A.R COACHING CENTRE

UG-TRB, PG-TRB, POLY-TRB, ENGG-TRB, TNSET COACHING FOR PHYSICS
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PG TRB - 2019

Subject Name: **Unit-IX: Nuclear Physics** **Time**: 2 Hours
Test Type: Full Unit **Maximum Marks**: 100

1. Nuclear force is
(i) Charge dependent, (ii) Charge independent, (iii) Spin independent, (iv) Have saturation property, (v) Non - central force.
   a. i, ii, v are correct
   b. i, iii, iv are correct
   c. i, iv, v are correct
   d. ii, iv, v are correct

2. The angular momentum of neutrino is,
   a. $\hbar$
   b. $\frac{\hbar}{2}$
   c. $\frac{\hbar}{3}$
   d. $\frac{\hbar}{4}$

3. Quadrupole moment is exhibited by ..... nuclei.
   a. ellipsoidal
   b. spherical
   c. linear
   d. None of these

4. The ground state of deuteron is
   a. a pure s-state
   b. a pure d-state
   c. a pure p-state
   d. a mixture of s and d states

5. Proton and neutron are classified is a
   a. non - strange baryons
   b. strangeness baryon
   c. strangeness -2- baryons
   d. non - strange meson

6. Non - conservation of parity is observed in
(i) β-decay, (ii) weak interaction, (iii) strong interaction, (iv) electromagnetic interaction, (v) α-decay. Correct term are,
   a. i, ii, iv
   b. ii, iii, v
   c. i, iv, v
   d. i, ii

7. $\pi^{\pm}$, π^{o} particle are classified as,
   a. leptons
   b. non - strange mesons
   c. strange mesons
   d. non - strange baryons

8. The burning of heavy nuclei is
   a. more sensitive to temperature
   b. less sensitive to temperature
   c. independent of temperature
   d. not possible at all

9. The elementary particles for which the spin of zero is
   a. neutron
   b. π-meson
   c. proton
   d. μ- meson

10. Neutron can be detected by,
   a. proportional counter
   b. ionization counter
   c. GM counter
   d. scintillation counter

11. A Geiger-Muller counter collects 10^7 electrons per discharge. The average current in the circuit is 1.33×10^{-11} A. Then the counting rate per minute is ($e = 1.6 \times 10^{-19}$ $coulomb$)
   a. 500
   b. 400
   c. 600
   d. 300

12. A neutron is
   a. a hadron, but not fermion
   b. a lepton, but not a baryon
   c. a boson, but not a meson
   d. None of the these

13. The liquid drop model of the nucleus is based on
   a) weak interaction of the nucleus.
   b) strong interaction among the nucleus.
   c) electromagnetic interaction among the nucleus.
   d) parity.

14. The charge distribution in the ground state of deuteron is
   a. spherical shape
   b. oblate shape
   c. prolate shape
   d. none of the above

15. Exchange of spin coordinates give rise to
   a. Mejorana exchange
   b. Heisenberg exchange
   c. Bartlett exchange
   d. Meson exchange

16. The contribution of surface energy to the total binding energy of the nucleus is proportional to
   a. $-A^{2/3}$
   b. $A^{2/3}$
   c. $A^{1/3}$
   d. $A^{-2/3}$

17. Quadrupole moment is given by the formula
   a. $Q = \frac{e}{2}(3z^2 - r^2)$
   b. $Q = \frac{e}{2}(3z^2 + r^2)$
   c. $Q = e\,(3z^2 - r^2)$
   d. $Q = e\,(3z^2 + r^2)$

18. Fermi age τ is given by $\tau =$
   a. $\frac{1}{6}\,\overline{r}$
   b. $\frac{1}{6}\,\overline{r}^2$
   c. $\left(\frac{1}{6}\,\overline{r}^2\right)^{1/2}$
   d. $\frac{1}{6}\,\overline{r}^{-2}$

19. Typical energy released in a nuclear fission and a nuclear fusion reactions are respectively
    a. $50\ MeV\ \ and\ \ 1000\ MeV$
    b. $200\ MeV\ \ and\ \ 1000\ MeV$
    c. $200\ MeV\ \ and\ \ 10\ MeV$
    d. $1000\ MeV\ \ and\ \ 50\ MeV$

20. The asymmetry terms in the Weizsacker semi-empirical mass formula is because of
    a) non - spherical shape of the nucleus
    b) non - zero spin of the nucleus
    c) unequal number of protons and neutrons inside the nucleus
    d) odd number of protons inside the nucleus

