear fission

C. Chemical reaction

D. Transmutation

Answer: D

Watch Video Solution

42. The amount of energy, which is required to separate the nucleons from a nucleus is called

A. Binding energy

B. Nuclear energy

C. Chemical energy

D. Radiation energy

Answer: A

Watch Video Solution

43. In the transormation fo $._{992}^{238}U$ to $._{92}^{234}U$, if one emission is an $\alpha -$ particle, what should be the other emission(s)?

A. Two β^-

B. Two $\beta^- \quad \text{and} \quad \text{one} \quad \beta^+$

C. One $\beta^- \quad \text{and} \quad \text{one} \quad \gamma$

D. One $\beta^+ \quad \text{and} \quad \text{one} \quad \beta^-$

Answer: A

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44. To determine the masses of the isotopes of an element which of the following techniques is useful

A. The acceleration of charged atoms by an electric field and their subsequent deflection by a variable magnetic field

B. The spectroscopic examination of the light emitted by vaporised elements subjected to electric discharge

C. The photographing of the diffraction patterns which arise when X-rays are passed through crystals

D. The bombardment of metal foil with alpha particles

Answer: A

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45. If two light nuclei are fused together in nuclear reaction, the average energy per nucleon a)Increases b)Decreases c)Cannot be determined d)Remains same

A. Increases

B. Cannot be determined

C. Remains same

D. Decrease

Answer: D

Watch Video Solution

46. A radioactive element resembling iodine in properties is

A. Astatine

B. Lead

C. Radium

D. Thorium

Answer: A

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47. When nuclear energy is intended to be harnessed for generation of electricity, potentially destructive neutron released in a nuclear reactor are absorbed by

A. Long rods of Cd

B. Heavy water

C. Cubical blocks of steel

D. Both (a) and (c)

Answer: A

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48. India conducted an underground nuclear test at

A. Tarapur

B. Narora

C. Pokhran

D. Pushkar

Answer: C

Watch Video Solution

49. Which of the following cannot be accelerated

A. α − particle

B. β − particle

C. Protons

D. Neutron

Answer: A

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50. What is the packing fraction of $^{56}_{26}Fe$?

A. -14.167

B. 173.90

C. -14.187

D. -73.90

Answer: A

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51. Match List I and List II and choose right one by using code given in list

List I (Nuclear reactor Component)		**List II** (Used substance)	
1.	Moderator	(A)	Uranium
2.	Control rods	(B)	Graphite
3.	Fuel rods	(C)	Boron
4.	Coolent	(D)	Lead
		(E)	Sodium

A. $\begin{matrix} 1 & 2 & 3 & 4 \\ B & A & C & E \end{matrix}$

B. $\begin{matrix} 1 & 2 & 3 & 4 \\ B & C & A & E \end{matrix}$

C. $\begin{matrix} 1 & 2 & 3 & 4 \\ C & B & A & E \end{matrix}$

D. $\begin{matrix} 1 & 2 & 3 & 4 \\ C & D & A & B \end{matrix}$

Answer: B

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52. The equation $._3 Li^6 + ._1 H^2 \rightarrow 2._2 He^4 +$ energy represents

A. Synthesis of helium

B. Transmutation of element

C. Fusion reaction

D. Nuclear fission

Answer: C

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53. Which radioactive carbon has been helpful in understanding the mechanism of photosynthesis in plants

A. $._6 C^{14}$

B. $._6 C^{13}$

C. $._6 C^{12}$

D. $._6 C^{15}$

Answer: A

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54. Who observed that when the nucleus of uranium atom was bombarded with fast moving neutrons, it becomes so unstable that it is immediately broken into two nuclei of nearly equal mass besides other fragments

A. J.J. Thomson

B. Chadwick

C. Einstein

D. Hahn and Strassmann

Answer: D

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55. Liquid sodim finds use in nuclear reactors. Its function is

A. To collect the reaction products

B. To act as a heat exchange or coolant

C. To absorb the neutrons in order to control the chain reaction

D. To act as a moderator which slows down the neutrons

Answer: B

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56. In a fission reaction the nucleus of an element

A. Loses only some elementary nuclear particles from another nuclear

B. Captures some elementary nuclear particles from another nucleus

C. Breaks up into several smaller nuclei

D. Breaks up into two smaller nuclei with the loss of some elementary nuclear particles

Answer: D

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57. Emission is caused by the transformation of one neutron into a proton. This results in the formation of a new element having

A. Same nuclear charge

B. Very lower nuclear charge

C. Nuclear charge higher by one unit

D. Nuclear charge lower by one unit

Answer: C

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58. Assertion : Nuclear fission is always accompanied by release of energy

Reason : Nuclear fission is a chain process

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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59. Assertion : Protons are more effective than neutrons of equal energy in causing artifical disintegration of atoms.

Reason : Neutrons are neutral they penetrate the nucleus.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true

Answer: D

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Ordinary Thinking Isotopes Isotones And Nuclear Isomers

1. Successive emission of an α-particle and two β-particles by an atom of an element result in the formation of its

A. Isobar

B. Isomorph

C. Isotope

D. Isome

Answer: C

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2. Emission of a β - particle by a nuclide results in the formation ________ of the element.

