Nuclear Physics Notes Questions

1. The nucleus consists of the elementary particles, protons and neutrons which are known as
   a) Nucleons
   b) Nucleolous
   c) Both a and b
   d) None of the above

   Ans a

   Explanation

   The nucleus consists of the elementary particles, protons and neutrons which are known as nucleons.

2. A nucleus of an element is represented as ZXA, where X is the chemical symbol of the element and Z and A represents
   a) Atomic number and Mass number respectively
   b) Mass number and Atomic number respectively
   c) Atomic weight and Volume
   d) None of the above

   Ans a

   Explanation

   Z represents the atomic number which is equal to the number of protons and A, the mass number which is equal to the total number of protons and neutrons.

3. The equation **Mass number - Atomic number** gives which of the following(N=A-Z)
   a) Protons
   b) Neutrons
   c) Electrons
   d) Equation is wrong

   Ans b

   Explanation

   Z represents the atomic number which is equal to the number of protons and A, the mass number which is equal to the total number of protons and neutrons.

4. Match the following
   a) Isotopes- same mass number A, but different atomic number Z

b) Isobars- same number of neutrons

c) Isotones- same atomic number Z but different mass number A

     a) 213

     b) 312

     c) 123

     d) 321

Ans b

Explanation

They are the classification of nuclei

5. According to Rutherford's α−particle scattering experiment, the approximate size of nuclear radius is

a) 10^{-15} m

b) 10^{-10} m

c) 10^{15} m

d) 10^{-6} m

Ans a

Explanation

According to Rutherford's α−particle scattering experiment, the distance of the closest approach of α − particle to the nucleus was taken as a measure of nuclear radius, which is approximately 10^{-15} m

6. The mass of one nucleon is equal to

a) 1.87×10^{-7} kg

b) 1.47×10^{-20} kg

c) 1.67×10^{-27} kg

d) 2.97×10^{-17} kg

Ans c

Explanation

mN = mass of one nucleon and is approximately equal to 1.67×10^{-27} kg.

7. The value of 1 amu is

a) 2.66×10^{-25} kg

b) 1.56×10^{-17} kg

c) 0.6×10^{-27} kg

d) 1.66×10^{-27} kg

Ans d

Explanation

One atomic mass unit is considered as one twelfth of the mass of carbon atom, 1 amu $= 1.66 \times 10^{-27}$ kg.

8. When the protons and neutrons combine to form a nucleus, the mass that disappears is converted into an equivalent amount of energy.
   a) Nuclear energy
   b) Potential energy
   c) Binding energy
   d) None of the above

   Ans c

   Explanation

   When the protons and neutrons combine to form a nucleus, the mass that disappears is converted into an equivalent amount of energy. This energy is called the **binding energy** of the nucleus.

9. The relation between radius of nucleus and the mass number is given by
   a) $R \propto A^{1/3}$
   b) $R \propto A^{2/3}$
   c) $R \propto A^{1/2}$
   d) None of the above

   Ans a

   Explanation

   An empirical relation is found to hold good between the radius of the nucleus R and its mass number A. It is given by $R \propto A^{1/3}$

10. The binding energy per nucleon increases sharply with mass number A up to
    a) 40
    b) 21
    c) 20
    d) 15

    Ans c

    Explanation

The binding energy per nucleon increases sharply with mass number A up to 20. It increases slowly after A = 20.

11. The binding energy curve becomes almost flat for mass number between
    a) 40 and 120
    b) 21 and 60
    c) 30 and 50
    d) None of the above

    Ans a

    Explanation

    The curve becomes almost flat for mass number between 40 and 120. Beyond 120, it decreases slowly as A increases.

12. Isotopic mass of a nuclei can be determined by
    a) Bragg's spectrometer
    b) Diffraction spectrometer
    c) Bain bridge spectrometer
    d) None of the above

    Ans c

    Explanation

    Bainbridge mass spectrometer is an instrument used for the accurate determination of Isotopic masses.

