doubtnut
India's Number 1 Education App

PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

ATOMS, MOLECULES AND NUCLEI

Mcqs

1. The empirical atom model was given by

A. J.J. Thomson

B. Rutherford

C. Niels Bohr

D. Somerfeld

Answer: A

Watch Video Solution

2. The radius of the atom is of the order of

A. 10^{-6} m

B. 10^{-8} m

C. 10^{-10} m

D. 10^{-12} m

Answer: C

Watch Video Solution

3. Electron in the atom are held due to

A. Coulomb's forces

B. nuclear forces

C. gravitational forces

D. Vander forces

Answer: A

Watch Video Solution

4. Atom consists of electrons distributed in a positively charged sphere was proved by

A. Thomson

B. Rutherford

C. Bohr

D. Hertz

Answer: A

Watch Video Solution

5. Which of the following statement is correct in case of Thomson's atom model?

A. It explains the phenomenon of thermionic emission, photoelectric emission and ionisation

B. It could not explain emission of line spectra by elements

C. It could not explain scattering of α-particles

D. all of these

Answer: D

Watch Video Solution

6. The nuclear model of atom was given by

A. Avogadro

B. Niels bohr

C. John Dalton

D. Rutherford

Answer: D

Watch Video Solution

7. The existence of a positively charged nucleus in an atom was discovered by

A. Thomson

B. Rutherford

C. Maxwell

D. Bohr

Answer: B

Watch Video Solution

8. According to Rutherford, the positively charged nucleus of the atom has a radius of about

A. $10^{-14}m$

B. 10^{-12} m

C. 10^{-14} cm

D. 10^{-10} cm

Answer: A

Watch Video Solution

9. According to Rutherford, electrons revolve in a circular orbit around the nucleus in order to

A. attract protons

B. absorb energy

C. radiate energy

D. nullify attraction from nucleus

Answer: D

Watch Video Solution

10. According to classical theory, Rutherfor'd atom model is

A. stable

B. unstable

C. meta stable

D. both a and b

Answer: B

Watch Video Solution

11. Rutherford's atomic model was unstable because

A. nuclei will break down

B. electrons do not remain in orbit

C. orbiting electrons radiate energy

D. electrons are repelled by the nucleus

Answer: C

Watch Video Solution

12. The electrons of Rutherford's model would be expected to lose energy because, they

A. move randomly

B. jump on nucleus

C. radiate electromagnetic waves

D. escape from the atom

Answer: C

Watch Video Solution

13. The nuclear structure of the atom was discovered by Rutherford by bombarding metal foil with

A. X-rays

B. γ-rays

C. β-rays

D. α-rays

Answer: D

Watch Video Solution

14. The scattering of α-particles by metal foil can be explained by

A. Rutherford's model

B. Thomson's model

C. Bohr's model

D. all of these

Answer: A

Watch Video Solution

15. Rutherford's experiment of scattering of α-particles shows that atom

A. is positively charged

B. is negatively charged

C. has a large nucleus

D. has a very small, positively charged nucleus

Answer: D

Watch Video Solution

16. When α- particles are passed through a thin foil, then

A. they all pass through

B. they all are deflected

C. most of them are deflected

D. most of them pass without deflecting

Answer: D

Watch Video Solution

17. The deflection of α-particles through a thin foil is due to

A. repulsion by the nucleus

B. interactions with protons

C. attractiong to nuclei

D. collision with β-particles

Answer: A

Watch Video Solution

18. As the radius of the orbit goes on decreasing the electrons should emit a radiation of

A. constant frequency

B. increasing frequency

C. decreasing frequency

D. none of these

Answer: B

Watch Video Solution

19. According to Rutherford's atom model, the proposed path of an electron will be

A. circular

B. straight line

C. parabolic

D. spiral

Answer: A

Watch Video Solution

20. According to rutherford, electrons revolve round the nucleus in circular orbits due to

A. Cpulomb's force

B. nuclear forces

C. gravitational forces

D. Vander wall's force

Answer: A

Watch Video Solution

21. Alpha-particles that come closed to nuclei

A. are deflected more

B. are deflected less

C. make more collisions

D. are solved down more

Answer: A

Watch Video Solution

22. For a given value of n, the number of electrons in an orbit is

A. n

B. n^2

C. $2n^2$

D. $2n$

Answer: C

Watch Video Solution

23. Bohr's atom model is the modification of Rutherford's atom model by the application of

A. Newtons theory

B. Huygen's theory

C. Maxwell's theory

D. Planck's quantum theory

Answer: D

Watch Video Solution

24. According to Bohr's atom model, an electron can revolve around a nucleus, if its orbits is a circle of

A. unchanged radius

B. permitted radius

C. increasing radius

D. decreasing radius

Answer: B

Watch Video Solution

25. According to Bohr's model, angular momentum of electron is equal to integral multiple of

A. h

B. $\frac{h}{\pi}$

C. $\frac{2h}{\pi}$

D. $\frac{h}{2\pi}$

Answer: D

Watch Video Solution

26. To explain his theory, Bohr used the conservation of

A. energy

B. linear momentum

C. angular momentum

D. quantum frequency

Answer: C

Watch Video Solution

27. Which of the following model was successful to explain observed hydrogen spectrum?

A. thomson's model

B. Rutherford's model

C. Bohr's model

D. none of these

Answer: C

Watch Video Solution

28. In Bohr's model electrons are revolving in a circular orbits around the nucleus called as

A. stationary orbits

B. non radiating orbits

C. Bohr's orbits

D. all of these

Answer: D

Watch Video Solution

29. According to bohr's theory of H atom, an electron can revolve around a proton indefinitely, if its path is

A. a perfect circle of any radius

B. a circle of an allowed radius

C. a circle of constantly decreasing radius

D. an ellipse with fixed focus

Answer: B

Watch Video Solution

30. According to Bohr, an electron radiates energy, when it

A. revolves around the nucleus

B. revolves around the neutrons

C. jumps from lower orbits to higher orbit

D. jumps from higher orbit to lower orbit

Answer: D

Watch Video Solution

31. The concept of an atom with, quantised energy levels, was introduced by

A. E fermi

B. Rutherford

C. Niels Bohr

D. C. V. raman

Answer: D

Watch Video Solution

32. According to Bohr the difference between the energies of the electron in the two orbits is equal to

A. h v

B. hc/λ

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

Watch Video Solution

33. According to Bohr's atomic model

A. the electron radiates energy only when it jumps to inner orbit

B. an atom has heavy, positively charged nucleus

C. the electron can move in particular orbits

D. all of these

Answer: D

Watch Video Solution

34. According to Bohr's postulates which of the following quantities takes discrete values

A. kinetic energy

B. potential energy

C. angular momentum

D. momentum

Answer: C

Watch Video Solution

35. The angular momentum of an electron in n^{th} orbit is given by

A. nh

B. $\frac{h}{2\pi n}$

C. $\frac{nh}{2\pi}$

D. $\frac{n^2 h}{2\pi}$

Answer: C

Watch Video Solution

36. When an electron jumps from the initial orbit n_i to the final orbit n_f, the energy radiated is given by

A. $hv = E_i / E_f$

B. $hv = E_i E_f$

C. $hv = E_i + E_f$

D. $hv = E_i - E_f$

Answer: D

Watch Video Solution

37. The angular momentum of electrons in an atom produces

A. magnetic moment

B. ZEEMAN effect

C. light

D. nuclear fission

Answer: A

Watch Video Solution

38. According to bohr's theory of H atom, for the electron in the n^{th} allowed orbit

A. linear momentum is proportional to $(1/n)$

B. the K.E. is proportional to $(1/n^2)$

C. the angular momentum is proportional to n

D. all of these

Answer: D

Watch Video Solution

39. In the Bohr's theory of H atom

A. the radius of the n^{th} orbits is proportional to n^2

B. angular momentum is equal to $nh/2\pi$

C. the magnitude of the P.E. of the electron in any orbit is greater than its kinetic energy

D. all of these

Answer: D

Watch Video Solution

40. The maximum number of photons emitted when an electron jumps from an energy level $n = 4$ to $n = 1$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

41. According to planck's quantum theory any electromagnetic radiation is

A. continuously emitted

B. continuously absorbed

C. emitted or absorbed in discrete units

D. none of these

Answer: C

Watch Video Solution

42. According to PLANCK, energy packets are called as

A. quanta

B. photons

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

Watch Video Solution

43. According to Max Planck energy of photon is

A. $E = hv$

B. $E = h$

C. $E = v$

D. h / v

Answer: A

Watch Video Solution

44. Derive an expression for the radius of n^{th}

Bohr's orbit in Hydrogen atom.

A. $\dfrac{\in_0 n^2h^2}{\pi me^2}$

B. $\dfrac{n^2h^2}{\in_0 \pi me^2}$

C. $\dfrac{\pi me^2}{\in_0 n^2h^2}$

D. n^2h^2

Answer: A

Watch Video Solution

45. The radii of Bohr's orbit are directly proportional to

A. principle quantum number

B. square of principle quantum number

C. cube of principle quantum number

D. forth power of principle quantum number

Answer: B

Watch Video Solution

46. The linear speed of an electron, in bohr's orbit is given by

A. $\frac{e^2}{h}$

B. $\frac{e^2}{2 \in_0 nh}$

C. $\dfrac{2 \in_0 nh}{e}$

D. $2 \in_0 h$

Answer: B

Watch Video Solution

47. According to Bohr's theory speed of an electron in a stationary orbit is related to n as

A. $v_n \propto 1/n^2$

B. $v_n \propto 1/n$

C. $v_n \propto n$

D. $v_n \propto n^2$

Answer: B

Watch Video Solution

48. Angular speed of an electron in a Bohr's orbit is given by

A. $\omega = \dfrac{\pi m e^4}{2 \in_0^2 n^3 h^3}$

B. $\omega = \dfrac{4 \in_0^2 n^3 h^3}{m e^4}$

C. $\omega = \dfrac{me^4}{4 \in_0^2 n^3 h^3}$

D. all of these

Answer: A

Watch Video Solution

49. According to Bohr's theory, the angular speed (ω) of electron related to n as

A. $\omega \propto \dfrac{1}{n}$

B. $\omega \propto \dfrac{1}{n^2}$

C. $\omega \propto \frac{1}{n^3}$

D. $\omega \propto \frac{1}{n^4}$

Answer: C

Watch Video Solution

50. Period of revolution of electron in the n^{th} bohr's orbit is given by

A. $T = \frac{4 \in_0^2 n^3 h^3}{me^4}$

B. $T = 4 \in_0^2 n^3 h^3$

C. $T = me^4n$

D. $T = 2\pi$

Answer: A

Watch Video Solution

51. According to Bohr's theory the relation between the period of revolution of electron and principle quantum number is

A. $T \propto 1/n^2$

B. $T \propto 1/n^3$

C. $T \propto n^2$

D. $T \propto n^3$

Answer: D

Watch Video Solution

52. According to Bohr's theory frequency of the revolution of electron in a Bohr's orbit is inversely proportional to

A. principle quantum number

B. square of principle quantum number

C. cube of principle quantum number

D. forth power of principle quantum number

Answer: C

Watch Video Solution

53. Frequency of revolution of electron in the n^{th} Bohr's orbit is given by

A. $f = \dfrac{me^4}{4 \in_0^2 n^3 h^3}$

B. $f = 4 \in_0^2 n^3 h^3$

C. $f = \dfrac{me^4}{4 \in_0^2 h^2}$

D. $f = \dfrac{me^4}{\in_0 n}$

Answer: A

Watch Video Solution

54. The total energy of the electron in the bohr's orbit is given by

A. $E = -\frac{me^4}{8 \in_0^2 n^2 h^2}$

B. $E = -\frac{1}{8\pi \in_0} \frac{e^2}{r}$

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

Watch Video Solution

55. The energy of the electron in Bohr's orbit related to n as

A. $E \propto 1/n$

B. $E \propto 1/n^2$

C. $E \propto n$

D. $E \propto n^2$

Answer: B

Watch Video Solution

56. the centripetal acceleration of an electron in a Bohr's orbit is inversely proportional to