A. Isotope

B. Isomer

C. Isomorph

D. Isobar

Answer: D

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3. Isotopes of same elemeents have the same number of

A. Protons

B. Neutrons

C. Deutrons

D. None

Answer: A

Watch Video Solution

4. Average atomic mass of chlorine is 35.5 then the correct naturally occuring molar ratio of $^{35}Cl \& ^{37}Cl$ is

A. $1:3$

B. $3:1$

C. $1:1$

D. $1:4$

Answer: B

Watch Video Solution

5. In treatment of cancer, which of the following is used?

A. $._{53} I^{131}$

B. $._{15} P^{32}$

C. $._{27} Co^{60}$

D. $-(1)H^{2}$

Answer: C

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6. $O-18$ isotope of oxygen will have

A. 18 protons

B. 9 protons and 9 neutrons

C. 8 neutrons and 10 protons

D. 10 neutrons and 8 protons

Answer: D

Watch Video Solution

7. Atomic weight of the isotope of hydrogen which contains 2 neutrons in the nucleus would be

A. 2

B. 3

C. 1

D. 4

Answer: B

Watch Video Solution

8. Isotopes differ in

A. The number of protons

B. The number of neutrons

C. The number of protons and neutrons both

D. None of these

Answer: B

Watch Video Solution

9. An isotope of 'parent' is produced, when its nucleus loses

A. One α − particle

B. One β − particle

C. One α and two β-particles

D. One β and two α − particles

Answer: C

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10. $._{18}Ar^{40}, ._{20}Ca^{40}$ and $._{19}K^{40}$ are

A. Isomers

B. Isotopes

C. Isobars

D. Isotones

Answer: C

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11. The atoms of same element having same chemical properties but different masses are called

A. Isothermals

B. Isotopes

C. Isentropus

D. Elementary particles

Answer: B

Watch Video Solution

12. Do isobars have the same number of neutrons?

A. Protons

B. Neutrons

C. Protons and neutrons

D. Nucleons

Answer: c

Watch Video Solution

13. The radioactive isotope of hydrogen is

A. Tritium

B. Deuterium

C. Para hydrogen

D. Ortho hydrogen

Answer: A

Watch Video Solution

14. Isotopes were discovered by

A. Aston

B. Soddy

C. Thomson

D. Mullikan

Answer: B

Watch Video Solution

15. Difference in $._{17}Cl^{35}$ and $._{17}Cl^{37}$ is of

A. Atomic number

B. Number of protons

C. Number of neutrons

D. Number of electrons

Answer: C

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16. Match the list I and list II and pick the correct matching from the codes given below

List I (Atomic/Molecular Species)	List II (Corresponding pairs)
A. Isotope	1. $^{228}Ra_{88}$ & $^{228}Ac_{89}$
B. Isobar	2. $^{39}Ar_{18}$ & $^{40}K_{19}$
C. Isotone	3. $^{2}H_{1}$ & $^{3}H_{1}$
D. Isosters	4. $^{235}U_{92}$ & $^{231}Th_{90}$
E. Isodiaphers	5. CO_2 & N_2O

A. $A-2, B-1, C-4, D-5, E-3$

B. $A-2, B-5, C-1, D-4, E-3$

C. $A-3, B-1, C-2, D-5, E-4$

D. $A-5, B-4, C-1, D-2, E-3$

Answer: C

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17. In which one of the following pairs, the two species are both isoelectronic and isotopic ? (At. Numbers : Ca = 20, Ar = 18, K = 19, Mg = 12, Fe = 26, Na = 11)

A. $.^{40}Ca^{2+}$ and $.^{40}Ar$

B. $.^{39}K^{+}$ and $.^{40}K^{+}$

C. $.^{24}Mg^{2+}$ and $.^{25}Mg$

D. $.^{23}Na$ and $.^{24}Na^{+}$

Answer: B

Watch Video Solution

18. Which of the following is an isotonic pair

A. $._{19}^{40}K, ._{20}^{40}Ca$

B. $._{19}^{39}K, ._{20}^{40}Ca$

C. $._{18}^{33}Ar, ._{18}^{40}Ar$

D. $._{18}^{40}Ar, ._{20}{}^{40}Ca$

Answer: B

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19. An isotope of oxygen has mass number 18. Other isotopes of oxygen will have the same

A. Mass number

B. Atomic weight

C. Number of neutrons

D. Number of protons

Answer: D

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20. Positron emission results from the transformation of one nuclear proton into neutron. The isotope thus produced possesses

A. Same mass number

B. Higher nuclear charge

C. Intense radioactivity

D. No radioactivity

Answer: A

View Text Solution

21. The symbol of an isotope is $._{32}X^{65}$, this reveals that

A. It atomic number is 32 and atomic weight is 65

B. Its atomic number is 65

C. It has 65 electrons

D. It has 32 neutrons

Answer: A

View Text Solution

22. Which radioactive isotope is used to detect tumours?

A. $.^{60}Co$

B. $.^{32}F$

C. $.^{131}I$

D. $.^{14}C$

Answer: C

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23. Isotope of uranium used in atomic bomb is