21. The ionization power is maximum for
    a. neutrons
    b. gamma rays
    c. beta particles
    d. alpha particles

22. In a scintillation counter, the scintillator generally used is
    a. anthracene
    b. argon
    c. camphor
    d. neon

23. In Carbon-Nitrogen cycle process ..... act as a catalyst
    a. C^{13}
    b. C^{12}
    c. ${}_1H^1$
    d. ${}_2He^4$

24. Nuclear fusion produced by very high temperature is called
    a. Chemical reaction
    b. Physical reaction
    c. Directional property
    d. Thermonuclear reaction

25. The shape of Yukava potential is $V(r) =$
    a. $V_o\ e^{-r/r_o}$
    b. $-V_o\ e^{-r^2/r_o^2}$
    c. $-\dfrac{V_o\ e^{-r/r_o}}{r/r_o}$
    d. $-\dfrac{V_o\ e^{-r^2/r_o^2}}{r^2/r_o^2}$

26. The collective model of nucleus was developed by
    a. de - Broglie
    b. Aage Bohr and Moltelson
    c. Nilson
    d. Fermi

27. The nuclear energy levels were introduced by
    a. liquid drop model
    b. shell model
    c. collective model
    d. radioactivity model

28. Primary cosmic rays consist of
    a. electrons
    b. protons
    c. neutrons
    d. Mesons

29. Semi magic numbers are

a. 6, 14, 28, 40 b. 2, 8, 20, 50

c. 6, 14, 28, 50 d. 2, 6, 14, 28

30. In nuclear reaction $Li^7(p,\ x)\ He^4$, the particle x is,

a. p b. d

c. n d. α

31. Semi - empirical mass formula not suitable for

a. $A < 15$ b. $A > 15$

c. $A = 15$ d. $A = 20$

32. The potential between two nucleons is,

a. $V(r) = g^2\ \frac{e^{-\mu r}}{r}$ b. $V(r) = -g^2\ \frac{e^{-\mu r}}{r}$

c. $V(r) = g\ \frac{e^{-\mu r}}{r}$ d. $V(r) = -g\ \frac{e^{-\mu r}}{r}$

33. Which one is not conserved in nuclear reactions,

a. Linear momentum b. Angular momentum

c. Electric quadrupole moment d. Parity

34. The ratio of the size ${}_{82}Pb^{208}$ and ${}_{12}Mg^{26}$ nuclei is approximately

a. 2 b. 3.9

c. 2.23 d. 2.7

35. Binding energy of the α - particle is

a. 28.3 meV b. 28.3 MeV

c. 2.83 meV d. 2.83 MeV

36. In the semi empirical mass formula asymmetry energy correction is

a. classical effect b. electromagnetic effect

c. quantum mechanical effect d. quadrupole effect

37. Physical quantities that are conserved in a nuclear reaction are

(i) Energy. (ii) Charge. (iii) Spin. (iv) Hyper charge

a. i, iii, iv are correct b. i, ii, iii are correct

c. i, ii, iv are correct d. i, iv are correct

38. Assertion (A) : Nuclear force is very attractive.
Reason (R) : Stable nuclei exist in nature.

a) A and R are true but R is the correct explanation.

b) A and R are true but R is not the correct explanation.

c) A is true but R is false.

d) A is false but R is true.

39. Radius of nucleus Al^{27} is 3.6 $fermi$. The approximate nuclear radius of Cu^{64} is,
    a. 8.5 $fermi$
    b. 7.2 $fermi$
    c. 4.8 $fermi$
    d. 5.2 $fermi$

40. The decay chain for $_{92}U^{238}$ nucleus involves eight α - decays and six β - decays. The final nucleus at the end of the process .....
    a. $Z = 88,\ A = 206$
    b. $Z = 84,\ A = 224$
    c. $Z = 82,\ A = 206$
    d. $Z = 76,\ A = 200$

41. Atoms which have isobaric nuclei have
    a) same mass numbers and same chemical properties
    b) different mass numbers and same chemical properties
    c) same mass numbers and different chemical properties
    d) different mass numbers and different chemical properties

42. A deuteron is the ground state consist of
    a) one proton and one neutron with anti parallel spins
    b) one proton and one neutron with parallel spins
    c) two protons with parallel spins
    d) two neutrons with parallel spins

43. The ground state of the deuteron has a small positive electric quadrupole moment. This is manifestation of the
    a) Extremely small range of the nuclear force
    b) Tensor nature of the nuclear force
    c) Charge independent of the nuclear force
    d) Charge dependent of the nuclear force