A. principle quantum number

B. square of quantum number

C. cube of quantum number

D. forth power of its quantum number.

Answer: D

Watch Video Solution

57. Total energy possessed by an electron revolving around nucleus in an orbit of radius r is proportional to

A. r

B. r^{-1}

C. r^{-2}

D. r^{-3}

Answer: B

Watch Video Solution

58. The radius of the lowest orbit of the hydrogen atom is

A. 1Å

B. 0.53Å

C. 0.1Å

D. 0.05Å

Answer: B

Watch Video Solution

59. If 'r' is the radius of the lowest orbit of Bohr's model of H-atom, then the radius of n^{th} orbit is

A. rn^2

B. 2r

C. n^2 / r

D. rn

Answer: A

Watch Video Solution

60. When hydrogen atom is in its first excited level, its radius is

A. same

B. half

C. twice

D. 4 times

Answer: D

Watch Video Solution

61. If the radius of the first Bohr orbit of H atom is 0.5Å, the radius of third orbit will be

A. 45Å

B. 4.5Å

C. 1.5Å

D. 0.166Å

Answer: B

Watch Video Solution

62. The ratio of the radii of the first three Bohr orbit in H atom is

A. $1 : \frac{1}{2} : \frac{1}{3}$

B. $1 : 2 : 3$

C. $1 : 4 : 9$

D. $1 : 8 : 27$

Answer: C

Watch Video Solution

63. The radius of H atom in its ground state is 0.53Å After collision with an electron, its radius is found to be $21.2 \times 10^{-11} m$. In this state, the principle quantum number 'n' of the H-atom is

A. 2

B. 3

C. 4

D. 16

Answer: A

Watch Video Solution

64. According to Bohr's theory, the radius of an electron in an orbit described by principal quantum number n and atomic number Z is proportional to

A. Z^2n^2

B. $\frac{Z^2}{n^2}$

C. $\frac{Z^2}{n}$

D. $\frac{n^2}{Z}$

Answer: D

Watch Video Solution

65. The speed of an electron, in the orbit of a H-atom, in the ground state is

A. c

B. $\frac{c}{2}$

C. $\frac{c}{10}$

D. $\frac{c}{137}$

Answer: D

Watch Video Solution

66. The speed of electron in first Bohr orbit is c/137. The speed of electron in second Bohr orbit will be

A. $\frac{2c}{137}$

B. $\frac{4c}{137}$

C. $\frac{c}{274}$

D. $\frac{c}{548}$

Answer: C

Watch Video Solution

67. The speed of the electron in the first orbit is $2.182 \times 10^6 m/s$, the speed of electron in the third orbit is

A. $2.182 \times 10^6 m/s$

B. $2.182 \times 10^4 m/s$

C. $7.273 \times 10^5 m/s$

D. $7.273 \times 10^4 m/s$

Answer: C

Watch Video Solution

68. The period of revolution of electron in the third orbit in a H-atom is $4.132 \times 10^{-15} s$. Hence the period in the fourth orbit is

A. $9.794 \times 10^{-15} s$

B. $9.794 \times 10^{-14} s$

C. $9.974 \times 10^{-15} s$

D. $9.974 \times 10^{-14} s$

Answer: A

Watch Video Solution

69. The change in the angular momentum of the electron when it jumps from the fourth orbit ot the first orbit in a H-atom is

A. $3.167 \times 10^{-34} kgm^2 / s$

B. $3.167 \times 10^{-20} kgm^2 / s$

C. $3.167 \times 10^{-32} kgm^2 / s$

D. $3.167 \times 10^{-30} kgm^2 / s$

Answer: A

Watch Video Solution

70. The angular speed of the electron in the first orbit in a H atom is 4.103×10^{16} rad/s. Hence the angular speed of the electron in the third orbit is

A. 1.52×10^{15} rad/s

B. 1.25×10^{15} rad/s

C. 1.52×10^{14} rad/s

D. 1.25×10^{14} rad/s

Answer: A

Watch Video Solution

71. The linear momentum of the electron in the ground state of H-atom is $2 \times 10^{-24} kgm/s$, its linear momentum in the 8^{th} orbit is

A. $2.5 \times 10^{-25} kgm/s$

B. $5.2 \times 10^{-25} kgm/s$

C. $5.2 \times 10^{-15} kgm/s$

D. $2.5 \times 10^{-15} kgm/s$

Answer: A

View Text Solution

72. With increasing quantum numbers, the energy difference between adjacent energy level atoms

A. increases

B. decreases

C. will be same

D. either 'a' or 'b'

Answer: B

Watch Video Solution

73. The difference between atomic energy levels is observed as a measured value of the energy of

A. emitted wave

B. incident wave

C. reflected wave

D. electromagnetic wave

Answer: A

Watch Video Solution

74. When a hydrogen atom is raised from the ground state to an excited state

A. the P.E. decreases and K.E. increases

B. the P.E. increases and K.E. decreases

C. both P.E. and K.E. increases

D. both K.E. and P.E. decreases

Answer: B

Watch Video Solution

75. The energy of the electron in the ground state of H-atom is $-13.6eV$. Its energy in the second orbit is

A. $-13.6eV$

B. $-3.4eV$

C. $-1.51eV$

D. $-0.85eV$

Answer: B

Watch Video Solution

76. The energy of the electron in the ground state of H-atom is $-13.6eV$. The energy of the first excited state will be

A. $-3.4eV$

B. $-27.2eV$

C. $-6.8eV$

D. $-52.4eV$

Answer: A

Watch Video Solution

77. The ratio of energies of the H-atom, in its first to second excited state is

A. $1:4$

B. $4:9$

C. $9:4$

D. $4:1$

Answer: C

Watch Video Solution

78. Energy of the lowest level of H-atom is -13.6 eV. The energy of the emitted photons in transition from fourth to second energy state is

A. 2.55 eV

B. 3.2 eV

C. 4.5 eV

D. 5.4 eV

Answer: A

Watch Video Solution

79. the nergy of an excited state of H atom is -0.85 eV. What will be the quantum number of the orbit, if the ground state energy for hydrogen is -13.6 eV?

A. 4

B. 3

C. 2

D. 1

Answer: A

Watch Video Solution

Watch Video Solution

80. The ionisation potential of H-atom is 13.6 eV. The energy required to remove an electron from the second orbit of hydrogen is

A. 27.2 eV

B. 13.6 eV

C. 6.8 eV

D. 3.4 eV

Answer: D

Watch Video Solution

81. If the ionisation potential of a H-atom is ω, then its energy in the first excited state is

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

B. $\frac{\omega}{3}$

C. $\frac{\omega}{4}$

D. $\frac{\omega}{5}$

Answer: C

Watch Video Solution

82. A hydrogen atom is in an excited state corresponding to an energy level of -0.85 eV. The frequency of the photon emitted if it comes down to the ground state (-13.6 eV) in a single jump is

A. 3.077×10^{15} Hz

B. 30.77×10^{15} Hz

C. 307.7×10^{15} Hz

D. 3077×10^{15} Hz

Answer: A

Watch Video Solution

83. The binding energy of the electron in the third orbit is 1.51 eV. Its. P.E. in the same orbit is

A. -1.51 eV

B. -3.4 eV

C. -3.02 eV

D. 3.02 eV

Answer: C

Watch Video Solution

84. Which of the following transition in a hydrogen atom produces a photon of minimum energy?

A. $n = 1$ to $n = 0$

B. $n = 5$ to $n = 6$

C. $n = 6$ to $n = 8$

D. $n = 4$ to $n = 3$

Answer: C

Watch Video Solution

85. Normally the time taken in the transition is

A. zero

B. 1

C. 10^{-5} s

D. 10^{-8} s

Answer: D

Watch Video Solution

86. Of the following transitions in the hydrogen atom, the one which gives on emission line of heighest frequency is

A. $n = 1$ to $n = 2$

B. $n = 3$ to $n = 10$

C. $n = 10$ to $n = 3$

D. $n = 2$ to $n = 1$

Answer: D

Watch Video Solution

87. The work that must be done to remove an electron from an atom is called its

A. electron affinity

B. ionisation energy

C. energy band

D. heat of vaporisation

Answer: B

Watch Video Solution

88. Centripetal acceleration of electron in the first Bohr orbit will be

A. $9 \times 10^{22} m / s^2$

B. $4 \times 10^{22} m / s^2$

C. $6 \times 10^{22} m / s^2$

D. $2 \times 10^{22} m / s^2$

Answer: A

Watch Video Solution

89. The ratio of magnetic dipole moment to angular momentum of electron is

A. $\frac{e}{m}$

B. $\frac{e}{2m}$

C. $\frac{m}{e}$

D. $\frac{2m}{e}$

Answer: B

Watch Video Solution

90. As the radius of orbit in Bohr's atom increases, the P.E. of the electron

A. decreases

B. increases

C. remains same

D. may increase or decrease

Answer: B

Watch Video Solution

91. The energy of an electron

A. is greater in outer orbits

B. is greater in inner orbits than in outer orbits

C. is always the same which ever are the orbit

D. decreases as the quantum number increases

Answer: A

Watch Video Solution

92. If the angular momentum of an electron in an orbit is J then the K.E. of the electron in that orbit is

A. $\frac{J^2}{2mr^2}$

B. $\frac{Jv}{r}$

C. $\frac{J^2}{2m}$

D. $\frac{J^2}{2\pi}$

Answer: A

Watch Video Solution

93. If the frequency of revolution of electron in an orbit H atom is n then the equivalent current is

A. $\frac{2\pi re}{n}$

B. $\frac{en}{2\pi r}$

C. $e^2\pi n$

D. en

Answer: D

Watch Video Solution

94. In two individual hydrogen atoms electrons move around the nucleus in circular orbits of radii R and 4R. The ratio of the time taken by them to complete one revolution is:

A. $1:4$

B. $4:1$

C. $1:8$

D. $8:1$

Answer: C

Watch Video Solution

95. In an atom, two electron move around the nucleus in circular orbits taking time 't' and '8t' to complete one revolution. The ratio of their radii is

A. $4:1$

B. $1:4$

C. $1:8$

D. $8 : 1$

Answer: B

Watch Video Solution

96. In Bohr's model of hydrogen atom, let PE represents potential energy and TE the total energy. In going to a higher level

A. P.E. decrease, T.E. increases

B. P.E. increases, T.E. decreases

C. P.E. decreases, T.E. decreases

D. P.E. increases, T.E. increases

Answer: D

Watch Video Solution

97. The first excitation potential of a given atom is $10.2V$,then the ionisation potential is

A. 20.4 V

B. 13.6 V

C. 30.6 V

D. 40.8 V

Answer: B

Watch Video Solution

98. Whenever an electron jumps from outer stationary orbit to inner stationary orbit then a

A. photon of energy hv is emitted

B. light radiation of frequency v is emitted

C. spectral line of wave length λ is emitted

D. all of these

Answer: D

Watch Video Solution

99. The wavelength of a spectral line emitted due to the transition of electron from outer stationary orbit to inner stationary orbit is given by

A. $\frac{1}{\lambda} = R\left(\frac{1}{p^2} - \frac{1}{n^2}\right)$

B. $\lambda = R\left(\frac{1}{p^2} - \frac{1}{n^2}\right)$

C. $\lambda = R\left(\frac{1}{p^2}\right)$

D. $\frac{1}{\lambda} = R\frac{1}{n^2}$

Answer: A

Watch Video Solution

100. Which of the following series in the spectrum of the hydrogen atom lies in the visible region of the electromagnetic spectrum

A. Lyman series

B. Balmer series

C. Paschen series

D. Plund series

Answer: B

Watch Video Solution

101. Each line of Balmer series represents

A. energy level

B. low energy level

C. angular momentum

D. transition of electrons

Answer: C

Watch Video Solution

102. Information about energy levels. Within the atoms of a gas, comes from the study of

A. spectrum of the gas

B. fermi energy level of gas

C. thermionic emission in gas

D. photoelectric emission in gas

Answer: A

Watch Video Solution

103. An electron makes a transition from orbit $n = 4$ to the orbit $n = 2$ of a hydrogen atom. The wave number of the emitted radiations $(R =$ Rydberg's constant) will be

A. $\frac{2R}{16}$

B. $\frac{3R}{16}$

C. $\frac{4R}{16}$

D. $\frac{5R}{16}$

Answer: B

Watch Video Solution

104. According to Bohr's theory, when an electron jumps from any higher orbit to the third orbit, spectral lines are emitted. These are called

A. Lyman series

B. Balmer series

C. Paschen series

D. Plund series

Answer: C

Watch Video Solution

105. Which of the following types of radiation is not emitted by the electronic structure of atoms?

A. Ultraviolet light

B. X-rays

C. Visible light

D. γ-rays

Answer: D

Watch Video Solution

106. A spectral line is emitted when an electron

A. rotates in the circular orbit

B. rotates in the elliptical orbit

C. jumps from lower orbit to higher orbit

D. jumps from higher orbit to lower orbit

Answer: D

Watch Video Solution

107. Lines of Lyman series are emitted by the hydrogen atom when the electron jumps

A. from higher orbits to first orbit

B. from higher orbit's to second orbit

C. from second orbit to any other orbit

D. from third orbit to higher orbits

Answer: A

Watch Video Solution

108. The spectral series of the hydrogen spectrum that lies in the ultraviolet region is the

A. Lyman series

B. Balmer series

C. Paschen series

D. Brackett series

Answer: A

Watch Video Solution

109. Rydberg constant R is equal to

A. $\dfrac{me^2}{8 \in_0^2 ch^3}$

B. $\dfrac{me^4}{8 \in_0^2 ch^2}$

C. $\dfrac{m^2e^4}{8 \in_0^2 ch^3}$

D. $\dfrac{m^4e^4}{8 \in_0^2 ch^3}$

Answer: B

Watch Video Solution

110. Line spectrum is obtained from the substances in

A. atomic state

B. molecular state

C. nuclear state

D. none of these

Answer: A

Watch Video Solution

111. Infrared spectrum lies between

A. radiowave and microwave regions

B. microwave and visible regions

C. visible and ultraviolet regions

D. ultraviolet and X-rays regions

Answer: B

Watch Video Solution

112. Which of the following are in the ascending order of wavelength?

A. H_{α}, H_{β} and H_{γ} lines of Balmer series

B. Lyman limit, Balmer limit

C. Violet, blue, yellow, red colours in solar spectrum

D. both 'b' and 'c'

Answer: D

Watch Video Solution

113. Rydberg's constant is

A. same for all elements

B. different for different elements

C. a universal constants

D. is different for lighter elements but same for heavier elements

Answer: B

Watch Video Solution

114. If the mass of the electron is reduced to half the Rudberg constant

A. remains unchanged

B. become half

C. becomes double

D. becomes one fourth

Answer: B

Watch Video Solution

115. The Lyman transitions involve

A. largest changes of energy

B. smallest changes of energy

C. largest changes of potential energy

D. smallest changes in potential energy

Answer: A

Watch Video Solution

116. The ratio of the wavelengths of H_{α} and H_{β} lines of Paschen series is of the order of

A. 10

B. $1/10$

C. 1.5

D. 100

Answer: C

Watch Video Solution

117. Which series of H_2 atom lie in infrared region?

A. Lyman

B. Balmer

C. brackett, Paschen, Pfund

D. all of these

Answer: C

Watch Video Solution

118. Which series of Hydrogen atom was first discovered?

A. Lyman

B. Balmer

C. Paschen

D. all of these

Answer: B

Watch Video Solution

119. Which of the following lines of Balmer series has longest wavelength?

A. H_{α}

B. H_{β}

C. H_{γ}

D. all of these

Answer: A

Watch Video Solution

120. The series limit wavelength of the Lyman series for the hydrogen atom is given by

A. $\frac{1}{R}$

B. $\frac{4}{R}$

C. $\frac{9}{R}$

D. $\frac{16}{R}$

Answer: A

Watch Video Solution

121. Generally the approximate limits of visible spectrum are

A. 1000 Å to 4000 Å

B. 4000 Å to 7000 Å

C. 7000 Å to 10,000 Å

D. 10,000 Å to 13,000 Å

Answer: B

Watch Video Solution

122. The frequnecy of visible light is of the order of

A. $5000 \times 10^{8} c / s$

B. $3 \times 10^{10} c / s$

C. $10^{6} c / s$

D. $5 \times 10^{14} c / s$

Answer: D

Watch Video Solution

123. The series limit wavelength of the Balmer series for the hydrogen atom is

A. $\frac{1}{R}$

B. $\frac{4}{R}$

C. $\frac{9}{R}$

D. $\frac{16}{R}$

Answer: B

Watch Video Solution

124. If R is the Rydberg's constant, the energy of an electron in the ground state H atom is

A. $\frac{Rc}{h}$

B. $\frac{-1}{Rhc}$

C. $-Rhc$

D. $\frac{vc}{R}$

Answer: C

Watch Video Solution

125. According to bohr's theory, the wave number of last line of balmer series is $(R = 1.1 \times 10^7 m^{-1})$

A. $5.5 \times 10^5 m^{-1}$

B. $4.4 \times 10^7 m^{-1}$

C. $2.75 \times 10^6 m^{-1}$

D. $2.75 \times 10^8 m^{-1}$

Answer: C

Watch Video Solution

126. The wavelength of the first spectral line of the Lyman series of hydrogen spectrum is

A. 912 Å

B. 1215 Å

C. 1512 Å

D. 6563 Å

Answer: B

Watch Video Solution

127. If the wavelength of the first line of the Balmer series of hydrogen is 6561Å, the wavelngth of the second line of the series should be

A. 3575 Å

B. 3860 Å

C. 4500 Å

D. 4860 Å

Answer: D

Watch Video Solution

Watch Video Solution

128. If the series limit wavelength of the Lyman series for hydrogen atom is 912Å, then the series limit wavelength for the Balmer series for the hydrogen atom is

A. 912 Å

B. $912 \times 2\text{Å}$

C. $912 \times 4\text{Å}$

D. $912 / 2\text{Å}$

Answer: C

Watch Video Solution

129. An electron jumps from the $4th$ orbit to the $2nd$ orbit of hydrogen atom. Given the Rydberg's constant $R = 10^5 cm^{-1}$. The frequency in Hz of the emitted radiation will be

A. $\frac{3}{16} \times 10^5$

B. $\frac{3}{16} \times 10^{15}$

C. $\frac{9}{16} \times 10^{15}$

D. $\frac{3}{4} \times 10^{15}$

Answer: C

Watch Video Solution

130. The wavelength of the first line of Balmer series is $6563 Å$. The Rydberg's constant is

A. $1.09 \times 10^{5} m^{-1}$

B. $1.09 \times 10^{6} m^{-1}$

C. $1.09 \times 10^{7} m^{-1}$

D. $1.09 \times 10^{8} m^{-1}$

Answer: C

Watch Video Solution

131. According to the Bohr's theory the wave length of shortest wavelength of a spectral line in Barckett series is

A. 4480 Å

B. 8800 Å

C. 14545 Å

D. 18450 Å

Answer: C

Watch Video Solution

132. The seond line of Balmer series has wavelength 4861Å The wavelength o fthe first line Balmer series is

A. 6563 Å

B. 3656 Å

C. 6380 Å

D. 3860 Å

Answer: A

Watch Video Solution

133. The shortest wavelength in Lyman series is 912 Å. The shortest wavalength in Paschen series is

A. 8208 Å

B. 8082 Å

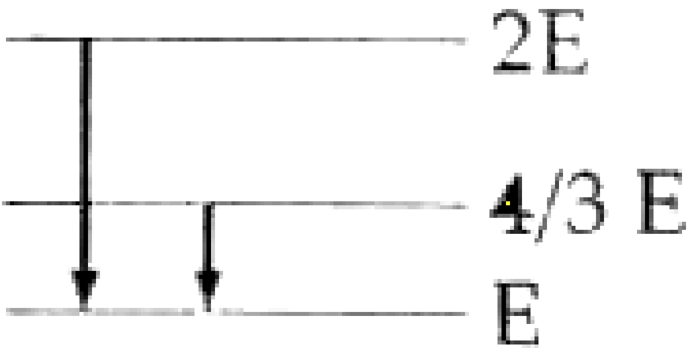
C. 8820 Å

D. 2088 Å

Answer: A

Watch Video Solution

134. The following figure indicates the energy levels of a certain atom. When the system moves from 2E level to E level, a photon of wavelength λ is emitted. The wavelength of photon produced during its transition from level 4E/3 to level E is



A. $\frac{\lambda}{3}$

B. $\frac{3\lambda}{4}$

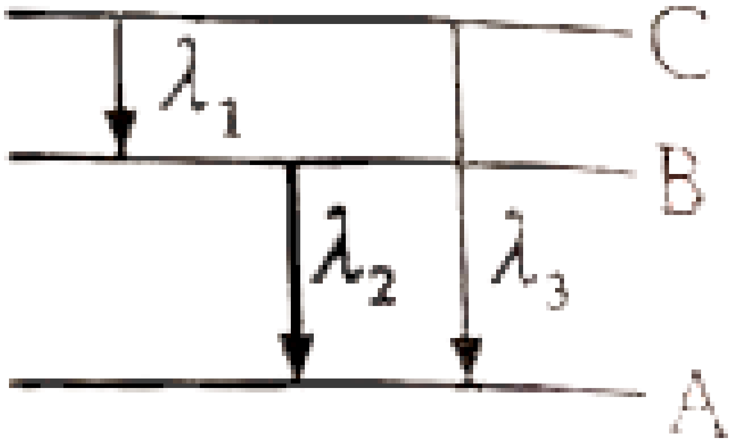
C. $\frac{4\lambda}{3}$

D. 3λ

Answer: D

View Text Solution

135. Energy levels A, B, C of a certain atom correspond to increasing values of energy i.e. $E_A < E_B < E_C$. If $\lambda_1, \lambda_2, \lambda_3$ are the wavelength of radiations corresponding to the transitions C to B, B to A and C to A respectively. which of the following statement is correct?