A. $._{92}^{237}U$

B. $._{92}^{238}U$

C. $._{92}^{239}U$

D. $._{92}^{235}U$

Answer: B

View Text Solution

24. $._{6}^{13}C$ and $._{7}^{14}N$ are the

A. Isotopes

B. Isotones

C. Isobars

D. Isosteres

Answer: B

View Text Solution

25. Which of the following pairs are isotopes

A. $._{1}^{2}H^{+}$ and $._{1}^{3}H$

B. $._{1}^{3}H$ and $._{2}^{4}H^{-}$

C. $._2^3 He$ and $._2^4 He$

D. $._6^{12} C$ and $._7^{14} N^+$

Answer: d

Watch Video Solution

26. Which of the following nuclear reactions will generate an isotope ?

A. Neutron particle emission

B. Positron emission

C. $\alpha -$ particle emission

D. $\beta -$ particle emission

Answer: A

Watch Video Solution

27. Which among the following isotope is not found in natural uranium

A. $._{92}U^{234}$

B. $._{92}U^{235}$

C. $._{92}U^{238}$

D. $._{92}U^{239}$

Answer: D

View Text Solution

28. Which of the following statement is false

A. In chlorine gas, the ratio of Cl^{35} and Cl^{37} is $1:3$

B. The hydrogen bomb is based on the principle of nuclear fusion

C. The atom bomb is based on the principle of nuclear fission

D. The penetrating power of a proton is less than that of an electron

Answer: A

View Text Solution

29. Nuclides

A. Have specific atomic number

B. Have same number of protons

C. Have specific atomic number and mass numbers

D. Are isotopes

Answer: D

View Text Solution

30. Which isotope on bombardment with α-particles will give $._8 O^{17}$ and $._1 H^1$

A. $._8 O^{16}$

B. $._7 N^{14}$

C. $._7 N^{15}$

D. $._6 C^{14}$

Answer: B

View Text Solution

31. Radioactive isotopes that have an excessive neutron/proton ratio generally exhibit

A. e^- emission

B. $._{2}He^{4}$ emission

C. e^{+} emission

D. K-electron capture

Answer: A

View Text Solution

32. The atomic number of bromine is 35 and its atomic weight is 79. Two isotopes of bromine are present in equal amounts. Which of the following statement represents the correct number of neutrons

A. $\begin{matrix} \text{First isotope} & \text{second isotope} \\ 34 & 36 \end{matrix}$

B. $\begin{matrix} \text{First isotope} & \text{second isotope} \\ 44 & 46 \end{matrix}$

C. $\begin{matrix} \text{First isotope} & \text{second isotope} \\ 45 & 47 \end{matrix}$

D. $\begin{matrix} \text{First isotope} & \text{second isotope} \\ 79 & 81 \end{matrix}$

Answer: B

View Text Solution

33. Ordinary oxygen contains.

A. Only $O-16$ isotopes

B. Only $O-17$ isotopes

C. A mixture of $O-16 \text{ and } O-18$ isotopes

D. A mixture of $O-16, O=17 \text{ and } O-18$ isotpes

Answer: D

Watch Video Solution

34. Assertion: $._1 H^1, ._1 H^2 \text{ and } ._1 H^3$ are isotopes of hydrogen.

Reason : Nuclides of the same element of different mass numbers are called isotopes of that element

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanantion of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true

Answer: A

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Critical Thinking Objective Question

1. $U^{235} + n^{1} \rightarrow$ fission product + neutron + 3.2 $\times 10^{-11} j$. The energy released , when 1g of u^{235} finally undergoes fission , is

A. $12.75 \times 10^{8} kJ$

B. $18.60 \times 10^{9} kJ$

C. $8.21 \times 10^{7} kJ$

D. $6.55 \times 10^{6} kJ$

Answer: C

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2. The half life of ${}_{6}C^{14}$, if decay constant 6.31×10^{-4} is

A. 1098 yr

B. $109.8 yr$

C. $10.98 yr$

D. $1.098 yr$

Answer: A

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3. half life of radium is 1580 years. Its average life will be

A. $2.5 \times 10^3 yr$

B. $1.832 \times 10^3 yr$

C. $2.275 \times 10^3 yr$

D. $8.825 \times 10^2 yr$

Answer: C

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4. The half-life of a radioactive isotope is 3 hours. The value of its disintegration constant is

A. 0.231 per hr

B. 2.31 per hr

C. 0.2079 per hr

D. 2.079 per hr

Answer: A

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5. A radioactive element with half-life 6.5 hr has 48×10^{19} atoms. Number of atoms left after 26 hr

A. 24×10^{19}

B. 12×10^{19}

C. 3×10^{19}

D. 6×10^{19}

Answer: C

View Text Solution

6. Percentage of a radioactive element decayed after 20 s when half-life is 4 s

A. 92.25

B. 96.87

C. 50

D. 75

Answer: B

View Text Solution

7. Which metal Aprons are worn by radiographer to protect him from radiation

A. Mercury coated apron

B. Lead apron

C. Copper apron

D. Aluminimised apron

Answer: B

View Text Solution

8. The missing particle in the reaction, $._{92}^{235}U + ._0^1n \rightarrow ._{56}Ba^{146} + \ldots + 3_0^1n$ is

A. $._{32}^{87}Ge$

B. $._{35}^{89}Br$

C. $._{36}^{87}Kr$

D. $._{23}^{86}Br$

Answer: C

View Text Solution

9. Sulphur 35(34,96903 amu) emits a $\beta -$ particles but no γ-rays. The product is c hlorine $-35\ (34,\ 96885$ amu),. The maximum energy carried by $\beta -$ particle is:

A. 0.016767 MeV

B. 1.6758 MeV

C. 0.16758 MeV

D. 16.758 MeV

Answer: C

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10. Number of α- particles emitted per second by a radioactive element falls to 1//32 of its original value in 50 days. The half-life-period of this element is

A. 5 days

B. 15 days

C. 10 days

D. 20 days

Answer: C

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11. The half-life of 1 g of radioactive sample is 9 hour. The radioactive decay obeys first order kinetics. The time required for the original sample to reduce to 0.2 g is

A. 15.6 hours

B. 156 hours

C. 20.9 hours

D. 2.09 hours

Answer: C

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12. A woord specimen from an archeological centre shows a $._6^{14}C$ activity of 5.0 counts/min/gm of carbon. What is the age of the specimen ($t_{1/2}$ for $._6^{14}C$ is 5000 years) and a freshly cut wood gives 15 counts/min/g of carbon

A. 5.78×10^4 years

B. 9.85×10^4 years

C. 7.85×10^3 years

D. 0.85×10^4 years

Answer: C

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13. The activity of carbon-14 in a piece of ancient wood is only 12.5 % . If the half life period of carbon-14 is 5760 years, the age of the piece of wood will be