13. The velocity selector allows the ions of a particular velocity to come out of it, by the action of
    a) Electric field
    b) Magnetic field
    c) Both a and b
    d) None of the above

    Ans c

    Explanation

    The velocity selector allows the ions of a particular velocity to come out of it, by the combined action of an electric and a magnetic field

14. The force that binds both protons and neutrons within the nucleus is called as

a) Nuclear force
b) Gravitational force
c) Electric force
d) None of the above

Ans a

Explanation

There is some other force in the nucleus which overcomes the electrostatic repulsion between positively charged protons and binds the protons and neutrons inside the nucleus. This force is called **nuclear force.**

15. Whether nuclear force is charge independent?
    a) Yes
    b) No
    c) Either yes or no
    d) None

Ans a

Explanation

Nuclear force is charge independent. It is the same for all the three types of pairs of nucleons (n–n), (p–p) and (n–p). This shows that nuclear force is not electrostatic in nature.

16. Which of the following force is strongest in nature
    a) Electromagnetic force
    b) Gravitational force
    c) Nuclear force
    d) None of the above

Ans c

Explanation

Nuclear force is the strongest known force in nature.

17. Nuclear force is how many times stronger than gravitational force
    a) 10^{40}
    b) 10^{10}
    c) 10^{20}
    d) 10^{25}

Ans a

Explanation

Nuclear force is not a gravitational force. Nuclear force is about 1040 times stronger than the gravitational force.

18. The phenomenon of radioactivity was discovered by
    a) Marie curie
    b) Henri Becquerel
    c) James prout
    d) None of the above

    Ans b

    Explanation

    The phenomenon of radioactivity was discovered by Henri Becquerel in 1896. He found that a photographic plate wrapped in a black paper was affected by certain penetrating radiations emitted by uranium salt.

19. Radioactivity is in elements having atomic number
    a) Z<82
    b) Z>82
    c) Z=82
    d) None of the above

    Ans b

    Explanation

    The phenomenon of spontaneous emission of highly penetrating radiations such as α, β and γ rays by heavy elements having atomic number greater than 82 is called radioactivity.

20. The radio activity is affected by
    a) Temperature
    b) Pressure
    c) Electric field
    d) None of the above

    Ans d

    Explanation

The radioactive phenomenon is spontaneous and is unaffected by any external agent like temperature, pressure, electric and magnetic fields etc

21. The primary cosmic ray consists of
    a) 95% proton, 4% helium, remaining heavy nuclei
    b) 90% proton, 9% helium and remaining heavy nuclei
    c) 85% proton, 14% helium and remaining heavy nuclei
    d) 65% proton, 24% helium and remaining 10 %heavy nuclei

    Ans b

    Explanation

    The primary cosmic rays consist of 90% protons, 9% helium nuclei and remaining heavy nuclei. The energy of the primary cosmic rays is of the order 108 MeV.

22. The intensity of cosmic rays is high at
    a) Poles
    b) Equator
    c) Tropic of capricon
    d) Tropic of cancer

    Ans a

    Explanation

    The experiments to study the variation of cosmic ray intensity (I) with geomagnetic latitude (θ) showed that the intensity is maximum at the poles ($\theta = 900$), minimum at the equator ($\theta = 0$).

23. The intensity of cosmic rays is minimum at
    a) Poles
    b) Equator
    c) Tropic of cancer
    d) None of the above

    Ans b

    Explanation

    The experiments to study the variation of cosmic ray intensity (I) with geomagnetic latitude (θ) showed that the intensity is maximum at the poles ($\theta = 900$), minimum at the equator ($\theta = 0$).

24. The cosmic rays cannot enter places near equator since they are
    a) Perpendicular to gravitational field
    b) Parallel to gravitational field
    c) Deflected by ozone
    d) None of the above
    Ans a
    Explanation
    The charged particles that approach at the equator have to travel in a perpendicular direction to the field and are deflected away.