A. $\lambda_3 = \lambda_1 + \lambda_2$

B. $\lambda_3 = \dfrac{\lambda_1\lambda_2}{\lambda_1 + \lambda_2}$

C. $\lambda_1 + \lambda_2 + \lambda_3 = 0$

D. $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

Answer: B

View Text Solution

136. The nucleus of a hydrogen atom is

A. proton

B. electron

C. neutron

D. positron

Answer: A

Watch Video Solution

137. Proton was discovered by

A. Rutherford

B. Chadwick

C. Goldstein

D. Becquerel

Answer: C

Watch Video Solution

138. The expression Ze gives the charge on

A. a proton

B. neutron

C. an electron

D. a nucleus

Answer: D

Watch Video Solution

139. The mass of a proton is

A. 1.0073 a.m.u.

B. 1.6726×10^{-27} kg

C. both a and b

D. neither a nor b

Answer: C

Watch Video Solution

140. The charge on a nucleus is

A. positive

B. zero

C. negative

D. can not be predicted

Answer: A

Watch Video Solution

141. The atomic number of an element is equal to the number of

A. protons

B. neutrons

C. electrons

D. deutrons

Answer: A

Watch Video Solution

142. Neutron was discovered by

A. Chadwick

B. Rutherford

C. Bohr

D. Planck

Answer: A

Watch Video Solution

143. Which of the following is a nucleon?

A. meson

B. proton

C. neutron

D. all of these

Answer: D

Watch Video Solution

144. The mass number of a nucleus is equal to the number of

A. electrons

B. protons

C. neutrons

D. nucleons

Answer: D

Watch Video Solution

145. The nucleus of an atom is composed of

A. protons

B. neutrons and protons

C. electrons and protons

D. electrons, protons and neutrons

Answer: B

Watch Video Solution

146. Nuclear forces exists between

A. neutron - neutron

B. proton - proton

C. neutron - proton

D. all of these

Answer: D

Watch Video Solution

147. The nuclear force acting in the nucleus is stronger than

A. coulomb forces

B. cohesive forces

C. gravitational forces

D. both a and c

Answer: D

Watch Video Solution

148. Which of the following are short range forces?

A. Nuclear forces

B. Cohesive forces

C. Coulomb's forces

D. none of these

Answer: A

Watch Video Solution

149. Which of the following has the same mass as a proton, but no charge?

A. Neutron

B. Electron

C. Positron

D. Neutrino

Answer: A

Watch Video Solution

150. Every nucleus, of a given element, has the same number of

A. mesons

B. protons

C. neutrons

D. positions

Answer: B

Watch Video Solution

151. The mass of an atom is

A. equal to zero

B. double of the atomic number

C. concentrated in the orbits

D. concentrated in the nucleus

Answer: D

Watch Video Solution

152. A particle having no charge and no mass is

A. position

B. neutron

C. electron

D. neutrino

Answer: D

Watch Video Solution

153. The unit of nuclear radius is

A. metre

B. fermi

C. ampere

D. coulomb

Answer: B

Watch Video Solution

154. Which one og the following particles can be added to the nucleus of an atom, without changing, its chemical properties?

A. Electron

B. Proton

C. Positron

D. Neutron

Answer: D

Watch Video Solution

155. The number of neutrons is equal to

A. A

B. Z

C. A-Z

D. A+Z

Answer: C

Watch Video Solution

156. The number of proton, neutrons and electrons in the nucleus of $._{11} Na^{23}$ are respectively

A. 23, 12 and 11

B. 11, 12 and 11

C. 23, 11 and 12

D. 12, 11 and 0

Answer: B

Watch Video Solution

157. 1 atomic mass unit is equal to

A. mass of an atom of $._6 C^{12}$

B. mass of hydrogen atom

C. one gram

D. $(1/12)^{th}$ mass of an atom of $._6 C^{12}$

Answer: D

Watch Video Solution

158. The mass of an atom depends upon the number of

A. neutrons

B. protons

C. electrons

D. both a and b

Answer: D

Watch Video Solution

159. The mass of neutron is same as that of

A. a proton

B. atomis mass

C. an electron

D. atomic number

Answer: A

Watch Video Solution

160. Masses of many atoms are close to integral multiple of the mass of an

A. nitrogen atom

B. hydrogen atom

C. carbon atom

D. potensium atom

Answer: B

Watch Video Solution

161. The ratio of the mass of the proton to the mass of the electron is

A. 920

B. 1840

C. 3680

D. 4810

Answer: B

Watch Video Solution

162. Calculate the energy equivalent of 1 a.m.u. in MeV

A. 900 MeV

B. 921 MeV

C. 931 MeV

D. 950 MeV

Answer: C

Watch Video Solution

163. Atom with the same atomic number and different mass numbers are called a)Isobars b)Isomers c)Isotones d)Isotopes

A. isobars

B. isomers

C. isotones

D. isotopes

Answer: D

Watch Video Solution

164. Atoms of different elements having the same number of neutrons but different atomic numbers are called

A. isobars

B. isomers

C. isotones

D. isotopes

Answer: C

Watch Video Solution

165. Elements of the same mass number but of different atomic number are known as ....

A. isobars

B. isomers

C. isotones

D. isotopes

Answer: A

Watch Video Solution

166. Nuclei of the isotopes have the same number of

A. mesons

B. protoms

C. neutrons

D. nucleons

Answer: B

Watch Video Solution

167. Which one of the following has the identical property for isotopes?

A. Physical property

B. Chemical property

C. Nuclear property

D. Thermal property

Answer: B

Watch Video Solution

168. The number of electrons in an atom of atomic number Z and mass number A is

A. zero

B. Z

C. A-Z

D. A

Answer: B

Watch Video Solution

169. The number of protons in an atom of atomic number Z and mass number A is

A. zero

B. Z

C. A-Z

D. A

Answer: B

Watch Video Solution

170. The number of nucleons in an atom of atomic number Z and mass number A is

A. zero

B. Z

C. A-Z

D. A

Answer: D

Watch Video Solution

171. When the mass equal to 1 a.m.u. is converted into energy, the energy produced is

A. $1.5 \times 10^{-18} J$

B. $1.5 \times 10^{-14} J$

C. $1.5 \times 10^{-12} J$

D. $1.5 \times 10^{-10} J$

Answer: D

Watch Video Solution

172. In a nuclear reaction, which of the following is conserved?

A. Momentum

B. Charge

C. Sum of mass and energy

D. all of these

Answer: D

Watch Video Solution

173. A pair of isotopes is

A. $._{6}C^{14}$ and $._{7}N^{13}$

B. $._{7}N^{13}$ and $._{7}N^{14}$

C. $._{6}C^{14}$ and $._{7}N^{14}$

D. $._{6}C^{14}$ and $._{8}O^{16}$

Answer: B

Watch Video Solution

174. Mass energy equation was propounded by

A. Newton

B. Madam curie

C. C.V. Raman

D. Einstein

Answer: D

Watch Video Solution

175. The mass of an atomic nucleus is less than the sum of the masses of its constituents. Thus mass defect is converted in to

A. heat energy

B. light energy

C. electrical energy

D. energy which binds nucleons together

Answer: D

Watch Video Solution

176. According to Einsteins theory of relativity, mass of an object moving with velocity v is

A. $m = \dfrac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$

B. $m = \dfrac{m_0}{\left(1 - \frac{v^2}{c^2}\right)^{\frac{1}{2}}}$

C. $m = m_0\left(1 - \dfrac{v^2}{c^2}\right)^{-\frac{1}{2}}$

D. all of these

Answer: D

Watch Video Solution

177. According to Einstein, the relation between mass and energy is given by

A. $E = mc^2$

B. $m = Ec^2$

C. $E = mc^{-2}$

D. $E = mc$

Answer: A

Watch Video Solution

178. Which of the following statement is not true regarding einsteins mass energy relation?

A. Mass disappears to reappear as energy.

B. Energy disappears to reappear as mass

C. Mass and energy are two different forms of the same entity.

D. Mass and energy can never be related to each other.

Answer: D

Watch Video Solution

179. In nuclear reactions, we have the conservation of

A. mass

B. energy

C. momentum

D. all of these

Answer: D

Watch Video Solution

180. The energy equivalent to 1 a.m.u. is equal to the energy which an electron would acquire, when accelerated through a potential difference of

A. $931 \times 10^{3} V$

B. $93 \times 10^{4} V$

C. $931 \times 10^{5} V$

D. $931 \times 10^{6} V$

Answer: D

Watch Video Solution

181. The mass of an electron at rest is 9.1×10^{-31} kg. the mass of an electron, when it is moving with a speed of 2.4×10^{8} m/s is $\left(c = 3 \times 10^{8} m / s\right)$