A. 17.281×10^2 years

B. 172.81×10^2 years

C. 1.7281×10^2 years

D. 1728.1×10^2 years

Answer: B

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14. The radium and uranium atoms in a sample of uranium mineral are in the ratio of 12.8×10^6. If half life period of radium is 1620 years , the half life period of uranium will be

A. 45.3×10^9 years

B. 45.3×10^{10} years

C. 4.53×10^9 years

D. 4.53×10^6 years

Answer: C

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15. A radioactive nuclide X decays at the rate of 1.00×10^5 disintegration $S^{-1}g^{-1}$. Radium decays at the rate of 3.70×10^{10}

disintegration $s^{-1}g^{-1}$. The activity of X in millicurie $g^{-1}(mcig^{-1})$

is

A. 0.027

B. 0.270×10^{-5}

C. 0.0027

D. 0.00027

Answer: B

View Text Solution

16. Which one of the following statement is not correct

A. $._{6}^{14}C$ is a non-radioactive isotope of carbon

B. $._{27}^{6}Co$ is an unstable radioisotope of cobalt

C. BF_3 is a Lewis acid

D. CN^- is a very strong ligand

Answer: A

View Text Solution

17. The half-life of a radioactive isotope is 3 hour. IF the initial mass of isotope were $256g$ the mass of it remaining undercayed after $18hr$ is:

A. $4.0g$

B. $8.0g$

C. $12.0g$

D. $16.0g$

Answer: A

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18. A radioactive sample has a half life 1500 years. A sealed tube conataining 1g of the sample will contain after 3000 years,

A. 1 g of the sample

B. 0.5 g of the sample

C. 0.25 g of the sample

D. 0.00 g of the sample

Answer: C

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19. 8 grams of a radioactive substance is reduced to 0.5 g after 1 hour . The $t_{1/2}$ of the radioactive substance is

A. 15 min

B. 30 min

C. 45 min

D. 10 min

Answer: A

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20. $\frac{15}{16}th$ of a radioactive sample decays in 40 days. Half-life of the sample is

A. 100 days

B. 10 days

C. 1 day

D. $\log_e 2$ days

Answer: B

View Text Solution

21. Oxygen contains 90% of O^{16} and 10% of O^{18}. Its atomic mass is

A. 17.4

B. 16.2

C. 16.5

D. 17

Answer: B

View Text Solution

22. A first order reaction is half completed in 45 minutes. How long does it need 99.9% of the reaction to be completed

A. 5 hours

B. 7.5 hours

C. 10 hours

D. 20 hours

Answer: B

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23. The half life period of Pb^{210} is 22 years. If $2g$ of Pb^{210} is taken, then after 11 years the amount of Pb^{210} will be present is

A. 1.414 g

B. 2.428 g

C. 3.442 g

D. 4/456 g

Answer: A

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24. Consider an $\alpha -$ particle just in contact with a $._{92}U^{238}$ nucleus. Calculate the coulombic repulsion energy (i.e., the height of the coulombic barrier between U^{238} and alpha particle) assuming that the distance between them is equal to the sum of their radii

A. $23.851 \times 10^4 eV$

B. $26.147738 \times 10^4 eV$

C. $25.3522 \times 10^4 eV$

D. $20.2254 \times 10^4 eV$

Answer: B

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25. What is the half -life of a radioactive susbtance if 87.5% of any given amount of the substance disintegrates in 40 minutes

A. 160 min

B. 10 min

C. 20 min

D. 13 min 20s

Answer: D

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26. How many alpha particles are emitted per second by 1 microgram of radium

A. $3.62 \times 10^4 / s$

B. $0.362 \times 10^4 / s$

C. $362 \times 10^4 / s$

D. $36.2 \times 10^4 / s$

Answer: A

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27. If 1 microgram of radium has disintegrated for 500 years, how many alpha particles will be emitted per second

A. $2.92 \times 10^4 / s$

B. $292 \times 10^4 / s$

C. $0.292 \times 10^4 / s$

D. $29.2 \times 10^4 / s$

Answer: A

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Jee Section Only One Choice Correct Answer

1. If uranium (mass number 238 and atomic number 92) emits an $\alpha -$ paticle, the produc has mass number and atomic number

A. 236 and 92

B. 234 and 90

C. 238 and 90

D. 236 and 90

Answer: B

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2. Elements having different nuclear charge but the same mass number are called

A. Isotopes

B. Isobars

C. Isomers

D. Isotones

Answer: B

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3. The radiations from a naturally ocuurring radio element, as seen after deflection in a magnetic field in one direction, are

A. Definitely α-rays

B. Definitely $\beta -$ rays

C. Both α and β-rays

D. Either α or $\beta -$ rays

Answer: D

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4. During a beta decay

A. An atomic electron is ejected

B. An electron which is already present with in the nucleus is ejected

C. A neutron in the nucleus decays emitting an electron

D. A part of binding of the nucleus is converted into an electron

Answer: C

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5. The half $-$ life periof of a radioactive element is 140 days. After 560 days, one gram of the element will reduce to

A. $\frac{1}{2}g$

B. $\frac{1}{4}g$

C. $\frac{1}{8}g$

D. $\frac{1}{16}g$

Answer: D

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6. The sum of the number of neutrons and proton in the isotope of hydrogen is

A. 6

B. 5

C. 4

D. 3

Answer: D

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7. The reaction which disintegrates neutron is or neutron is emitted (which completes first):

A. $._{96} Am^{240} + ._{2} He^{4} \rightarrow ._{97} Bk^{244} + ._{+1} e^{0}$

B. $._{15} P^{30} \rightarrow ._{14} Si^{30} + ._{1} e^{0}$

C. $._{6} C^{12} + ._{1} H^{1} \rightarrow ._{7} N^{13}$

D. $._{13} Al^{27} + ._{2} He^{4} \rightarrow ._{15} P^{30}$

Answer: D

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8. A freshly prepared radioactive source of half-life $2h$ emits radiation of intensity which is 64 times the permissible safe level. The minimum time after which it would be possible to work safely with this source is