25. The cosmic rays can easily reach poles because of
    a) Perpendicular to gravitational field
    b) Parallel to gravitational field
    c) Ozone
    d) None of the above
    Ans b
    Explanation
    They experience no force and easily reach the surface of the earth and hence maximum intensity at poles.

26. Electron and positron combining together to produce photon is known as
    a) Pair production
    b) Cosmic ray shower
    c) Annihilation
    d) None of the above
    Ans c
    Explanation
    The converse of pair production in which an electron and positron combine to produce a photon is known as annihilation of matter.

27. The intensity of cosmic rays
    a) Increases with altitude and reaches maximum @20km
    b) Decreases with altitude and reaches maximum @ ground level
    c) Increases above 20km altitude
    d) Decreases above 10km altitude

Ans a
Explanation

It is seen that the intensity increases with altitude and reaches a maximum at a height of about 20 km.

28. The conversion of photon into electron and positron pair is known as
    a) Pair production
    b) Annihilation
    c) Cosmic ray shower
    d) None of the above

    Ans a
    Explanation

    The conversion of a photon into an electron–positron pair on its interaction with the strong electric field surrounding a nucleus is called pair production.

29. Does the photon has mass and charge?
    a) Positive charge and no mass
    b) Negative charge and mass equal to that of electron
    c) No mass and no charge
    d) Positive charge and mass of proton

    Ans c
    Explanation

    Photon is a quantum of radiation with no charge and no mass, but it is a carrier of energy. It travels with velocity of light.

30. Which of the following does not belong to Lepton group
    a) Neutrino
    b) Electron
    c) Muon
    d) Proton

    Ans d
    Explanation

    This group contains particles such as electron, positron, neutrino, anti neutrino, positive and negative muons.

31. The mass of a proton and neutron is equal to _____ of electron
    a) 1360 and 2560
    b) 1836 and 1840
    c) 1745 and 1887
    d) 1863 and 1804
       Ans b
       Explanation
       The mass is equal to 1836 and 1840 times of electron check the table in book for more information

32. The mass of product of nuclei in nuclear fission
    a) Equal to the sum of lighter nuclei
    b) Greater than the sum of lighter nuclei
    c) Less than the sum of lighter nuclei
    d) None of the above
       Ans c
       Explanation
       The mass of product of nuclei in nuclear fission is less than the sum of lighter nuclei.

33. The above which the nuclear fusion takes place is
    a) 10^7 K
    b) 1000 C
    c) Room temperature
    d) 10^4 K
       Ans a
       Explanation
       The fusion process can be carried out only at a extremely high temperature of the order of 10^7 K because, only at these very high temperatures the nuclei are able to overcome their mutual repulsion.

34. The principle used in Hydrogen bomb is
    a) Nuclear fission
    b) Nuclear fusion
    c) Both a and b
    d) None of the above

Ans b

Explanation

Principle used in Hydrogen bomb is nuclear fusion

35. Which public sector owns constructs and operates nuclear power plants in India
    a) NPCIL
    b) AEC
    c) IGCAR
    d) BARC

    Ans a

    Explanation

    Nuclear Power Corporation of India Ltd. (NPCIL) is the public sector company which owns, constructs and operates nuclear power plants in India.

36. The first nuclear power plant was built at
    a) Moscow
    b) Chicago
    c) Beijing
    d) Bombay

    Ans b

    Explanation

    A nuclear reactor is a device in which the nuclear fission reaction takes place in a self sustained and controlled manner. The first nuclear reactor was built in 1942 at Chicago USA.

37. In pressurized heavy water reactor pellets of uranium oxide are packed in
    a) Zirconium alloy
    b) Lead container
    c) Plutonium alloy
    d) Steel alloy

    Ans a

    Explanation

    In the pressurised heavy water reactors (PHWR) built in our country, natural uranium oxide is used as fuel. Tiny pellets of uranium oxide are packed in thin tubes of zirconium alloy.

38. The nuclear reactor in kalpakkam is
    a) PWR
    b) FBTR
    c) PHWR
    d) PFBR
    Ans d
    Explanation
    It is a pressurized fast breeder reactor with 500MW capacity.