A. 1.517×10^{-31} kg

B. 15.17×10^{-31} kg

C. 151.7×10^{-31} kg

D. 1517×10^{-31} kg

Answer: B

Watch Video Solution

182. The effective mass of photon of frequency 5×10^{14} Hz is

A. 3.683×10^{-32} kg

B. 3.683×10^{-36} kg

C. 36.83×10^{-32} kg

D. 38.63×10^{-32} kg

Answer: B

Watch Video Solution

183. The rest mass of a proton is 1.67×10^{-27} kg Its total energy when it moves with a speed of 2.1×10^{8} m/s is

A. $2.105 \times 10^{-10} J$

B. $20.16 \times 10^{-10} J$

C. $2.105 \times 10^{-9} J$

D. $20.15 \times 10^{-9} J$

Answer: A

Watch Video Solution

184. If a particle moves with a speed of 1.5×10^8 m/s then the ratio of its mass to its rest mass is

A. 1.155

B. 11.55

C. 15.15

D. 1.515

Answer: A

Watch Video Solution

185. The velocity of a particle at which the kinetic energy is equal to its rest mass energy is

A. 25.98×10^8 m/s

B. 2.598×10^8 m/s

C. 2.895×10^8 m/s

D. 2.985×10^8 m/s

Answer: B

Watch Video Solution

186. The rest mass of an electron is 9.1×10^{-31} kg. Its kinetic energy when it moves with a speed of 2.4×10^{8} m/s is

A. $5.45 \times 10^{-14} J$

B. $54.36 \times 10^{-14} J$

C. $56.43 \times 10^{-14} J$

D. $53.46 \times 10^{-14} J$

Answer: A

Watch Video Solution

187. The phenomenon of radioactivity was discovered by

A. Becquerel

B. M.Curie

C. Rontgen

D. Newton

Answer: A

Watch Video Solution

188. 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. decay of proton

B. decay of nucleus

C. emission of α-particles

D. none of these

Answer: B

Watch Video Solution

189. Radioactivity is due to a) Stable electronic configuration b) Unstable electronic configuration c) Stable nucleus d) Unstable nucleus

A. unstable electronic configuration

B. stable electronic cofiguration

C. unstable nuclei

D. stable nuclei

Answer: C

Watch Video Solution

190. Which one of the following is not a mode of radioactive decay?

A. Electron emission

B. Alpha decay

C. Fusion

D. Gamma emission

Answer: C

Watch Video Solution

191. A nucleus which is unstable and tends to breakdown is called

A. radioactive

B. fissionable

C. fusbale

D. none of these

Answer: A

Watch Video Solution

192. The phenomenon of spontaneous emission of radiations is

A. radioactivity

B. electron emission

C. rectification

D. none of these

Answer: A

Watch Video Solution

193. Radioactivity is a

A. spontaneous phenomenon

B. production of radio waves

C. transmission of ratio waves

D. reception of radioawaves

Answer: A

Watch Video Solution

194. Curie is unit of

A. half life

B. radiactively

C. energy of γ rays

D. intensity of γ rays

Answer: B

Watch Video Solution

195. Heavy radioactive elements eventually turn into

A. lead

B. boron

C. carbon

D. uranium

Answer: A

Watch Video Solution

196. Which of the following metals was discovered by Madam Curie?

A. Polonium and radium

B. Bismuth and lead

C. Thorium and uranium

D. Cobalt and barium

Answer: A

Watch Video Solution

197. Artificial radioactivity was discovered by ....

A. Klaproth

B. Rontgen

C. Irene Curie and joliot

D. P. Curie and M.Curie

Answer: C

Watch Video Solution

198. Radioactive samples are stored in lead boxes because it is

A. heavy

B. strong

C. good absorber

D. bad conductor

Answer: C

Watch Video Solution

199. the process of radioactive radiations remains unaffected due to

A. physical changes

B. chemical changes

C. electric or magnetic fields

D. all of these

Answer: D

Watch Video Solution

200. Which of the following are positively charged particles?

A. α-rays

B. β-rays

C. γ-rays

D. none of these

Answer: A

Watch Video Solution

201. The α particle is same as

A. gas atom

B. helium nuclei

C. singly ionised atom

D. ionised hydrogen atom

Answer: B

Watch Video Solution

202. Which of the following particle is deflected towards positive plate in an electric field?

A. α

B. β

C. γ

D. δ

Answer: B

Watch Video Solution

203. The mass of an $\alpha -$ particle is.

A. equal to mass of four protons

B. equal to mass of four neutrons

C. equal to sum of mass of two protons and two neutrons

D. less than the sum of mass of two protons and two neutrons

Answer: D

Watch Video Solution

204. To produce intense ionisation, in air at S.T.P., we have to use

A. α-rays

B. β-rays

C. γ-rays

D. X-rays

Answer: A

Watch Video Solution

205. The penetrating power of α-particle is

A. least

B. moderate

C. high

D. none of these

Answer: A

Watch Video Solution

206. The velocity of α-particles is of the order of

A. 10^6 m/s

B. 10^7 m/s

C. 10^8 m/s

D. 10^9 m/s

Answer: B

Watch Video Solution

207. Which of the following particle can affect photographic plates?

A. α

B. β

C. γ

D. all of these

Answer: D

Watch Video Solution

208. Which of the following particle can be deflected by electric and magnetic field?

A. α

B. β

C. both a and b

D. neither a nor b

Answer: C

Watch Video Solution

209. Which of the following particle can produce fluorescence in substances like zink sulphide?

A. α

B. β

C. γ

D. all of these

Answer: D

Watch Video Solution

210. If the mass number of an atom of an element decreases by 4 and atomic number decreases by two then it is

A. α

B. β

C. γ

D. X-rays

Answer: A

Watch Video Solution

211. In an α-decay

A. the parent and daughter nuclei have same number of protons

B. the daughter nucleus has one proton more than parant nucleus

C. the daughter nucleus has two protons less than parent nucleus

D. the daughter nucleus has two neutrons more than parent nucleus

Answer: C

Watch Video Solution

212. The part of the atom which is not affected by chemical pr physical changes is

A. proton

B. neutron

C. nucleus

D. electron

Answer: C

Watch Video Solution

213. The nature of Becqueral rays was discovered by

A. Ruthereford

B. Thomson

C. Einstein

D. Bohr

Answer: A

Watch Video Solution

214. The β-particle are

A. positively charged

B. negatively charged

C. uncharged

D. none of these

Answer: B

Watch Video Solution

215. Which of the following particle is same as electron?

A. α

B. β

C. γ

D. X-rays

Answer: B

Watch Video Solution

216. In β-decay, the nuclei emit

A. protons

B. electrons

C. neutrinos

D. both 'b' and 'c'

Answer: D

Watch Video Solution

217. If an atomic nueleus emits an electron its atomic mass will

A. decrease

B. increase

C. becomes zero

D. remain the same

Answer: D

Watch Video Solution

218. The pentrating and ionisation power of β-particle is

A. least

B. moderate

C. high

D. none of these

Answer: B

Watch Video Solution

219. With the emission of β-particle from an atom of an element, its atomic number

A. remains same

B. increases

C. increases by one

D. decreases by one

Answer: C

Watch Video Solution

220. During radioactive disintegration, β-ray emission is accompanied by the emission of

A. α-rays

B. γ-rays

C. nucleon

D. neutrons

Answer: B

Watch Video Solution

221. When a nucleus decays by emitting a β-particle, the daughter nucleus has one more

A. meson

B. electron

C. proton

D. neutrino

Answer: C

Watch Video Solution

222. In a β-decay

A. the parent and daughter nuclei have same number of protons

B. the daughter nucleus has one proton more less than parant nucleus

C. the daugther nucleus has one proton more than the parent nucleus

D. the daughter nucleus has one neutrons more than parent nucleus

Answer: C

Watch Video Solution

223. Which is the most commonly used particle to produce radio isotopes of elements?

A. α

B. β

C. γ

D. X-rays

Answer: A

Watch Video Solution

224. A radioactive material undergoes decay by ejecting electrons. The electron ejected in this process is

A. the electron from the decay of a neutron

B. the electron present in the nucleus

C. the resulting from the conversion of γ-photon

D. an orbital electron

Answer: A

Watch Video Solution

225. The particles of γ radiation are

A. protons

B. photons

C. electrons

D. none of these

Answer: B

Watch Video Solution

226. The short wavelength electromagnetic wave emitted by nuclei are called

A. α-rays

B. β-rays

C. γ-rays

D. none of these

Answer: C

Watch Video Solution

227. High energy photons, emited in nuclear reorganisation, are called

A. α-rays

B. β-rays

C. γ-rays

D. X-rays

Answer: C

Watch Video Solution

228. The γ rays are

A. singly ionised gas atom

B. helium nuclei

C. fast moving electrons

D. electromagnetic waves

Answer: D

Watch Video Solution

229. The γ-rays passing through a strong uniform electric field

A. deflects

B. deflects vertically

C. deflects horizontally

D. does not deflect

Answer: D

Watch Video Solution

230. When an atomic nucleus emits γ-rays then

A. mass number decreases

B. atomic number decreases

C. mass of nucleus decreases

D. no change in atomic number and mass number

Answer: D

Watch Video Solution

231. Which of the following has high-pentrating power?

A. α-rays

B. β-rays

C. γ-rays

D. none of these

Answer: C

Watch Video Solution

232. The ionisation power of β-particle is

A. least

B. moderate

C. high

D. none of these

Answer: B

Watch Video Solution

233. Which of the following rays has same velocity as that of light?

A. α-rays

B. β-rays

C. γ-rays

D. none of these

Answer: C

Watch Video Solution

234. The same radioactive nucleus may emit

A. all the three α, β and γ one after another

B. all the three α, β and γ radiations simulataneously

C. only α and β simultaneously

D. only one α, β and γ at a time

Answer: D

Watch Video Solution

235. If α, β and γ rays of same energy are aranged in ascending order of their ranges in air the order will be

A. α, β, γ

B. β, α, γ

C. α, γ, β

D. γ, β, α

Answer: A

Watch Video Solution

236. A redioactive element $._{Z}X^{A}$ emits an α particle and changes into

A. $._{Z-2}Y^{A}$

B. $._{Z}Y^{A-4}$

C. $._{Z-2}Y^{A-4}$

D. $._{Z+2}Y^{A}$

Answer: C

Watch Video Solution

237. The equation $._{Z}X^{A} \rightarrow ._{Z+1}Y^{A} + ._{-1}e^{0} + \bar{v}$ represents

A. α-decay

B. β-decay

C. γ-decay

D. fusion

Answer: B

Watch Video Solution

238. A neutron is emitted from a nucleus $._0 X^{233}$ How many β particles must be emitted from it to convert it into $._{92} X^{233}$?

