





PHYSICS

RESONANCE ENGLISH

NUCLEAR PHYSICS



1. As the mass number A increases, which of the following quantities related to a nucleous do not change A. mass

B. volume

C. density

D. binding energy

Answer: C

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2. Fusion reaction takes place at high

tamperature because

A. atoms get ionized at high temperature B. molecules get decomposed at high temperature C. nuclei get decomposed at high temperature D. due to their energy nuclei overcome their mutual repulsion and combines

Answer: D

3. Two protons are kept at a separation of 10nm. Let F_n and F_e be the nuclear force and the electromagnetic force between them.

A.
$$F_n > \ > F_e$$

$$\mathsf{B.}\,F_n=F_e$$

$$\mathsf{C}.\,F_n < \ < F_e$$

D.
$$F_n pprox F_e$$

Answer: C



4. In a fast breeder atomic reactor

A fast neutrons converts natural uranium into fissionable fuel and released energy B. thermal neutrons cause fission of enriched uranium and released energy C. Fast neutrons cause fission of enriched uranium and release more energy D. thermal neutrons cause fission of natural uranium and produce energy

Answer: C



5. If m, m_n and m_p are masses of $._Z X^A$ nucleus, neutron and proton respectively.

A.
$$M=(A-Z)m_n+Zm_p$$

- $\mathsf{B}.\,M=Zm_n+(A-Z)m_p$
- $\mathsf{C}.\,M < (A-Z)m_n + Zm_p$

D. $M > (A-Z) + Zm_p$

Answer: A



6. A positron of 1MeV collides with an electron of 1MeV and gets annihilated and the reaction produces two γ – ray photons. If the effective mass of each photons is 0.0016amu, then the energy of each γ – ray photon is about-

A. 1.5 MeV

B. 3MeV

C. 6MeV

D. 2 MeV

Answer: B



7. If mass of the fissionable material is less

than the critical mass, then

A. fission and chain reaction both are

impossible

B. fission is possible but chain reaction is

impossible

C. fission is impossible but chain reaction is

possible

D. fission and chain reaction both are

possible.

Answer: A

8. If the total binding energies of $._1 H^2$, $._2 He^4$, $._{26} Fe^{56}$ and $._{92} U^{235}$ nuclei are 2.22, 28.3, 492 and 1786*MeV* respectively, identify the most stable nucleus out of the following

A. $._{26} Fe^{58}$ B. $._1 H^2$ C. $._{92} U^{235}$

 $\mathsf{D}_{\cdot \cdot 2} \; He^4$

Answer: D

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9. The binding energies per nucleon for a deuteron and an lpha-particle are x_1 and x_2 respectively. The energy Q released in the reaction ${}^2H_1 + {}^2H_1
ightarrow {}^4He_2 + Q$ is

A.
$$(x_1+x_2)$$

- $\mathsf{B.}\left(x_2-x_1\right)$
- $\mathsf{C.}\,4(x_1-x_2)$
- D. $4(x_2-x_1)$

Answer: D



10. If the mass of proton= 1.008 a.m.u. and mass of neutron=1.009a.m.u. then binding energy per nucleon for $._4 Be^9$ (mass=9.012 amu) would be-

A. 0.065 MeV

B. 60 .44MeV

C. 0.7 MeV

D. 6.72 MeV

Answer: C

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11. The binding energies of two nuclei P^n and Q^{2n} and x and y joules. If 2x > y then the energy released in the reaction $P^n + P^n o Q^{2n}$, will be

A. 2x+y

B. 2x-y

$$\mathsf{C}.-(2x-y)$$

D. x+y

Answer: B

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12. One requires energy E_n to remove a nucleon from a nucleus and an energy E_e to remove an electron from the orbit of an atom.