44. Which of the following reaction is possible?
    a. $_4Be^{10} + {}_2He^4 \longrightarrow {}_6C^{13} + {}_1H^1$
    b. $_5B^{10} + {}_0n^1 \longrightarrow {}_6C^{11} + e^-$
    c. $_{11}Na^{23} + {}_1H^1 \longrightarrow {}_{10}Ne^{20} + {}_2He^4$
    d. $_7N^{13} + {}_1H^1 \longrightarrow {}_6C^{14} + e^- + \nu$

45. The four possible configuration of neutrons in the ground state of $_4Be^9$ nucleus according to the shell model, and the associated nuclear spin are listed below. Choose the correct one
    a) $\left(1s_{1/2}\right)^2 \left(1p_{3/2}\right)^3\ ;\ j = 3/2$
    b) $\left(1s_{1/2}\right)^2 \left(1p_{1/2}\right)^2 \left(1p_{3/2}\right)^1\ ;\ j = 3/2$
    c) $\left(1s_{1/2}\right)^2 \left(1p_{3/2}\right)^2 \left(1p_{1/2}\right)^1\ ;\ j = 1/2$
    d) $\left(1s_{1/2}\right)^1 \left(1p_{3/2}\right)^4\ ;\ j = 1/2$

46. By capturing an electron $_{25}Mn^{54}_{29}$ transition into $_{24}Cr^{54}_{30}$ releasing
    a. a neutrino
    b. an antineutrino
    c. an α - particle
    d. a positron

47. The ground state of angular momentum and parity of $_{30}Zn^{67}$ are,

a. $\left(\frac{7}{2}\right)^{-}$ b. $\left(\frac{3}{2}\right)^{+}$

c. $\left(\frac{5}{2}\right)^{+}$ d. $\left(\frac{5}{2}\right)^{-}$

48. Analyse the statements given below
i. The density of nucleus is independent of its volume.
ii. The existence non-zero quadrupole moments shows the nucleus non-spherical.
iii. Nucleus density very low than other.
iv. 184 is magic number.

a) All the four statements are correct

b) All the four statements are wrong

c) Statements i and ii are correct, iii and iv are wrong

d) Statements i, ii, and iv are correct, iii is wrong

49. A. The electromagnetic force is cause by the exchange of photon (or) charged particles.
B. Strong nuclear force arises from exchange of mesons.
C. Weak nuclear force arises from exchange of vector bosons.
D. Gravitation force arises due to exchange of gravitons.
The true statements are,

a. A and B only b. B and C only

c. A, B and D only d. All of these

50. Match the following,

(1) Direct reaction	–	(A) Low energy reaction
(2) Compound reaction	–	(B) (d, p), (d, n)
(3) Stripping reaction	–	(C) (p, d), (n, d)
(4) Pick-up reaction	–	(D) High energy reaction

a) (1) - A, (2) - D, (3) - B, (4) - C

b) (1) - A, (2) - D, (3) - C, (4) - B

c) (1) - D, (2) - A, (3) - B, (4) - C

d) (1) - D, (2) - A, (3) - C, (4) - B

51. The fission start 1000 neutrons and 1050 neutrons are ready to fission in next generation. Calculate the multiplication factor.

a. 0.9523 b. 1.05

c. ∞ d. 0

52. Fission of one atom of U^{235} releases 200 MeV energy. Calculate the amount of energy released by 10^{-3} kg of uranium.

a. 5.126×10^{23} MeV b. 5.126×10^{26} MeV

c. 5.126×10^{20} MeV d. 1.7×10^{23} MeV

53. The precise masses in the reaction $H^1 + F^{19} \longrightarrow He^4 + O^{16}$.

Determine the Q value and the nature of the reaction, (Given, $m_p = 1.007825\ amu$, $m_n = 1.008665\ amu$, mass of $F^{19} = 18.998405\ amu$, mass of $He^4 = 4.002603\ amu$, mass of $O^{16} = 15.994915\ amu$) .

a. $8.11\ eV$ and exoergic
b. $8.11\ eV$ and endoergic
c. $8.11 \times 10^6\ eV$ and exoergic
d. $8.11\ MeV$ and endoergic

54. According to the liquid drop model, the fission process occurs due to

a) Pairing of nucleons
b) Neutron - proton asymmetry
c) Large oscillations
d) A competition between surface energy and coulomb energy