39. The function of a moderator is
    a) Absorb the neutron
    b) Emit the neutron
    c) Speed up neutron
    d) Slowdown the neutron
    Ans d
    Explanation
    The function of a moderator is to slow down fast neutrons produced in the fission process having an average energy of about 2 MeV.

40. The full form of KAMINI reactor is
    a) Kalpakkam mini reactor
    b) Kacheguda mini reactor
    c) Kudankulam mini reactor
    d) None of the above
    Ans a
    Explanation
    KAMINI kalpakkam mini reactor

41. The moderator slows down energy of the neutron about
    a) 2MeV to 0.025MeV
    b) 2MeV to 0.025eV
    c) 2MeV to 1MeV
    d) 2MeV to 1eV
    Ans b

Explanation

The function of a moderator is to slow down fast neutrons produced in the fission process having an average energy of about 2 MeV to thermal neutrons with an average energy of about 0.025.

42. The temperature of the interior of the sun is about
   a) 1.4×10^8 K
   b) 1.4×10^7 K
   c) 1.2×10^{10} K
   d) 1.32×10^6 K

   Ans b

   Explanation

   The temperature of the interior of the sun is about 1.4×10^7 K and the temperature of some stars is of the order 10^8 K.

43. The origin of such a tremendous amount of energy in sun is because of
   a) Nuclear force
   b) Gravitational
   c) Chemical
   d) Fusion of protons into helium

   Ans d

   Explanation

   The origin of such a tremendous amount of energy is neither chemical nor gravitational. The fusion of protons into helium is supposed to release energy in sun and stars.

44. Mesons have mass between
   a) Neutron and proton
   b) Electron and proton
   c) Neutron and electron
   d) None of the above

   Ans b

   Explanation

   Mesons are fundamental particles carrying a single unit of charge and possessing mass intermediate between electron and proton (m_e and m_p).

45. Which of the following is a type of meson?
    a) Pion
    b) N meson
    c) Kaon
    d) All the above
    Ans d
    Explanation
    The name meson was given by Yukawa in 1935. The three types of mesons are (i) π-meson (pion) (ii) K−meson (kaon) and (iii) ηmeson. The mesons are the interaction agents between nucleons.

46. The heavier particles other than nucleons are
    a) Baryons
    b) Hyperons
    c) Both a and b
    d) None of the above
    Ans c
    Explanation
    Protons and neutrons are called nucleons and the rest of the heavier particles other than nucleons are known as hyperons.

47. In pressurized heavy water reactors which acts as a neutron reflector
    a) Control rods
    b) Neutron source
    c) Moderator
    d) None of the above
    Ans c
    Explanation
    In pressurized heavy water reactors the moderator itself acts as the reflector.

48. The reactor is surrounded by a concrete wall of thickness about
    a) 2 to 2.5m
    b) 3 to 3.5m
    c) 1 to 1.75m
    d) 0.5 to 2m

Ans a
Explanation

As a protection against the harmful radiations, the reactor is surrounded by a concrete wall of thickness about 2 to 2.5 m.

49. The process of producing fissile materials by absorbing neutrons is known as
    a) Feeding
    b) Breeding
    c) Both a and b
    d) None of the above

    Ans b
    Explanation

    In the reactor, these can be converted into a fissile material 94Pu239 and 92U233 respectively by absorption of neutrons. The process of producing more fissile material in a reactor in this manner than consumed during the operation of the reactor is called breeding.

50. Which of the following is used in cooling system of nuclear reactors?
    a) Ordinary water
    b) Heavy water
    c) Liquid sodium
    d) All the above

    Ans d
    Explanation

    The cooling system removes the heat generated in the reactor core. Ordinary water, heavy water and liquid sodium are the commonly used coolants.

51. The boiling point of liquid sodium is about
    a) 700 C
    b) 500 C
    c) 1000 C
    d) 1500 C

    Ans c
    Explanation

Being a metal substance, liquid sodium is a very good conductor of heat and it remains in the liquid state for a very high temperature as its boiling point is about 1000 C.