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

239. When the radioactive isotope $._{88} Ra^{228}$ decays in series by the emission of 3α and 1β particle, the isotope finally formed is

A. $._{89} X^{229}$

B. $._{86} X^{222}$

C. $._{83} X^{216}$

D. $._{83} X^{215}$

Answer: C

Watch Video Solution

240. What is the respective number of α and β particles emitted in the following radioactive decay? $._{90}X^{200} \rightarrow ._{80}Y^{168}$

A. 6 and 8

B. 6 and 6

C. 8 and 8

D. 8 and 6

Answer: D

Watch Video Solution

241. $._{90}Th^{232}$ emits 6α and 4β particles and gets converted into a lead. The mass number and atomic number of lead is

A. 208, 82

B. 82, 208

C. 210, 82

D. 210, 84

Answer: A

Watch Video Solution

242. In a cloud chamber α, β and γ radiations are sent. The nature of tracks produced by these particles respectively will be

A. thin and long, thick and short thin and very long.

B. thick and short, thin and long, fuzzy

C. thick and long, thin and short, fuzzy

D. thick and short, thin and long, thick and long

Answer: B

View Text Solution

243. The rate of decay of radioactive element

A. is constant

B. decreases inversely with time

C. increases directly with time

D. decreases exponentially with time

Answer: D

Watch Video Solution

244. Which of the following of radioactive material is a measure of its instability?

A. Full life

B. Mean life

C. Half life

D. none of these

Answer: C

Watch Video Solution

245. The decay constant of a radioactive sample

A. decreases as the atom becomes older

B. increases as the atom becomes older

C. is independent of the age

D. dependes on the nature of activity

Answer: C

Watch Video Solution

246. The rate of disintegration at a given instant, is directly proportional to the number of atoms present at that instant. This is the statement of

A. law of radioactive decay

B. half life

C. law of radioactive transformation

D. group displacement law

Answer: A

Watch Video Solution

247. The time required for the atoms of that element to decrease to half the original value is

A. mean life

B. half life

C. period

D. full life

Answer: B

Watch Video Solution

248. The half-life of a radioactive substance depends upon:

A. decay costant

B. mass of substance

C. atomic number of substance

D. all of these

Answer: A

Watch Video Solution

249. The mathematical equation of law of radioactive decay is

A. $N = N_0 e^{-\lambda t}$

B. $N = e^{-\lambda t}$

C. $N = N_0 e^{\lambda t}$

D. $N_0 = N e^{-\lambda t}$

Answer: A

Watch Video Solution

250. The relation between half life period and decay constant is

A. $T = \frac{0.693}{\lambda}$

B. $T = 0.693\lambda$

C. $T = \frac{\lambda}{0.693}$

D. none of these

Answer: A

Watch Video Solution

251. A radioactive decay rate of 1 curie represents

A. 10^6 disintegrations per second

B. 10^9 disintegrations per second

C. 3.7×10^{10} disintegrations per second

D. 3.7×10^4 disintegrations per second

Answer: C

Watch Video Solution

252. When a nucleus undergoes radioactive decay, its new mass number is

A. always equal to its original mass number

B. always more than its original mass number

C. never more than its original mass number

D. never less than its original mass number

Answer: C

Watch Video Solution

253. The decay constant of a radioactive element is definded as the reciprocal of the time interval after which the number of atoms of the radioactive element falls to nearly

A. 50% of its original number

B. 36.8% of its original number

C. 63.2% of its original number

D. 75% of the original number

Answer: B

Watch Video Solution

254. The half life of a radioactive element is T and its initial activity at $t=0$ is A_0 and at $t=t$ it is A, then

A. $A=A_0 2^{t/T}$

B. $A=A_0(2t)^T$

C. $A_0=A2^{t/T}$

D. $A_0=A2^{-t/T}$

Answer: C

Watch Video Solution

255. The decay constant of the end product of a radioactive series is

A. zero

B. infinite

C. indefinite

D. small and definite

Answer: A

Watch Video Solution

256. Half-life-speed of lead is:

A. zero

B. infinite

C. 1950 days

D. 1590 days

Answer: B

Watch Video Solution

257. The half life of 1 gm of a radioactive element of atomic weight M is T. The half life of M gm of the same element will be

A. T

B. TM

C. $\frac{T}{M}$

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

Answer: A

Watch Video Solution

258. Rate of disintegration per atom is called

A. decay constant

B. Mean life

C. Half life

D. none of these

Answer: A

Watch Video Solution

259. The value of decay constant is independent of

A. temperature

B. pressure

C. force

D. all of these

Answer: D

Watch Video Solution

260. Which of the following is the unit of activity of a radiactive element?

A. curie

B. Rutherford

C. becquerel

D. all of these

Answer: D

Watch Video Solution

261. Half-life of radioactive element depend upon

A. temperature

B. pressure

C. nature of substance

D. all of these

Answer: C

Watch Video Solution

262. N atoms of a radioactive substance emit n α-particles per second. The half life of the radioactive substance is

A. $\dfrac{n}{N}$ sec

B. $\dfrac{N}{n}$ sec

C. $\dfrac{0.693N}{n}$ sec

D. $\dfrac{0.693n}{N}$ sec

Answer: C

Watch Video Solution

263. If the half life of radium is 1620 years then its decay constant is

A. 4.2×10^{-4} per year

B. 2.4×10^{-4} per year

C. 4.2×10^{-2} per year

D. 2.4×10^{-2} per year

Answer: A

Watch Video Solution

264. A radioactive substance decay to $\frac{1}{5}$ of its original value in 56 days. The decay constant is

A. 0.287 day^{-1}

B. 0.0287 per day

C. 2.87 per day

D. 28.7 per day

Answer: B

Watch Video Solution

265. The activity of a radioactive substance is readuced by 80% in 100 days. Its half life is

A. 40 says

B. 41 days

C. 42 days

D. 43.04 days

Answer: D

Watch Video Solution

266. The half-life period of radium is 1600 years. The fraction of a sample of radium that would remain after 6400 years is.

A. $\frac{1}{4}$

B. $\frac{1}{16}$

C. $\frac{1}{32}$

D. $\frac{1}{64}$

Answer: B

Watch Video Solution

267. A sample contains 10 mg of radioactive material of half life 270 days. The mass of remaining radioactive material after 540 days will be

A. 2.5 mg

B. 5 mg

C. 10 mg

D. 15 mg

Answer: A

Watch Video Solution

268. If a radioactive material has half life of one year, a sample will be reduced to 1/8 of its mass in

A. 2 years

B. 3 years

C. 4 years

D. 6 years

Answer: B

Watch Video Solution

269. A radioactive substance decays to $\frac{1}{64}$ of its initial quantity in 30 days. The time during which it will decays to $\frac{1}{128}$ of its initial quantity is

A. 30 days

B. 35 days

C. 40 days

D. 45 days

Answer: B

Watch Video Solution

270. Three specimens A, B, C of same radioactive element has activities 1 microcurie, 1 rutherford and 1 becquerel respectively. Which specimen has maximum mass?

A. A

B. B

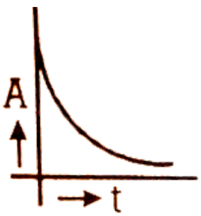
C. C

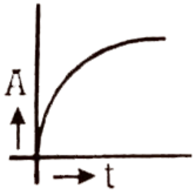
D. all have equal masses

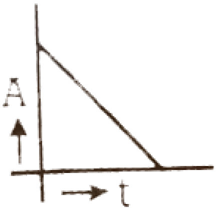
Answer: B

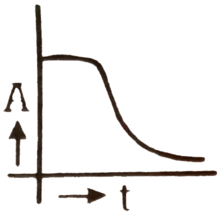
Watch Video Solution

271. Which of the following graphs represents the variation of activity (A) of a radioactive substance with time (t).

A. 

B. 

C. 

D. 

Answer: A

View Text Solution

272. The de-Broglie wavelength of a particle having a momentum of $2 \times 10^{-28} kg - ms^{-1}$ is

A. $3.3 \times 10^{-5} m$

B. $6.6 \times 10^{-6} m$

C. $3.3 \times 10^{-6} m$

D. $1.65 \times 10^{-6} m$

Answer: C

Watch Video Solution

273. The de-Broglie wavelength λ

A. is proportional to mass

B. is proportional to impulse

C. inversely proportional to impulse

D. does not depend on impulase

Answer: C

Watch Video Solution

274. The de Broglie wavelength (λ) of a particle is related to its kinetic energy E as

A. $\lambda \propto E$

B. $\lambda \propto \sqrt{E}$

C. $\lambda \propto 1/E$

D. $\lambda \propto 1/\sqrt{E}$

Answer: D

Watch Video Solution

275. A proton and an alpha - particle are accelerated through same potential difference. Then, the ratio of de-Broglie wavelength of proton and alpha-particle is

A. $2\sqrt{2}:1$

B. $1:\sqrt{2}$

C. $\sqrt{2}:1$

D. $1:2\sqrt{2}$

Answer: A

Watch Video Solution

276. A photon , an electron and a uranium nucleus all have the same wavelength . The one with the most energy

A. is the photon

B. is the electron

C. is the uranium nucleus

D. depends upon the wavelength and the properties of the particle

Answer: A

Watch Video Solution

277. If a photon and an electron propagate in the form of waves, having the same wavelength, it implies that both of them have the same

A. energy

B. velocity

C. linear momentum

D. angular momentum

Answer: C

Watch Video Solution

278. An α-particle and a proton are accelerated in such a way that they get the same kinetic energy. What is the ratio of their de Broglie wavelengths?

A. $1:1$

B. $1:2$

C. $1:3$

D. $3:2$

Answer: B

Watch Video Solution

279. Dual nature of radiation is shown by

A. diffraction and reflection

B. refraction and diffraction

C. photoelectric effect alone

D. photoelectric effect and diffraction

Answer: D

Watch Video Solution

280. If particles are moving with same velocity , then maximum de - Broglie wavelength will be for

A. α-particle

B. β-particle

C. proton

D. neutron

Answer: B

Watch Video Solution

281. What is the de Broglie wavelength of a 2 kg mass moving with a velocity of 10 m/s?

A. $6.6 \times 10^{-35} m$

B. $3.3 \times 10^{-35} m$

C. $8 \times 10^{-35} m$

D. $2.5 \times 10^{-35} m$

Answer: B

Watch Video Solution

282. What is the de - Broglie wavelength of the alpha - particle accelerated through a potential difference V?

A. $\frac{0.287}{\sqrt{V}}\text{Å}$

B. $\frac{12.27}{\sqrt{V}}\text{Å}$

C. $\frac{0.101}{\sqrt{V}}\text{Å}$

D. $\frac{0.202}{\sqrt{V}}\text{Å}$

Answer: C

Watch Video Solution

283. For the Bohr's first orbit of circumference $2\pi r$, the de - Broglie wavelength of revolving electron will be

A. $2\pi r$

B. πr

C. $1/2\pi r$

D. $1/4\pi r$

Answer: A

Watch Video Solution

284. Through what potential difference should an electron be accelerated so that its de-Broglie wavelength becomes 0.4Å?

A. 999 V

B. 242 V

C. 941 V

D. 520 V

Answer: C

Watch Video Solution

285. The de - Broglie wavelength of a particle moving with a velocity $2.25 \times 10^8 m/s$ is equal to the wavelength of photon. The ratio of kinetic energy of the particle to the energy of the photon is (velocity of light is $3 \times 10^8 m/s$

A. $1/8$

B. $3/8$

C. $5/8$

D. $7/8$

Answer: B

Watch Video Solution

286. An electron and a proton are accelerated through the same potential difference. The ratio of their de-Broglie wavelengths will be