Then

A. $E_n < E_e$

$$\mathsf{B.}\, E_e\,<\,E_n$$

 $\mathsf{C}.E_e = E_n$

D. nothing can be stated

Answer: C



13. Slow neutron are sometimes refer to as

thermal neutrons because

- A. neutron being heated
- B. the energy of these neutrons is equal to

the energy of neutrons in a heated atom

C. these neutrons have energy of neutrons

in a neutron has at normal temperature

D. such neutrons gather energy released in

the fission process

Answer: C

14. Which of the following is correct about nuclear forces?

A. these are the strongest among forces

B. these are short range force

C. these are charge independent forces

D. all of the above

Answer: D

15. The graph between the binding energy per

nucleon (E) and atomic mass number (A) is as-





Answer: D



16. The probability of a radioactive atoms to survive 5 times longer than its half-value period is-

A.
$$\frac{2}{5}$$

B. 2x5
C. 2^{-5}

D. 2^5

Answer: C



17. After emission of an α – particle by a radiative element $._{84} X^{212}$, the resulting element would be-

A.
$$._{84} Y^{210}$$

B. $._{82} Y^{208}$
C. $._{84} Y^{208}$
D. $._{86} Y^{210}$

Answer: B



18. The SI unit of activity is-

A. Curie

B. rutherford

C. becquerel

D. sievert

Answer: C

19. The specific activity of radius is nearly-

A. 1Bq

B. 1Ci

C. $3.7 imes 10^{10}Ci$

D.1mCi

Answer: B

20. After a time equal to four half lives, the amount of radioactive material remaining undecayed is-

A. 6.25~%

B. 12.5 %

C. 25~%

D. 50~%

Answer: A



21. The mean of life of a radioactive sample is 100 years. Then after 100 years, about-

A. 0% of the sample remains active

B. 37% of the simple remains active

C. 63% of the sample remain active

D. 50 % of the sample remains active

Answer: B

22. The count rate of 10g of radioactive material was measured at different times and times has been shown in the figure. The half-life of material and the total counts (approximately) in the first half life period, respectively are.



Time (in hr)

A. 4h,9000

B. 3h,14000

C. 3h,235

D. 3h,50

Answer: B

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23. How many atoms decay in one mean life

time of a radioactive sample-

A. 37~%

B. 63~%

C. 50~%

D. 100~%

Answer: B

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24. The half life of radioactive substance is T.

Then the fraction of the substance that has

decayed in time t is-

A. (t/T)

 $\mathsf{B.}\,2^{t\,/\,T}$

C.
$$(1/2)^{t/T}$$

D.
$$1-\left(1/2
ight)^{t/T}$$

Answer: D



25. The half-life of a radioactive substance is 3h and its activity is $1\mu Ci$. Then the activity after 9h will be (in μCi)-



Answer: D



26. The half -life of cobalt-60 is 5.25 years. How

long after a new sample is delivered, will the

activity have decreased to about one third $\left(1/3
ight)$ of its original value-

A. 5.25 years

B. 8.3 years

C. 10.50 years

D. 15.75 years

Answer: B

27. A radioactive element $ThA(._{84} Po^{216})$ can undergo α and β are type of disintegrations with half-lives, T_1 and T_2 respectively. Then the half-life of ThA is

A. $T_1 + T_2$

- $\mathsf{B.}\,T_1T_2$
- $C. T_1 T_2$

D.
$$rac{T_1T_2}{T_1+T_2}$$

Answer: D



28. A radioactive nucleus undergoes a series of decay according to the scheme $A \xrightarrow{\alpha} A_1 \xrightarrow{\beta} A_2 \xrightarrow{\alpha} A_3 \xrightarrow{\gamma} A_4$ if the mass number and atomic number of A are 180 and 72 respectively, then what are these number for A_3

A. 171 and 69

B. 174 and 70

C. 176 and 69

D. 176 and 70

Answer: A

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29. Compare the ionising power of α , β and γ radiations.

A.
$$lpha > \gamma > eta$$

 $\mathsf{B.}\,\alpha>\beta>\gamma$

 $\mathsf{C}.\,\alpha<\beta<\gamma$

D.
$$lpha > eta < \gamma$$

Answer: B

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30. In nuclear power station energy of uranium is used for producing-

A. Electric energy

B. Mechanical energy

C. Heat energy

D. magnetic energy

Answer: A

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31. The order of magnitude of the density of nuclear matter is=

A.
$$10^4 kg/m^3$$

B. $10^{17} kg/m^3$

C. $10^{27} kg/m^3$

D. $10^{34} kg/m^3$

Answer: B

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32. The Process by which a heavy nucleus splits into light nuclei is known as-

A. fission

B. α -decay

C. Fussion

D. chain reaction

Answer: A





B. 3H

C. $3._0 n^1$

D. none of these

Answer: C



34. Boron rods are used in nuclear reactor as

A. moderator

- B. control rods
- C. coolant

D. protective shield

Answer: B

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35. Staements I: $._{z} X^{4}$ undergoes 2α -decays, 2β -decays (negative β) and 2γ -decays. As a result, the daughter product is $._{z} . -2 X^{A-B}$. Staements II: In α -decay, the mass number decreases by 4 unit and atomic number decreases by 2 unit. In β -decay (negative β), the mass number remains unchanged and atomic number increases by 1 unit. In γ -decay, mass number and atomic number remain unchanged.

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 but statement-2 is

false

D. Statement-1 is false, Statement-2 is true

Answer: A