52. Which of the following is used as neutron source in nuclear reactor?
    a) Beryllium with plutonium
    b) Beryllium with radium
    c) Beryllium with polonium
    d) All the above
    Ans d
    Explanation
    A source of neutron is required to initiate the fission chain reaction for the first time. A mixture of beryllium with plutonium or radium or polonium is commonly used as a source of neutron.

53. Atom bomb is based on which of the following reaction?
    a) Uncontrolled fission reaction
    b) Controlled fission reaction
    c) Uncontrolled fusion reaction
    d) Controlled fusion reaction
    Ans a
    Explanation
    Atom bomb is based on the principle of uncontrolled fission chain reaction. Natural uranium consists of 99.28% of U238 and 0.72% of U235. U238 is fissionable only by fast neutrons.

54. Who discovered that when uranium nucleus is bombarded with a neutron, it breaks up into two fragments of comparable masses with the release of energy.
    a) Otto Hahn
    b) F.Strass man
    c) Both a and b
    d) None of the above
    Ans c
    Explanation

In 1939, German scientists Otto Hahn and F. Strassman discovered that when uranium nucleus is bombarded with a neutron, it breaks up into two fragments of comparable masses with the release of energy.

55. The process of breaking up of the nucleus of a heavier atom into two fragments with the release of large amount of energy is called
    a) Nuclear fusion
    b) Nuclear fission
    c) Chemical reaction
    d) None of the above

    Ans b

    Explanation

    The process of breaking up of the nucleus of a heavier atom into two fragments with the release of large amount of energy is called nuclear fission. The fission is accompanied of the release of neutrons.

56. Mass of uranium-235
    a) 235.045733amu
    b) 235.005733amu
    c) 236.023577amu
    d) 237.457733amu

    Ans a

    Explanation

    Mass of $_{92}U_{235}$ = 235.045733amu

57. The intensity of radioactive radiation is founded by
    a) Whetstone bridge
    b) Hygrometer
    c) Geiger Muller counter
    d) None of the above

    Ans c

    Explanation

    Geiger – Muller counter is used to measure the intensity of the radioactive radiation. When nuclear radiations pass through gas, ionization is produced.

58. The tube of Geiger Muller counter is filled with what gas?
    a) Radon
    b) Argon
    c) Oxygen
    d) Nitrogen
    Ans b
    Explanation
    The tube is filled with an inert gas like argon at a low pressure.

59. A high potential difference of about _____ is applied between the electrodes through a high resistance R of about 100 mega ohm.
    a) 1000V
    b) 500V
    c) 200V
    d) 300V
    Ans a
    Explanation
    A high potential difference of about 1000 V is applied between the electrodes through a high resistance R of about 100 mega ohm.

60. The conversion of one element into another by artificial methods is known as
    a) Fission
    b) Artificial transmutation
    c) Both a and b
    d) None of the above
    Ans b
    Explanation
    Artificial transmutation is the conversion of one element into another by artificial methods. The first successful artificial transmutation was carried out by Rutherford.

61. Which of the following is a particle accelerator?
    a) Electrostatic accelerator
    b) Cyclic accelerator
    c) Synchronous accelerator
    d) All the above

Ans d

Explanation

Electrostatic accelerators

Cyclic or synchronous accelerator

62. Which of the following is a electrostatic accelerator
    a) Cockcroft – Walton
    b) Linear accelerator
    c) Cyclotron
    d) None of the above

    Ans a

    Explanation

    The Cockcroft – Walton and Van de Graaff generators belong to this class. These accelerators can accelerate particles only upto a few million electron-volts.

63. Which of the following is the example for synchronous accelerator?
    a) Cockcroft-walton
    b) Linear accelerator
    c) Van de gruff generator
    d) All the above

    Ans b

    Explanation

    Linear accelerator, cyclotron, betatron, synchrocyclotron and synchrotron.