A. 6 hours

B. 12 hours

C. 24 hours

D. 128 hours

Answer: B

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9. The triad of nuclei that is isotonic is

A. $._6 C^{14}, ._7 N^{15}, ._9 F^{17}$

B. $._6 C^{12}, ._7 N^{14}, ._9 F^{19}$

C. $._6 C^{14}, ._7 N^{14}, ._9 F^{17}$

D. $._6 C^{14}, ._7 N^{14}, ._9 F^{19}$

Answer: A

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10. The decay constant of a radioactive sample is $'\lambda'$. The half-life and mean life of the sample are respectively a) $\frac{1}{\lambda}, \frac{\text{in2}}{\lambda}$ b) $\frac{\text{in2}}{\lambda}, \frac{1}{\lambda}$ c) $\text{in2}, \frac{1}{\lambda}$ d) $\frac{\lambda}{\text{in2}}, \frac{1}{\lambda}$

A. $\frac{1}{\lambda}, \frac{\ln 2}{\lambda}$

B. $\frac{\ln 2}{\lambda}, \frac{1}{\lambda}$

C. $\lambda \ln 2, \frac{1}{\lambda}$

D. $\frac{\lambda}{\ln 2}, \frac{1}{\lambda}$

Answer: B

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11. $._{13}Al^{27}$ is a stable isotope. $._{13}Al^{29}$ is expected to disintegrate by

A. $\alpha -$ emission

B. `beta-emission

C. Positron emission

D. Proton emission

Answer: B

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12. In the nuclear reaction $U_{92}^{238} \rightarrow Pb_{82}^{206}$, the number of alpha and beta particles decayed are:

A. $4\alpha, 3\beta$

B. $8\alpha, 6\beta$

C. $6\alpha, 4\beta$

D. $7\alpha, 5\beta$

Answer: B

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13. The number of neutrons accompanying the formation of $._{54}Xe^{139}$ and $._{38}Sr^{94}$ from the absorption of a slow neutron by $._{92}U^{235}$, followed by nuclear fission is

A. 0

B. 2

C. 1

D. 3

Answer: D

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14. $.^{23}$ Na is the more stable isotope of Na. Find out the process by which $._{11}^{24}$ Na can undergo radioactive decay.

A. β^{-} emssion

B. α- emission

C. β^{+} emssion

D. K electron capture

Answer: A

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15. A positron is emitted from $._{11}Na^{23}$. The ratio of the atomic mass and atomic number of the resulting nuclide is

A. 22/10

B. 22/11

C. 23/10

D. 23/12

Answer: C

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16. Given that the abundacne of isotopes $.^{54}Fe, .^{56}Fe$, and $.^{57}Fe$ is 5%, 90% and 5% respectively. The atomic mass of Fe is

A. 55.85

B. 55.95

C. 55.75

D. 56.05

Answer: B

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17. ${}_{92}U^{235}$ nucleus absorbs a neutron and disintegrates into ${}_{54}Xe^{139}$. ${}_{38}Sr^{94}$ and X. What will be the product X ?

A. α-particle

B. β − particle

C. 2 − neutrons

D. 3 − neutrons

Answer: D

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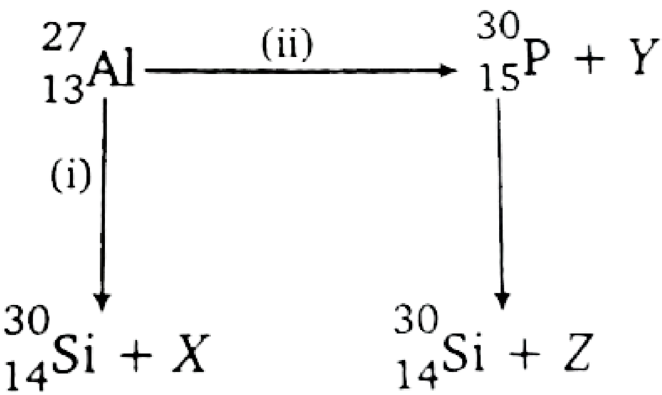
18. Bombardment of aluminium by $\alpha - \text{particle}$ leads to its artificial disintegration in two ways, (i) and (ii) as shown.

Products X, Y and Z respectively, are



A. Proton , neutron, positron

B. Neutron, positron, proton

C. Proton, positron, neutron

D. Positron, proton, neutron

Answer: A

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Jee Section More Than One Choice Correct Answer

1. An isotone of $._{32}^{76}Ge$ is-

(a) $._{32}^{77}Ge$

(b).$_{33}^{77}As$

(c).$_{34}^{77}Se$

(d).$_{34}^{78}Se$

A. $._{32}^{77}Ge$

B. $._{33}^{77}As$

C. $._{34}^{77}Se$

D. $._{34}^{78} Se$

Answer: B::D

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2. The nuclear reactions accompanied with emission of neutron (s) are

A. $._{13}^{27} Al + ._{2} He^{4} \rightarrow ._{15}^{30} P$

B. $._{6}^{12} C + ._{1}^{1} H \rightarrow ._{7}^{13} N$

C. $._{15}^{30} P \rightarrow ._{14}^{30} Si + ._{1}^{0} e$

D. $._{96}^{241} Am + ._{2}^{4} He \rightarrow ._{97}^{244} Bk + ._{1}^{0} e$

Answer: A::D

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3. Decrease in atomic number is observed during a)α-emission b)β-emission c)positron emission d)electron capture

A. Alpha emission

B. Beta emission

C. Positron emission

D. Electron capture

Answer: A::C::D

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4. In the nuclear transmutation :

$$.^9_4Be + X \rightarrow ^8_4 Be + Y$$

(X,Y) is (are)

A. (γ, n)

B. (p, D)

C. (n, D)

D. (γ, p)

Answer: A::B

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5. A plot of the number of neutrons (n) against the number of protons (p) of stable nuclei exhibits upward deviation from linearity for atomic number, $Z > 20.$ For an unstable nucleus having n/p ratio less than 1, the possible mode (s) of decay is (are)

A. $\beta^{-} -$ decay (β emission)

B. Orbital or K-electron capture

C. Neutron emission

D. $\beta^{+} -$ decay (positron emission)

Answer: B::D

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6. Which of the following statement is/are correct ?