55. Which equation is an example of artificial transmutation?

a. ${}_{92}U^{238} \longrightarrow {}_2He^4 + {}_{90}Th^{234}$
b. ${}_{13}Al^{27} + {}_2He^4 \longrightarrow {}_{15}P^{30} + {}_0n^1$
c. ${}_6C^{14} \longrightarrow {}_7N^{14} + e^- + \nu$
d. ${}_{88}Ra^{226} \longrightarrow {}_2He^4 + {}_{86}Ra^{222}$

56. One of the following properties of a nucleus is decided by the shape of the nucleus. Which one is it?

a. Mass of the nucleus
b. Electric dipole moment
c. Electric quadrupole moment
d. Magnetic moment

57. According to collective model the shape and quadrupole moment of odd-odd nuclei

a. Spherical and finite
b. Non-spherical and zero
c. Spherical and zero
d. Non-spherical and finite

58. The deuteron quadrupole moment can be explained by,

a. weak forces
b. hadronic forces
c. gravitational forces
d. tensor forces

59. If 200 MeV energy is released in the fission of a single nucleus ${}_{92}U^{235}$, how many fission must occur per second to produce a power of 1 kW

a. 3.125×10^{10}
b. 2.260×10^{10}
c. 3.125×10^{13}
d. 2.260×10^{13}

60. A nucleus is in excited state. It is not able to de-excite itself by gamma emission, it can de-excite through

a. Electron capture
b. Internal conversion
c. Alpha decay
d. Beta decay

61. The nuclesi having mass number as a multiple of four and n/p ratio equal to unity will be

a. most unstable
b. most stable
c. early stable
d. non-existent

62. Match the following,

List-I (Principle)	–	List-II (Process)
(A) Conservation of changes	–	(1) neutrino in beta decay
(B) Conservation of energy	–	(2) weak interaction
(C) Violation of parity	–	(3) Pair production in the vicinity of a nucleus
(D) Conservation of momentum	–	(4) Annihilation of deuteron and positron

a) (A) - 4, (B) - 1, (C) - 3, (D) - 2
b) (A) - 1, (B) - 3, (C) - 2, (D) - 4
c) (A) - 4, (B) - 1, (C) - 2, (D) - 3
d) (A) - 2, (B) - 4, (C) - 1, (D) - 3

63. Even-Even nuclei have total ground state angular momentum J is equal to
a) the vector sum of the unpaired neutron and unpaired proton j values.
b) the vector sum of the least neutron and the least proton j values.
c) zero
d) unit always

64. Match the following,

List-I (Types of Interaction)	–	List-II (Field quanta)
(A) Strong interaction	–	(1) Graviton
(B) Electromagnetic interaction	–	(2) Photon
(C) Weak interaction	–	(3) Intermediate vector boson
(D) Gravitational interaction	–	(4) Pion

a) (A) - 4, (B) - 3, (C) - 1, (D) - 2
b) (A) - 1, (B) - 2, (C) - 3, (D) - 4
c) (A) - 4, (B) - 2, (C) - 3, (D) - 1
d) (A) - 3, (B) - 4, (C) - 2, (D) - 1

65. The uranium nucleus at rest decays as given

$_{92}U^{235} \longrightarrow {}_{90}Th^{231} + {}_{2}He^{4}$

Which of the following is correct?
a) Each decay product has same kinetic energy.
b) The helium nucleus has more kinetic energy than that of the thorium nucleus.
c) Each decay product has same speed.
d) The decay products tend to go in the same direction.

66. Fusion of small nuclei and fission of heavy nuclei, both release large amount of energy. Which forces are responsible for the energy release in two cases?
    a) Strong nuclear force for fusion and weak nuclear force for fission.
    b) Strong nuclear force for fusion and coulomb force for fission.
    c) Coulomb force for both.
    d) Strong nuclear force for both.

67. If the mass of the reactants is larger than the mass of products, the reaction is said to be
    a. Exoergic reaction
    b. Endoergic reaction
    c. Elastic scattering
    d. None of the above

68. Find out wrong one
    a) Finite quadrupole moments must exist only for nuclei having spin $(I) \geq 1$.
    b) One nuclear magneton value is 3.152×10^{-8} eV/T.
    c) The energy required to decompose a nucleus into its constituent nucleons is termed as the binding energy of the nucleus.
    d) Binding of the hydrogen atom $(B.E) = \left[(Zm_H + Nm_n) + {}_ZM^A\right] c^2$.

