QB365 Question Bank Software Study Materials

Nuclear Physics Important 2 Marks Questions With Answers (Book Back and Creative)

10th Standard

Science

Total Marks : 60

2 Marks

30 x 2 = 60

1) Who discovered natural radioactivity?

   Answer : Henri Becquerel

2) Which radioactive material is present in the ore of pitchblende?

   Answer : Radium.

3) Write any two elements which are used for inducing radioactivity?

   Answer : Boron, Aluminium

4) Write the name of the electromagnetic radiation which is emitted during a natural radioactivity.

   Answer : Gamma radiation

5) If A is a radioactive element which emits an α - particle and produces $_{104}Rf^{259}$. Write the atomic number and mass number of the element A.

   Answer : Atomic number -106 ; Mass number - 263 (In alpha decay atomic number decrease by two and mass number decrease by four)

6) What is the average energy released from a single fission process?

   Answer : The average energy released from a single fission process is 200 MeV = 3.2 x 10^{-11}J

7) Which hazardous radiation is the cause for the genetic disease?

   Answer : Gamma Radiation

8) What is the amount of radiation that may cause death of a person when exposed to it?

   Answer : 600 R.

9) When and where was the first nuclear reactor built?

   Answer : 1942 at Chicago, USA.

10) Give the SI unit of radioactivity

   Answer : Becquerel (Bq).

11) Which material protects us from radiation?

   Answer : Lead.

12) Calculate the amount of energy released when a radioactive substance undergoes fusion and results in a mass defect of 2 kg.

   Answer : Mass defect in the reaction (m) = 2 kg
   Velocity of light (c) = 3 × 108 m s^{-1}
   By Einstein's equation,
   Energy released E = mc^2
   So E = 2 × (3 × 108^8)^2 = 1.8 × 10^{17}J

13) Define radioactivity. What are radioactive elements?

Answer : The phenomenon of nuclear decay of certain elements with the emission of radiations like alpha, beta and gamma rays is called as "radioactivity" and the elements which undergo this phenomenon are called as "radioactive elements".

14) Name the elements which undergoes spontaneous radioactivity.

Answer : The elements whose atomic number is more than 83 undergo spontaneous radioactivity.
Ex : Uranium, Radium, etc.
Technetium (Tc) with atomic number 43 and Promethium (Pm) with atomic number 61 are the only tow radio active substances.

15) Define Curie.

Answer : Curie is the traditional unit of radio activity. It is defined as the quantity of a radioactive substance which undergoes 3.7×10^{10} disintegrations in one second. This is actually close to the activity of 1 g of $Radium^{226}$".
1 curie = 3.7×10^{10} disintegrations per second.

16) What is meant by leakage of neutrons?

Answer : Escape of neutrons during nuclear fission process from the system is called leakage of neutrons.

17) What is Nuclear Fusion?

Answer : The process in which two lighter nuclei combine to form a heavier nucleus is termed as "nuclear fusion".
E.g: $_1H^2 + {}_1H^2 - {}_2He^4 + Q$ (Energy)
Here, $_1H^2$ represents an isotope of hydrogen known as "deuterium". The average energy released in each fusion reaction is about 3.84×10^{-12} J.

18) Name the nuclear power stations in Tamil Nadu.

Answer : Kalpakkam and Kudankulam.

19) What is meant by chain reaction?

Answer : A chain reaction is a self propagating power in which the number of neutrons goes on multiplying rapidly almost in a geometrical progression.

20) What is called Artificial Radio activity?

Answer : The phenomenon by which even light elements are made radioactive, by artificial or induced methods, is called 'artificial radioactivity' or 'man-made radioactivity'.

21) Compare between Natural and Artificial Radioactivity.

Answer :

S.No.	Natural radioactivity	Artificial radioactivity
i	Emission of radiation due to self-disintegration of a nucleus.	Emission of radiation due to disintegration of a nucleus through the induced process.
ii	Alpha, beta and gamma radiations are emitted.	Mostly elementary particles such as neutron, positron, etc., are emitted.
iii	It is a spontaneous process.	It is an induced process.
iv	Exhibited by elements with atomic number more than 83.	Exhibited by elements with atomic number less than 83.
v	This cannot be controlled.	This can be controlled.

22) Define the term Curie.

Answer : Curie: It is the traditional unit of radioactivity. It is defined as the quantity of a radioactive substance which undergoes 3.7×10^{10} disintegrations in one second. This is actually close to the activity of 1 g of radium 226. 1 curie = 3.7×10^{10} disintegrations per second.

23) Define the unit Becquerel.

Answer : It is The SI unit of radioactivity is becquerel. It is defined as the quantity of one disintegration per second.

24) Define the unit Roentgen.

Answer : It is The radiation exposure of y and x-rays is measured by another unit called roentgen. One roentgen is defined as the quantity of radioactive substance which produces a charge of 2.58×10^{-4} coulomb in 1 kg of air under standard conditions of pressure, temperature and Humidity.

25) Explain Electron Volt.

Answer : Electron Volt (eV) is the unit used in nuclear physics to measure the energy of small particles. It is nothing but the energy of one electron when it is accelerated using an electric potential of one volt. LeV = 1.602×10^{-19} joule. 1 million electron volt = 1 MeV = 10^6 eV (mega electron volt) The energy released in a nuclear fission process is about 200 MeV.

26) Define Nuclear Fusion.

Answer : The process in which two lighter nuclei combine to form a heavier nucleus is termed as 'nuclear fusion'. E.g: $_1H2$ + $_1H2$ --- > $_2He^4$ + Q (Energy) Here, $_1H^2$ represents an isotope of hydrogen known as 'deuterium'. The average energy released in each fusion reaction is about 3.84×10^{-12} J.
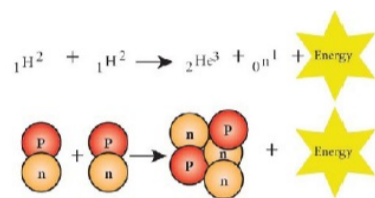
27) How old is our mother Earth? Any guess?

Answer : It is nearly 4.54×10^9 years (around 45 Crore 40 lakh years).

28) Why does not natural radioactivity take place elements which have atomic numbers less than 83?

Answer : i) Lighter elements have a greater nuclear force.
ii) This force holds nucleons within the nucleus. So no radiation comes out from lighter elements.

29) Why does mean $_{13}Al^{27}$,(a,n), $_{15}P^{30}$?

Answer : Alpha particle is used as projectile toward $_{13}Al^{27}$, and we get $_{15}P^{30}$, and a neutron (i.e)
$_{13}Al^{27} + _2He^4 \rightarrow _{15}P^{30*} + _0n^1$.

30) Write any two properties of gamma radiation.

Answer : i) They are electromagnetic waves consisting of photons.
ii) Neutral particles. Charge of each gamma particle = zero.