A. $\left(\frac{m_p}{m_e}\right)^{1/2}$

B. $\frac{m_e}{m_p}$

C. $\frac{m_p}{m_e}$

D. 1

Answer: A

Watch Video Solution

287. The idea of matter waves was given by

A. Davission and Germer

B. de-Broglie

C. Einstein

D. Planck

Answer: B

Watch Video Solution

288. If the kinetic energy of a free electron doubles , its de - Broglie wavelength changes by the factor

A. 2

B. $1/2$

C. $\sqrt{2}$

D. $1/\sqrt{2}$

Answer: D

Watch Video Solution

289. A particle with rest mass m_0 is moving with velocity c. what is the de-Broglie wavelength associated with it?

A. zero

B. infinity

C. hv/m_0c

D. m_0c/h

Answer: A

Watch Video Solution

290. An electron and proton have the same de-Broglie wavelength. Then the kinetic energy of the electron is

A. zero

B. equal to the K.E. of proton

C. less than the K.E. of proton

D. more than the K.E. of the proton

Answer: D

Watch Video Solution

291. The de - Broglie wavelength associated with a hydrogen molecule moving with a thermal velocity of $3km/s$ will be

A. $0.66 \times 10^{-10} m$

B. $0.33 \times 10^{-10} m$

C. $10^{-10} m$

D. $2 \times 10^{-10} m$

Answer: A

Watch Video Solution

292. The wavelength of de - Broglie wave is $2\mu m$, then its momentum is

$(h = 6.63 \times 10^{-34J-s}$

A. 3.315×10^{-28} kg m/s

B. 1.66×10^{-28} kg m/s

C. 4.97×10^{-28} kg m/s

D. 9.9×10^{-28} kg m/s

Answer: A

Watch Video Solution

293. A wave is associated with matter when it is

A. when it is stationary

B. when it is motion with the velocity of light only

C. when it is in motion with any velocity

D. none of the above

Answer: C

Watch Video Solution

294. Protons and α-particles have the same de Broglie wavelength. What is same for both of them?

A. mass

B. linear momentum

C. frequency

D. energy

Answer: B

Watch Video Solution

295. The de - Broglie wavelength associated with the particle of mass m moving with velocity v is

A. h/mv

B. mv/h

C. mh/v

D. m/hv

Answer: A

Watch Video Solution

296. If alpha particle, proton and electron move with the same momentum, them their respective de Broglie wavelengths $\lambda_{\alpha}, \lambda_{p}, \lambda_{e}$ are related as

A. Electron

B. All have the same de Broglie wavelength

C. proton

D. α-particle

Answer: B

Watch Video Solution

297. de-Broglie wavelength of a body of mass 1 kg moving with velocity of 2000 m/s is

A. $3.32 \times 10^{-27} \text{Å}$

B. $1.5 \times 10^{7} \text{Å}$

C. $0.55 \times 10^{-22} \text{Å}$

D. none of these

Answer: A

Watch Video Solution

298. A dust particle of mass 2 mg is carried by wind with a velocity of 100 cm/s. What is the de-Broglie wavelength associated with the dust particle? ($h = 6.63 \times 10^{-34} J - s$)

A. $3.32 \times 10^{-31} m$

B. $6.64 \times 10^{-30} m$

C. $3.32 \times 10^{-34} m$

D. $3.32 \times 10^{-28} m$

Answer: D

Watch Video Solution

299. The kinetic energy of electron and proton is $10^{-32} J$. Then the relation between their de - Broglie wavelength is

A. $\lambda_p < \lambda_e$

B. $\lambda_p > \lambda_e$

C. $\lambda_p = \lambda_e$

D. $\lambda_p = 2\lambda_e$

Answer: A

Watch Video Solution

300. A particle which has zero rest mass and non - zero energy and momentum must travel with a speed

A. equal to c, the speed of light in vacuum

B. greater than c

C. less than c

D. tending to infinity

Answer: A

Watch Video Solution

301. The relation between the circumference of an electron orbit in a hydrogen atom and the de Broglie wavelength of the electron in the same orbit is given by

A. $2\pi r = n\lambda$

B. $2\pi r = nh/2$

C. $2\pi r = 2n\lambda$

D. $2\pi r = n\lambda/4$

Answer: A

View Text Solution

302. An electron of mass m when accelerated through a potential difference V has de - Broglie wavelength λ. The de - Broglie wavelength associated with a proton of mass M accelerated through the same potential difference will be

A. $\lambda \frac{m}{M}$

B. $\lambda\sqrt{\frac{m}{M}}$

C. $\lambda\frac{M}{m}$

D. $\lambda\sqrt{\frac{M}{m}}$

Answer: B

Watch Video Solution

303. The de-Broglie wavelength of a proton and an electron are equal. The it follows that

A. the velocity of the proton is more than that of the electron

B. the velocity of the electron is more than that of the proton

C. the velocities of the proton and electrons are equal

D. the energies of proton and electron are equal

Answer: B

Watch Video Solution

304. What will happen to the de-Broglie wavelength if the velocity of the electron is increased?

A. It will decrease

B. It will increase

C. It will remain the same

D. It will become twice

Answer: A

Watch Video Solution

305. de-Broglie hypothesis treated electrons as

A. particles

B. waves

C. both 'a' and 'b'

D. none of these

Answer: B

Watch Video Solution

306. What is the wavelength of matter waves associated with a paticle of mass 200 gm and moving with a velocity of 100 m/s?

A. $6.6 \times 10^{-33} m$

B. $3.3 \times 10^{-35} m$

C. $2.2 \times 10^{-34} m$

D. $5.4 \times 10^{-34} m$

Answer: B

Watch Video Solution

307. The speed of an electron having a wavelength of $10^{-10} m$ is

A. $7.25 \times 10^{6} m / s$

B. $6.25 \times 10^{6} m / s$

C. $5.25 \times 10^{6} m / s$

D. $4.24 \times 10^{6} m / s$

Answer: A

Watch Video Solution

308. The de-Broglie wavelength associated with electrons revolving round the nucleus in a hydrogen atom in the ground state will be

A. 3.3 Å

B. 1.3 Å

C. 6.6 Å

D. 20 Å

Answer: A

Watch Video Solution

309. If the de-Brolie wavelength for a proton and for a α-particle are equal, then the ratio of their velocities will be

A. $4:1$

B. $2:1$

C. $1:2$

D. $1:4$

Answer: A

View Text Solution

310. The de-Broglie wavelength of an electron, an α-particle and a proton are $\lambda_e, \lambda_a, \lambda_p$. Which is wrong from the following?

A. $\lambda_e > \lambda_p$

B. $\lambda_e < \lambda_p$

C. $\lambda_p > \lambda_\alpha$

D. $\lambda_e > \lambda_p > \lambda_\alpha$

Answer: B

View Text Solution

311. From rest an electron is accelerated between two such points which has poteintial 20 & 40 volts respectively. Associated de-Broglie wavelength of electron is-

A. 7.5 Å

B. 2.75 Å

C. 2.75 m

D. 0.75 Å

Answer: B

Watch Video Solution

312. An electron is having a kinetic energy of 50 eV. Its de-Broglie wavelength is

A. 1.732 Å

B. 2.5 Å

C. 4.414 Å

D. 6.5 Å

Answer: A

Watch Video Solution

313. The de - Broglie wavelength of an electron having $80ev$ of energy is nearly

$(1eV = 1.6 \times 10^{-19} J$, Mass of electron $= 9 \times 10^{-31} kg$ Plank's constant $= 6.6 \times 10^{-34} J - \text{sec})$

A. 140 Å

B. 0.14 Å

C. 14 Å

D. 1.4 Å

Answer: D

Watch Video Solution

314. The de - Broglie wavelength λ associated with an electron having kinetic energy E is given by the expression

A. $\dfrac{h}{\sqrt{2mE}}$

B. $\frac{2h}{mE}$

C. $2mhE$

D. $\frac{2\sqrt{2mE}}{h}$

Answer: A

Watch Video Solution

315. A potential difference of 15 KV is applied to accelerate the electron in an electron microscope. The de broglie wavelength of the electron waves is

A. 1Å

B. 0.1Å

C. 0.5Å

D. 0.01Å

Answer: B

Watch Video Solution

316. The de-Broglie wavelength is proportional to

A. $\lambda \propto 1/v$

B. $\lambda \propto 1/m$

C. $\lambda \propto 1/p$

D. $\lambda \propto p$

Answer: C

Watch Video Solution

317. Eleactrons kept in an encloser at temperature T have a de-Broglie wavelength λ. If the temperature of the encloser is increased, then the de Broglie wavelength of the electrons will

A. increase

B. decrease

C. not change

D. none of these

Answer: B

Watch Video Solution

318. When the kinetic energy of an electron is increased , the wavelength of the associated wave will

A. increase

B. decrease

C. wavelength does not depend on the kinetic energy

D. none of the above

Answer: B

Watch Video Solution

Watch Video Solution

319. For an electron, having kinetic energy E and moving at non relatvitic speeds $(V < < C)$, the de-Broglie wavelength is inversely proportional to

A. E

B. $E^{1/2}$

C. $E^{-1/2}$

D. E^{-2}

Answer: B

Watch Video Solution

320. If particles are moving with same velocity , then maximum de - Broglie wavelength will be for

A. Neutron

B. Proton

C. β-particle

D. α-particle

Answer: C

Watch Video Solution

321. In Davisson and Germer experiment maximum intensity was observed for

A. $54^\circ, 50V$

B. $60^\circ, 50V$

C. $50^\circ, 54V$

D. $65^\circ, 54V$

Answer: C

Watch Video Solution

322. Davisson and Germer experiment proved

A. wave nature of light

B. particle nature of light

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: D

Watch Video Solution

323. The de-Broglie wavelength of an electron revolving in the ground state orbit is

A. πr

B. πr^2

C. $2\pi r$

D. $\sqrt{2\pi r}$

Answer: C

Watch Video Solution

324. In Davisson and Germer experiment, a detector with a galvanometer can be rotated on a circular scale. As the detector is rotaed the intensity of electronic beam after diffraction

A. remains constant

B. increases continuously

C. decreases continuously

D. increases becomes maximum and decreases

Answer: D

View Text Solution

325. In Davisson and Germer experiment, a crystal which diffracts a beam of electrons is of

A. sodium chloride

B. nickel

C. silver

D. calcium chloride

Answer: B

Watch Video Solution

326. In Davisson and Germer experiment, accelerating potential is kept constant at 54 V. As detector is rotated, the first intensity maximum is obtained at an angle of

A. 50°

B. 54°

C. 65°

D. 45°

Answer: A

Watch Video Solution

327. If the accelerating potential in Davisson and Germer experiment is 54 V, the de-Broglie wavelength of the electron is