69. What radius is needed in proton synchrotron to attain particle energies of 10 GeV, assuming that a guide field of 1.8 $Weber/m^2$ is available?
    a. 2.031 m
    b. 203.1 m
    c. 2.0×10^2 m
    d. 0.203×10^2 m

70. In proton synchrotron, proton moves in path of the radius is
    a. Constant
    b. Remain constant
    c. ∞
    d. 0

71. Find wrong one in synchrocyclotron
    a) The energy limited has been removed in modified form of the cyclotron called synchrocyclotron.
    b) The frequency of the applied electric field is varied.
    c) $\alpha-$ particle with energies of 400 MeV have been produced.
    d) The motion of the ion becomes radially stable and the paths becomes operating spirals.

72. A particle cyclotron is designed with does of radius 75 cm and with magnets that can provide a field a field of 1.5 T then,
    i. To what frequency should the oscillator be set if deuterons are to be accelerated?
    ii. What is the maximum energy of deuterons that can be obtained?
    a. i.12.00 MHz ii.17.95 MeV
    b. i.19.85 MHz ii.20.28 MeV
    c. i.11.45 MHz ii.30.26 MeV
    d. i.13.72 MHz ii.36.19 MeV

73. In Geiger-Muller counter dead time, recovery time and resolving time ordered approximately,
    a. 200 μs, 100 μs *and* 300 μs
    b. 100 μs, 200 μs *and* 400 μs
    c. 500 μs, 100 μs *and* 400 μs
    d. 100 μs, 100 μs *and* 200 μs

74. In advantages of bubble chamber, identity which of the following is wrong.
    a) The tracks obtained in a bubble chamber are sharper.
    b) Highly energetic particles can be stopped within the liquid and hence their ranges can be measured.
    c) Particles of low ionizing produce good tracks in bubble chamber.
    d) Cosmic ray phenomenon are not improved.

75. The Moderating ratio is
    a. $M = \varepsilon_e \dfrac{\sigma_{sc}}{\sigma_a}$
    b. $M = \varepsilon_e \dfrac{\sigma_a}{\sigma_{sc}}$
    c. $M = \dfrac{\sigma_{sc}}{\varepsilon_e\ \sigma_a}$
    d. $M = \dfrac{\sigma_a}{\varepsilon_e\ \sigma_{sc}}$

76. The first simple and logical explanation of the $\alpha-$ ray spectra was given by,
    a. Fermi
    b. Gamow
    c. Pauli's
    d. Yukava

77. The upper limit of the continuous $\beta-$ spectrum corresponds to the case where
    a) electron is emitted with zero energy.
    b) neutron is emitted with zero energy.
    c) both electron and neutrino are emitted with zero energy.
    d) both are emitted with maximum energy.

78. The atomic number of fission products in the nuclear fission of U^{235} range
    a. from 20 *to* 40
    b. from 30 *to* 40
    c. from 35 *to* 58
    d. from 40 *to* 80

79. The nuclear stability is determined by
    a. neutron/proton ratio
    b. mass of the nucleus
    c. radius of the nucleus
    d. all of the above

80. The acceleration that works on the principle of synchronous acceleration is
    a. Betatron
    b. Linear accelerator
    c. Cockcroft-Walton
    d. Vande graft generator

81. A satisfactory quenching gas must have only three main properties but given four
    1. Its ionization potential should be lower than that of the main counting gas in the tube. To suppress electron ejection completely it may be less than twice the cathode work function.
    2. It must have broad and intense ultraviolet absorption bands.
    3. When in an excited state it must prefer to dissociate rather than to de-excite by the emission of photons.
    4. The process of removing partly, the ions from the chamber due to the continuous discharge.

    Find wrong one,
    a. 1
    b. 2
    c. 3
    d. 4

82. According to diffusion equation

1. The diffusion equation taking into account the slowing down also called Fermi age equation.
2. If the reactor operating at steady state $\frac{\partial n}{\partial t} = 0$.
3. The diffusion equation is the first order differential equation.
4. The neutron age is a direct measure of the degree of moderation.

a. 1, 2, and 4 are correct
b. 1, 3, and 4 are correct
c. 2, 3, and 4 are correct
d. 1, 2, and 3 are correct

83. The electrostatic repulsion between protons tends to the binding energy is,

a. decrease
b. increase
c. not alter
d. make zero

84. A free neutron decays into a proton with the emission of

a. electron
b. photon
c. phonon
d. positron

85. The angular frequency of cyclotron is

a. $\omega = Bem$
b. $\omega = \frac{e}{m}$
c. $\omega = \frac{B}{m}$
d. $\omega = \frac{Be}{m}$