A. The nuclear composition of atoms of the same element is always the same but that of atoms of different elements is different.

B. Nuclei with a very high or very low neutron - to -proton ratio are radioactive

C. The shorter the half-life, the more intense is the radioactive decay of a given sample

D. Nuclei containing the magic number of neutrons and protons are the most stable

Answer: B::C::D

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7. Which of the following statement is/are correct

A. Isotopes are always radioactive species

B. Beta rays are always negatively charged particles

C. Alpha rays are always negatively charged particles

D. Radioactivity is due to unstable electronic configuration

Answer: A::C::D

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8. Which of the following is/are not true

A. The most radioactive element present in pitchblende is uranium

B. $P-32$ is used for the treatment of leukaemia

C. CO_2 present in the air contains $C-12$ only

D. Emission of γ- rays changes the mass number but not atomic number

Answer: A::C::D

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9. The coolant used in the reaction core can be

A. Heavy water

B. Molten Sodium

C. Alloy of sodium and potassium

D. Molten silver

Answer: A::B::C

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10. The fertile nuclides among the following are

A. $U238$

B. $Th - 232$

C. $U - 235$

D. $Pu - 239$

Answer: A::B

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11. The elements which have magic number of protons and neutrons among the following are

A. $._{92}^{208}Pb$

B. $._{56}^{138}Ba$

C. $._{8}^{16}O$

D. $._{18}^{38}Ar$

Answer: A::C

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Jee Section Reasoning Type Questions

1. Statement 1 : Proton -proton electrostatic repulsions begin to overcome attractive forces involving protons and neutrons in heavier nuclides

Statement 2 : The plot of atomic number (y-axis) veruse number of neutrons (x-axis) for stable nuclei shows a curvature towards x-axis from the line of 45° slope as the atomic number is increased.

A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 1

B. Statement 1 is true, Statement 2 is true, statement 2 is not a correct explanation for statement 1

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: D

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2. Statement 1 : Hydrogen bomb involves not only fusion but also fission reactions to start the fusion whereas atom bomb involves only fission.

Statement 2 : Though energy liberated per fusion is smaller than energy liberated per fission, yet hydrogen bomb is more powerful than atom bomb.

A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 2

B. Statement 1 is true, Statement 2 is true, statement 2 is not a correct explanation for statement 2

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: B

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3. Statement 1 : Artificial radioisotopes are obtained from stable nuclei whereas it is not so for natural radioisotopes.

Statement 2 : Radioisotopes obtained by artifical transmutation do not behave in the same way as the natural radioactive elements

A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 3

B. Statement 1 is true, Statement 2 is true, statement 2 is not a correct explanation for statement 3

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: D

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1. Carbon-14 is used to determine the age of organic material. The procedure is based on the formation of $.^{14}C$ by neutron capture in the upper atmosphere.

$.^{14}_{7}N + .^{1}_{0}n \to .^{14}_{6}C + ._{1}n^{1}$

$.^{14}C$ is absorbed by living organisms during photosynthesis. The $.^{14}C$ content is constant in living organism once the plant or animal dies, the uptake of carbon dioxide by it ceases and the level of $.^{14}C$ in the dead being, falls due to the decay which $.^{14}C$ undergoes.

$.^{14}_{6}C \to .^{14}_{7}N + \beta^{-}$

The half-life period of $.^{14}C$ is 5770 years. The decay constant (λ) can be calculated by using the following formula $\lambda = \dfrac{0.693}{t_{1/2}}$.

The comparison of the β^{-} activity of the dead matter with that of the carbon still in circulation enable measurement of the period of the isolation of the material from the living cycle. The method however, ceases to be accurate over periods longer than 30,000 years. The proportion of $.^{14}C$ to $.^{12}C$ in living matter is $1:10^{12}$. Which of the following option is correct

A. In living organisms, circulation of $.^{14}C$ from atmosphere is high so the carbon content is constant in organism

B. Carbon dating can be used to find out the age of earth crust and rocks

C. Radioactive absorption due to cosmic radiation is equal to the rate of radioactive decay, hence the carbon content remains constant in living organisms

D. Carbon dating can not be used to determine concentration of $.^{14}C$ in dead beings.

Answer: C

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2. Carbon 14 is used to determine the age of organic material. The procerdure is based on the formation of $.^{14}C$ by neutron capture in the upper atmosphere.

$._{7}^{14}N + ._{0}^{1}n \rightarrow ._{6}^{14}C + ._{1}n^{1}$

$.^{14}C$ is abosorbed by living organisms during phostosythesis. The $.^{14}C$ content is constant in living organisms once the plant or animal dies, the uptake of carbon dioxide by it ceases and the level of $.^{14}C$ in the dead being, falls due to the decay which $.^{14}C$ undergoes.

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What should be the age of fossil for meaningful determination of its age?

A. 6 years

B. 6000 years

C. 60,000 years

D. It can be used to calculate any age

Answer: B

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3. Carbon 14 is used to determine the age of organic material. The procerdure is based on the formation of $.^{14}C$ by neutron capture in the upper atmosphere.