64. When γ-ray or any high energy nuclear particle passes through human beings, the effect may be
    a) Pathological
    b) Genetical
    c) Both
    d) None of the above

    Ans c

    Explanation

    When γ-ray or any high energy nuclear particle passes through human beings, it disrupts the entire normal functioning of the biological system and the effect may be either pathological or genetic.

65. Safe limit of receiving the radiations is about
    a) 250 milli roentgen per week.
    b) 350 milli roentgen per week.
    c) 250 roentgen per week.
    d) 2500 milli roentgen per week.

    Ans a

    Explanation

    Safe limit of receiving the radiations is about 250 milli roentgen per week.

66. Which of the following is taken as precautions in laboratory?
    a) Radioactive materials are kept in thick−walled lead container.
    b) Lead aprons and lead gloves are used while working in hazardous area.
    c) All radioactive samples are handled by a remote control process.
    d) All the above

    Ans d

    Explanation

    It includes all the above and A small micro−film badge is always worn by the person and it is checked periodically for the safety limit of radiation.

67. The ratio of C14 and C12 atoms in atmosphere is
    a) 1:10^6
    b) 10^6:1
    c) 1:2
    d) 2:1

    Ans a

    Explanation

    The ratio of C14 and C12 atoms in atmosphere is 1 : 10^6. Hence, carbon dioxide present in the atmosphere contains a small portion of C14.

68. The amount of C14 in the sample will enable the calculation of time of death i.e, the age of the specimen could be estimated. This is called
    a) Carbon carbon dating
    b) Radio nitrogen dating
    c) Radio carbon dating
    d) None of the above

Ans c

Explanation

Living things take C14 from food and air. However with death, the intake of C14 stops, and the C14 that is already present begins to decay. Hence the amount of C14 in the sample will enable the calculation of time of death i.e, the age of the specimen could be estimated. This is called radio-carbon dating.

69. Which of the following is used to treat cancer?
    a) Radio sodium
    b) Radio carbon
    c) Radio cobalt
    d) None of the above

    Ans c

    Explanation

    Radio cobalt (Co60) emitting γ−rays is used in the treatment of cancer. Gamma rays destroy cancer cells to a greater extent.

70. _____is used in the detection of the nature of thyroid gland and also for treatment
    a) Radio iodine
    b) Radio cobalt
    c) Both a and b
    d) None of the above

    Ans a

    Explanation

    Radio-iodine (I131) is used in the detection of the nature of thyroid gland and also for treatment. Radioiodine is also used to locate brain tumours.

71. The artificial isotope can be produced by bombarding target by
    a) Cyclotron
    b) Van de gruff generator
    c) Both a and b
    d) None of the above

    Ans a

    Explanation

Method of production of artificial radio-isotope is to bombard the target element with particles from particle accelerators like cyclotron.

72. Artificial radioactivity or induced radioactivity was discovered by
    a) Irene Curie
    b) F. Jolio
    c) Both a and b
    d) None of the above

    Ans c
    Explanation
    Artificial radioactivity or induced radioactivity was discovered by Irene Curie and F. Joliot in 1934. This is also known as man-made radioactivity.

73. Neutrons are the constituent particles of all nuclei, except
    a) Hydrogen
    b) Nitrogen
    c) Oxygen
    d) All the above

    Ans a
    Explanation
    Neutrons are the constituent particles of all nuclei, except hydrogen.

74. Neutrons are deflected by
    a) Electric field
    b) Magnetic field
    c) Both a and b
    d) None of the above

    Ans d
    Explanation
    Neutrons are neutral particles with no charge and mass slightly greater than that of protons. Hence, they are not deflected by electric and magnetic fields.

75. The free neutron decays with an emission of
    a) Proton
    b) Electron

c) Antineutrino
d) All the above

Ans d

Explanation

Neutrons are stable inside the nucleus. But outside the nucleus they are unstable. The free neutron decays with an emission of proton, electron and antineutrino, with half life of 13 minutes.