86. In Fermi's theory of $\beta-$ the important thing is

a) to find out a value of $\beta-$ transformation.
b) to calculate the probability of $\beta-$ transformation.
c) to find out the parity of $\beta-$ transformation.
d) none of the above

87. According to scintillation counter

1. Scintillations counted by spinthariscope.
2. The energy of the particle converted into light.
3. Each of the dynodes is maintained at a voltage lower than other.
4. The dynode has a venential blind structure.
5. If N is the multiplication of electron factor of a single dynode state and there are n stages, then the total amplification is $(N)^n$

Codes:

a. All are correct
b. 1, 2, and 3 are correct
c. 1, 2, 4, and 5 are correct
d. 1, 3, 4, and 5 are correct

88. The final kinetic energy acquired by the particle in a cyclotron does not depend on the magnitude of

a) the voltage applied across the does.
b) the magnetic field applied across the does.
c) the mass of particle.
d) the radius of the paths.

Padasalai

89. Find wrong one
    a) $n+\pi^{+} \longrightarrow p, \quad n-\pi^{-} \longrightarrow p, \quad n+\pi^{o} \longrightarrow n$
    b) $p+\pi^{-} \longrightarrow n, \quad p-\pi^{+} \longrightarrow n, \quad p+\pi^{o} \longrightarrow p$
    c) $n+\pi^{+} \longrightarrow p, \quad n+\pi^{-} \longrightarrow p, \quad p+\pi^{o} \longrightarrow p$
    d) $p+\pi^{-} \longrightarrow n, \quad n-\pi^{-} \longrightarrow p, \quad n+\pi^{o} \longrightarrow n$

90. An ideal nuclear reactor moderators should have
    a) High atomic weight and low absorption cross section for neutrons.
    b) Low atomic weight and low absorption cross section for neutrons.
    c) Low atomic weight and high absorbtion cross section for neutrons.
    d) High atomic weight high low absorption cross section for neutrons.

91. Match the following,

(A) Escape rate	–	(1) D_2O
(B) Production rate	–	(2) Cadmium
(C) Control rod	–	(3) r^3
(D) Moderator	–	(4) r^2

    a) (A) - 4, (B) - 3, (C) - 1, (D) - 2
    b) (A) - 4, (B) - 3, (C) - 2, (D) - 1
    c) (A) - 3, (B) - 4, (C) - 1, (D) - 2
    d) (A) - 3, (B) - 4, (C) - 2, (D) - 1

92. Proton synchrotron called as
    a. Betatron and Cyclotron
    b. Bevatron and Cyclotron
    c. Cosmotron and Bevatron
    d. Cyclotron and Cosmotron

93. The Indian second research reactor is
    a. Apsara
    b. Circus
    c. Zerlina
    d. Purnima

94. Chain reaction can be set up only if the mass of fissionable material is
    a. less than the critical mass
    b. equal to the critical mass
    c. greater than the critical mass
    d. equal to 1 kg in all cases

95. PO^{212} emits $\alpha-$ particles whose kinetic energy is 10.54 MeV. The $\alpha-$ disintegration energy is,
    a. 10.84 MeV
    b. 10.47 MeV
    c. 10.34 MeV
    d. 10.74 MeV

96. Excited state of deuteron is
    a. exist
    b. not exist
    c. α
    d. maximum

97. The average binding energy per nucleon in a nucleus is
    a. 7.8 eV
    b. 931 MeV
    c. 6.8 MeV
    d. 7.8 MeV

98. Find wrong one according to alpha decay process
    a) The range is inversely proportional to pressure.
    b) The degree of hindrance depend upon the changes in angular momentum and parties in the transition.
    c) The fastest $\alpha-$ particle can penetrate the nucleus.
    d) The probability of the transmission through the barrier decreases exponentially as the thickness increases.

99. The parity of p-electron is
    a. odd
    b. even
    c. 0
    d. ∞

100. ${}_{35}Kr^{76}\ \left(\frac{9}{2}\right)^{+} \longrightarrow {}_{37}Rb^{85}\ \left(\frac{5}{2}\right)^{-}$, $\beta-$ decay iss
    a. Allowed, Fermi transition
    b. Allowed, Gamow-Teller transition
    c. First forbidden, Fermi transition
    d. First forbidden, Gamow-Teller transition