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A nulcear explosion has taken place leading to increases in conventration of $\hat{}\ (14)C$ in nearly areas. $\hat{}\ (14)C$ concentration is C_1 in nearby areas and C_2 in areas far away. If the age of the fossil is detemined to be T_1 and T_2 at the places respectively, then:

A. The age of the fossil will increase at the place where explosion has taken and $T_1 - T_2 = \frac{1}{\lambda \ln \frac{C_1}{C_2}}$

B. The age of the fossil will decrease at the place where explosion has taken place and $T_1 - T_2 = \frac{1}{\lambda} \ln \frac{C_1}{C_2}$

C. The age of fossil will be determined to be same

D. $\frac{T_1}{T_2} = \frac{C_1}{C_2}$

Answer: A

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4. The emission of an α or $a\beta$ particle by a radioactive element forms a new element. However, successive emission of some α or β-particles may give rise to an isotope or an isobar of the original element. In many cases, positron emission or $K-$ electron capture takes place, leading again to the formuation of new elements, alongwith the emission of neutrinos or antineutrinos. These emission also change the neutron/proton (n/p) ratio so that they give rise to stable isotopes which lie in the stability belt. However, in any disintegration reaction, the law of conservation of atomic number and mass number is always obeyed and this helps us to calculate the number of α and $\beta -$ particles emitted in the reaction.

The number of $\alpha -$ and $\beta -$ particle emitted in nuclear reaction $._{90}Th^{288} \rightarrow ._{83}Bi^{212}$ are respectively

A. 4, 1

B. 3, 7

C. 8, 1

D. 4, 7

Answer: A

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5. The emission of an α or $a\beta$ particle by a radioactive element forms a new element. However, successive emission of some α or β-particles may give rise to an isotope or an isobar of the original element. In many cases, positron emission or $K-$ electron capture takes place, leading again to the formuation of new elements, alongwith the emission of neutrinos or antineutrinos. These emission also change the neutron/proton (n/p) ratio so that they give rise to stable isotopes which lie in the stability belt. However, in any disintegration reaction, the law of conservation of atomic number and mass number is always obeyed and this helps us to calculate the number of α and $\beta-$ particles emitted in the reaction.

In the above sequence of reactions, the elements which are isotopes of each other are

A. X and Y

B. X and Z

C. X and W

D. None of these

Answer: C

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6. The emission of an α or $a\beta$ particle by a radioactive element forms a new element. However, successive emission of some α or β-particles may give rise to an isotope or an isobar of the original element. In many cases, positron emission or $K-$ electron capture takes place, leading again to the formuation of new elements, alongwith the emission of neutrinos or antineutrinos. These emission also change the neutron/proton (n/p) ratio so that they give rise to stable isotopes which lie in the stability belt. However, in any disintegration reaction, the law of conservation of atomic number and mass number is always obeyed and this helps us to calculate the number of α and $\beta-$ particles emitted in the reaction.

A radioactive element X emits $3\alpha, 1\beta$ and $1\gamma-$ particles and forms $._{76}Y^{235}$. Element X is

A. $._{81}^{237}X$

B. $._{80}^{237}X$

C. $._{81}^{236}X$

D. $._{80}^{236}X$

Answer: A

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7. The emission of an α or $a\beta$ particle by a radioactive element forms a new element. However, successive emission of some α or β-particles may give rise to an isotope or an isobar of the original element. In many cases, positron emission or $K-$ electron capture takes place, leading again to the formuation of new elements, alongwith the emission of neutrinos or antineutrinos. These emission also change the neutron/proton (n/p) ratio so that they give rise to stable isotopes which lie in the stability belt. However, in any disintegration reaction, the law of conservation of atomic number and mass number is always obeyed and this helps us to calculate the number of α and $\beta-$ particles emitted in the reaction.

In the nuclear reaction $Po \xrightarrow{-\alpha} Pb \xrightarrow{-\beta} Bi$, knowing that Bi belongs to Group 15, Po will belong to Group

A. 13

B. 14

C. 16

D. 18

Answer: C

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8. The emission of an α or $a\beta$ particle by a radioactive element forms a new element. However, successive emission of some α or β-particles may give rise to an isotope or an isobar of the original element. In many cases, positron emission or $K-$ electron capture takes place, leading again to the formuation of new elements, alongwith the emission of neutrinos or antineutrinos. These emission also change the neutron/proton (n/p) ratio so that they give rise to stable isotopes which lie in the stability belt. However, in any disintegration reaction, the law of conservation of atomic number and mass number is always obeyed and this helps us to calculate the number of α and $\beta-$ particles emitted in the reaction.

Positron emission result in

A. Decrease in the n/p ratio

B. Increase in the n/p ratio

C. No change in the n/p ratio

D. Decrease or increase in n/p ratio depending upon the nature of the element emitting the particle

Answer: B

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9. In the artificial transmutation of elements, Alchemists was interested to convert basic metals like iron into precious metals like gold. A number of subatomic particles was used as projectiles to hit the nuclei after accelerating these particles in cyclotron. The ejectiles were also generally some subatomic particles or in some cases, only γ-radiation were emitted. These nuclear reactions are generally represented by Bethe's notation. In certain cases it is observed that artificial transmutation of a stable nucleus gives a radioisotope which disintegrates by itself like a natural radioactive element. The phenomenon is called induced radioactivity.

Which one of the following notations shows the product incorrectly

A. $._{96}Cm^{242}(\alpha, 2n)._{97}Bk^{243}$

B. $._{5}B^{10}(\alpha, n)._{7}N^{13}$

C. $._{7}N^{14}(n, p)._{6}C^{14}$

D. $._{14}Si^{28}(d, n)._{15}P^{29}$

Answer: A

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10. In the artificial transmutation of elements, Alchemists was interested to convert basic metals like iron into precious metals like gold. A number of subatomic particles was used as projectiles to hit the nuclei after accelerating these particles in cyclotron. The ejectiles were also generally some subatomic particles or in some cases, only γ-radiation were emitted. These nuclear reactions are generally represented by Bethe's notation. In certain cases it is observed that artificial transmutation of a stable nucleus gives a radioisotope which disintegrates by itself like a natural radioactive element. The phenomenon is called induced radioactivity.