76. Whether neutrons penetrate nucleus?
    a) Yes
    b) No
    c) May be yes
    d) None of the above

Ans a

Explanation

As neutrons are neutral, they can easily penetrate any nucleus.

77. Neutrons are classified as slow and fast neutrons based on
    a) Fast
    b) Kinetic energy
    c) Potential energy
    d) None of the above

Ans b

Explanation

Neutrons are classified according to their kinetic energy as (a) slow neutrons and (b) fast neutrons. Both are capable of penetrating a nucleus causing artificial transmutation of the nucleus.

78. The activity of radio active substance is
    a) Rate at which neutrons decay
    b) Rate at which atom decay
    c) Both a and b
    d) None of the above

Ans b

Explanation

The activity of a radioactive substance is defined as the rate at which the atoms decay. If N is the number of atoms present at a certain time t, the activity R is given by R = – dN/dt.

79. The unit of activity is
    a) Curie
    b) Becquerel
    c) Both a and b
    d) None of the above
    ## Ans b
    ## Explanation
    The unit of activity is becquerel named after the scientist Henri Becquerel
     1 becquerel = 1 disintegration per second

80. The ratio between Sum of life time of all the atoms and Total number of atoms is called as
    a) Half period
    b) Mean life
    c) Both a and b
    d) None of the above
    ## Ans b
    ## Explanation
    Mean life = Sum of life time of all the atoms /Total number of atoms

81. The half life period of a radioactive element is defined as the time taken for _____of the radioactive element to undergo disintegration.
    a) One half
    b) One third
    c) One fourth
    d) None of the above
    ## Ans a
    ## Explanation
    The half life period of a radioactive element is defined as the time taken for one half of the radioactive element to undergo disintegration.

82. Rutherford and Soddy found that the rate of disintegration is independent of
    a) Physical
    b) Chemical
    c) Both a and b
    d) None of the above
       Ans c
       Explanation
       Rutherford and Soddy found that the rate of disintegration is independent of physical and chemical conditions.

83. When a radioactive nucleus emits γ−rays, only the energy level of the nucleus changes and
    a) Atomic number remain the same
    b) Mass number remain the same
    c) Atomic number and mass number remain the same
    d) None of the above
       Ans c
       Explanation
       When a radioactive nucleus emits γ−rays, only the energy level of the same.

84. When a radioactive nucleus disintegrates by emitting a β− particle, the atomic number increases by
    a) One
    b) Three
    c) Five
    d) None of the above
       Ans a
       Explanation
       When a radioactive nucleus disintegrates by emitting a β− particle, the atomic number increases by one and the mass number remains the same.

85. When a radioactive nucleus disintegrates by emitting an α-particle, the atomic number decreases by _____ and mass number decreases by ____
    a) One and two
    b) Two and four

c) Three and six
d) None
Ans b
Explanation
When a radioactive nucleus disintegrates by emitting a α-particle, the atomic number decreases by two and mass number decreases by four.

86. An α - particle is a helium nucleus consisting of two protons and two neutrons. It carries two units of _____ charge.
a) Positive
b) Negative
c) Neutral
d) None of the above
Ans a
Explanation
An α - particle is a helium nucleus consisting of two protons and two neutrons. It carries two units of positive charge.

87. Alpha particles are deflected by
a) Electric
b) Magnetic
c) Both
d) None of the above
Ans c
Explanation
They are deflected by electric and magnetic fields.

88. β–particles carry____ unit of negative charge.
a) 1
b) 2
c) 3
d) 4
Ans a
Explanation

β–particles carry one unit of negative charge and mass equal to that of electron. Therefore, they are nothing but electrons.

89. Ionization power of β–particles is
    a) Low
    b) High
    c) Equal to alpha particles
    d) None of the above

    Ans a
    Explanation
    The ionisation power is comparatively low

90. γ – rays are electro magnetic waves of _____ wavelength
    a)   very short
    b)   short
    c)   long
    d)   none

    Ans a
    Explanation
    They are electromagnetic waves of very short wavelength.