What is X in the following nuclear reaction

$$._7^{14}N + ._1^1H \rightarrow ._8^{15}O + 'X'$$

A. $._0 n^1$

B. $. ._{-1} e^0$

C. $. ._{+1} e^0$

D. γ

Answer: D

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11. In the artificial transmutation of elements, Alchemists was interested to convert basic metals like iron into precious metals like gold. A number of subatomic particles was used as projectiles to hit the nuclei after accelerating these particles in cyclotron. The ejectiles were also generally some subatomic particles or in some cases, only γ-radiation were emitted. These nuclear reactions are generally represented by Bethe's notation. In certain cases it is observed that artificial transmutation of a stable nucleus gives a radioisotope which disintegrates by itself like a natural radioactive element. The phenomenon is called induced radioactivity.

The following nuclear transmutation

$\cdot_{11} Na^{23} + \cdot_1 H^1 \rightarrow \cdot_{12} Mg^{23} + \cdot_0 n^1$ belongs to

A. (n,p) Type

B. (p,n) Type

C. (α, n) Type

D. (d, p) Type

Answer: B

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12. In the artificial transmutation of elements, Alchemists was interested to convert basic metals like iron into precious metals like gold. A number of subatomic particles was used as projectiles to hit the nuclei after accelerating these particles in cyclotron. The ejectiles were also generally some subatomic particles or in some cases, only γ-radiation were emitted. These nuclear reactions are generally represented by Bethe's notation. In certain cases it is observed that artificial transmutation of a stable nucleus gives a radioisotope which disintegrates by itself like a natural radioactive element. The phenomenon is called induced radioactivity.

Which one of the following is not an example of induced radioactivity

A. $._{2}^{4}He + \quad ._{12}^{24}Mg \rightarrow ._{14}^{27}Si + ._{0}n^{1}$
$._{14}^{27}Si \rightarrow ._{13}^{27}Al + ._{+1}e^{0}$

B. $._{1}^{1}H + \quad ._{6}^{12}C \rightarrow ._{7}^{13}N$

$\quad ._{7}^{13}N \rightarrow ._{6}^{13}C + ._{+1}e^{0}$

C. $._{1}^{2}D + \quad ._{11}^{23}Na \rightarrow ._{11}^{23}Na + ._{1}^{1}H$

$\quad ._{11}^{24}Na \rightarrow ._{12}^{24}Mg + ._{-1}e^{0}$

D. $._{92}^{238}U + \quad ._{0}n^{1} \rightarrow ._{92}^{239}U$

$\quad ._{92}^{239}U \rightarrow ._{93}^{239}Np + ._{-1}e^{0}$

Answer: D

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Jee Section Integer Type Questions

1. The total number of α and β particles emitted in the nuclear reaction

${}_{92}^{238}U \rightarrow {}_{82}^{214}Pb$ is

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2. The periodic table consists of 18 groups. An isotope of copper, on bombardment with protons, undergoes a nuclear reaction yielding element X as shown below. To which group, element X belongs in the periodic table

$$._{29}^{63}Cu + ._{1}^{1}H \rightarrow 6._{0}^{1}n + \alpha + 2._{1}^{1}H + X$$

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3. A closed vessel with rigid walls contains 1 mole of $._{92}^{238}U$ and 1 mole of air at $298K$. Considering complete decay of $._{92}^{238}U$ to $._{82}^{206}Pb$ the ratio of the final pressure to the initial pressure of the system at $298K$ is

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4. Mass number and atomic number of an atom are 232 and 90 respectively. How many $\alpha -$ particles of this atom must emit, after the emission of $2\beta -$ particles, such that the mass number and atomic number of new element are 212 and 82 respectively

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5. A very small amount of radioactive isotope of $.^{213} Pb$ was mixed with a non-radioactive lead salt containing 0.01 g of Pb (atomic mass 207). The whole lead was brought into solution and lead chromate was precipitated by addition of a soluble chromate. Evaporation of $10cm^3$ of the supernature liquid gave a residue having a radioactivity 1/24000 of that of the original quantity of $.^{213} Pb$. If the solubility of lead chromate is $x \times 10^{-y}$ mol dm^{-3}, then value of x is

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6. The number of neutrons emitteed when $._{92}^{235}U$ undergoes controlled nulclear fission to $._{54}^{142}Xe$ and $._{38}^{90}Sr$ is:

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Jee Section Matrix Match Type Questions

1. Match the entries listed in Column I with appropriate entries listed in Column II

	Column I		Column II (What is x)
(A)	${}_{7}^{14}N(x, p){}_{8}^{17}O$	(p)	γ -radiation
(B)	${}_{83}^{209}Bi(D, x){}_{84}^{210}Po$	(q)	deuterium
(C)	${}_{4}^{9}Be(p, x){}_{4}^{8}Be$	(r)	neutron
(D)	${}_{11}^{23}Na(n, x){}_{11}^{24}Na$	(s)	α -particle

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2. Match the entries listed in Column I with appropriate entries listed in Column II

	Column II		Column I
(p)	α -emitter	(A)	${}^{14}_{6}C$
(q)	β -emitter	(B)	${}^{216}_{84}Po$
(r)	Has neutrons or protons or both as magic numbers	(C)	${}^{39}_{20}Ca$
(s)	Does not lie in the stability belt	(D)	${}^{238}_{92}U$

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