A. 0.65 Å

B. 1.65 Å

C. 2.65 Å

D. 0.165 Å

Answer: B

Watch Video Solution

328. In Davisson and Germer experiment, if the angle of diffraction is 50°, then tha angle of glancing will be

A. 65°

B. 50°

C. 135°

D. 90°

Answer: A

View Text Solution

329. The main aim of Davisson-Germer experiment is to verify............ .

A. the wave nature of light

B. the quantum nature of light

C. wave nature of electron

D. negative charge of electron

Answer: C

Watch Video Solution

330. In Davission and Geremer experiment, an electron beam is incident on a crystal. In the diffracted beam there are

A. α-particles

B. protons

C. photons

D. electrons

Answer: D

Watch Video Solution

331. In Davission and Germer experiment, the function of nickel crystal is

A. to absorb the incident beam of electron

B. to absorb the incident beam of electron

C. to diffract the incident beam of electron

D. to refract the incident beam of electron

Answer: B

Watch Video Solution

332. X-ray are

A. stream of electrons

B. stearm of positively charged particles

C. electromagnetic radiation

D. stream of negatively charged particles

Answer: C

Watch Video Solution

333. The characteristic X-ray radiation is emitted when

A. the electrons are accelerated to a fixed energy

B. the source of electrons emits a monoenergetic beam

C. the bombarding electrons knock out electrons from the inner shell of the target atoms and one of outer electrons falls into this vacancy

D. the valence electrons in the target atoms are removed as a result of collision

Answer: C

Watch Video Solution

334. When high speed electrons hit a target

A. only heat is produced

B. only continuous X -rays are emitted

C. only continuousand characteristic X-ray are emitted

D. heat is produced and simutaneously continuous and characteristic X-rays are emitted

Answer: D

Watch Video Solution

335. The continuous X-ray spectrum produced by an X-ray machine at constant voltage has which of the following?

A. a maximum wavelength

B. a minimum wavaelength

C. a single wavelength

D. a minimum frequency

Answer: B

Watch Video Solution

336. The characteristic of the electrons striking the target in an X-ray tube that, determines the intensity of X-rays is

A. energy

B. momentum

C. number incident per second

D. mass

Answer: C

Watch Video Solution

337. The characteristic of the electrons striking the target in a Coolidge tube, that determines the upper limit of frequency of contimuous X-rays is

A. energy

B. momentum

C. number incident per second

D. mass

Answer: A

Watch Video Solution

338. The target element in an X-ray tube must have a high

A. atomic number only

B. mass number only

C. melting point only

D. both atomic number and melting point

Answer: D

Watch Video Solution

339. The characteristic of the target element that determines the frequency of characteristic X-rays, is

A. its mass number

B. its atomic number

C. its melting point

D. its conductivity

Answer: B

Watch Video Solution

340. During X-ray formation, if voltage is increased

A. minimum wavelength decreases

B. minimum wavelength increases

C. intensity decreases

D. intensity increases

Answer: A

Watch Video Solution

341. X-rays are produced

A. during electric dischange at low pressure

B. during nuclear explosions

C. when cathode rays are refkected from the target

D. whenelectrons from higher energy state come back to lower energy state

Answer: D

Watch Video Solution

342. What happens when fast moving electrons are stopped and fall on the metallic target in an evacuated glass bulb?

A. β-particles are produced

B. Metal becomes soft

C. γ-rays are produced

D. X-arys are produced

Answer: D

Watch Video Solution

343. Which of the following types of electromagnetic waves have the longest wavelength?

A. X-rays

B. Infrared

C. Radio waves

D. Visible light

Answer: C

Watch Video Solution

344. Intensity of X-rays depends upon the number of

A. neutrons

B. positrons

C. protons

D. electrons

Answer: D

Watch Video Solution

345. To produce hard X-rays in Coolidge tube, we should increase

A. current in filament

B. potential difference acros the filament

potential diference across the filament

C. potential difference across cathode and anticathode

D. none of the above

Answer: C

Watch Video Solution

346. In an X-ray tube, the intensity of the emitted X-ray beam is increased by

A. increasing the filament current

B. decreasing the filament current

C. increasing the target potential

D. decreasing the target potential

Answer: A

Watch Video Solution

347. The wavelength of the characteristic X - ray k_{α} line emitted by a hydrogens like element is 0.32λ . The wavelength of the K_{β} line emitted by the same element will be .....

A. 0.24 Å

B. 0.27 Å

C. 0.32 Å

D. 0.48 Å

Answer: B

Watch Video Solution

348. An X-ray tube operated at 30 kV emits a continuous X-ray of short wavelength limit $\lambda = 0.414\text{Å}$. The value of Planck's constant is

A. $6.62 \times 10^{-34} J - s$

B. $6.7 \times 10^{-34} J - s$

C. $6.6 \times 10^{-34} J - s$

D. $6.67 \times 10^{-31} J - s$

Answer: A

Watch Video Solution

349. The wavelength of K_{α} X-rays produced by an X-ray tube is 1.785 Å. Find the atomic number of the anode material of the tube $(R = 109737 cm^{-1})$

A. 24

B. 32

C. 48

D. 27

Answer: D

Watch Video Solution

350. Which of the following is accompanied by the characteristic X - ray emission ?

A. α-particle emission

B. Electron emission

C. Position emission

D. K-electron capture

Answer: D

Watch Video Solution

351. For continuous X-rays produced wavelength is

A. imversely proportional to the energy of the electrons hitting the target

B. inversely proportional to the intensity of the electron beam

C. proportional to intensity of the electron beam

D. proportional to target temperature

Answer: A

Watch Video Solution

352. The speed of the electron in the second orbit in a H-atom is

A. $1.1 \times 10^6 m / s$

B. $2.1 \times 10^6 m / s$

C. $1.5 \times 10^6 m / s$

D. $2.5 \times 10^6 m / s$

Answer: A

Watch Video Solution

353. The velocity of the electron in the first Bohr's orbit is $2.181 \times 10^6 m / s$. The linear velocity of electron in third orbit is

A. $72.7 \times 10^5 m / s$

B. $2.77 \times 10^5 m / s$

C. $7.27 \times 10^5 m / s$

D. $5.57 \times 10^5 m / s$

Answer: C

Watch Video Solution

354. The angular momentum of the electron in the third orbit of H atom is

A. $2.3 \times 10^{-34} Js$

B. $3.2 \times 10^{-34} Js$

C. $5.2 \times 10^{-34} Js$

D. $4.2 \times 10^{-34} Js$

Answer: B

Watch Video Solution

355. The angular speed of the electron in the first orbit in a hydrogen atom is

A. 5.1×10^{16} rad/s

B. 1.4×10^{16} rad/s

C. 4.1×10^{16} rad/s

D. 1.1×10^{16} rad/s

Answer: C

Watch Video Solution

356. The angular speed of the electron in the first orbit in a H atom is 4.103×10^{16} rad/s. Hence the angular speed of the electron in the third orbit is

A. 2.5×10^{15} rad/s

B. 1.5×10^{15} rad/s

C. 5.1×10^{15} rad/s

D. 5.5×10^{15} rad/s

Answer: B

Watch Video Solution

357. The radius of the first Bohr orbit of the hydrogen atom is 0.53 Å and angular momentum of the electron in that orbit is 1.055×10^{-34} Js. The linear speed of the electron in the second orbit of the H-atom is

A. 1.1×10^{6} m/s

B. 1.1×10^{-6} m/s

C. 2.1×10^{6} m/s

D. 2.1×10^{-6} m/s

Answer: A

Watch Video Solution

358. The radius of first Bohr orbit in H-atom is 0.53 Å. The radius of third orbit is

A. 7.44 Å

B. 7.47 Å

C. 47.7 Å

D. 4.77 Å

Answer: D

Watch Video Solution

359. The energy of the electron in the third orbit of H-atom is -1.51 eV. The energy of the electron in first orbit is

A. -13.6 eV

B. -16.6 eV

C. -1.36 eV

D. 13.6 eV

Answer: A

Watch Video Solution

360. Energy of an electron in second Bohr orbit of H-atom is -3.4 eV. The Rydbergs constant is

A. $2.1 \times 10^{-7} m^{-1}$

B. $1.1 \times 10^{7} m^{-1}$

C. $2.1 \times 10^{7} m^{-1}$

D. $1.1 \times 10^{-7} m^{-1}$

Answer: B

Watch Video Solution

361. If an electron in hydrogen atom jumps from third orbit to second orbit, the frequency of the emitted radiation is given by (c is speed of light)

A. 4.5×10^{14} Hz

B. 5.4×10^{14} Hz

C. 4.5×10^{-14} Hz

D. 5.5×10^{14} Hz

Answer: A

Watch Video Solution

362. The wavelength of H_α line in Balmer series is

A. 6653 Å

B. 6365 Å

C. 6563 Å

D. 5663 Å

Answer: C

Watch Video Solution

363. The shortest wavelength of spectral line in Lyman series is 912 Å. The shortest wavelength of the spectral line of the Paschen series is

A. 4143 Å

B. 4341 Å

C. 4431 Å

D. 1344 Å

Answer: B

Watch Video Solution

364. The shortest wavelength of spectral line in Lyman series is 912 Å. The shortest wavelength of the spectral line of the Paschen series is

A. 8208 Å

B. 8028 Å

C. 8828 Å

D. 8820 Å

Answer: A

Watch Video Solution

365. The ratio of the longest to the shortest wavelength lines in the Balmer series is

A. 1.1

B. 8.8

C. 1.8

D. 8.1

Answer: C

Watch Video Solution

366. A radioactive substance reduces to $\frac{1}{32}$ of its original value in 300 days. The half life of radioactive substance is

A. 60 days

B. 50 days

C. 40 days

D. 30 days

Answer: A

Watch Video Solution

367. A radioactive substance decay to $\frac{1}{5}$ of its original value in 56 days. The decay constant is

A. 9.2×10^{-2} per day

B. 2.2×10^{-2} per day

C. 2.8×10^{-2} per day

D. 9.9×10^{-2} per day

Answer: C

Watch Video Solution

368. A certain mass of radium is reduced by 70% in 2780 years. The decay constant is

A. 4.3×10^{-4} per year

B. 3.4×10^{-4} per year

C. 5.4×10^{-4} per year

D. 4.8×10^{-4} per year

Answer: A

Watch Video Solution

369. The half life of radius is 1620 years. The fraction decayed out of the original sample is 3/4. How many years required for it?

A. 3224 years

B. 2234 years

C. 3422 year

D. 3242 years

Answer: D

Watch Video Solution

370. One gram of a radioactive substance of half life 4 days is sealed in a tube. The quantity left after 5 days is

A. 460 mg

B. 240 mg

C. 420 mg

D. 402 mg

Answer: C

Watch Video Solution

371. A radioactive substance has a mass of 16 mg and its half life is 25 years. The quantity of substance will remain to be disintegrated in 100 years is

A. 1 mg

B. 2 mg

C. 5 mg

D. 7 mg

Answer: A

Watch Video Solution

372. The mass of an electron at rest is 9.1×10^{-31} kg. The energy of electron when it moves with speed of 1.8×10^{8} m/s is

A. $2 \times 10^{-13} J$

B. $1 \times 10^{13} J$

C. $1.29 \times 10^{-13} J$

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

Answer: C

Watch Video Solution

373. A particle moves with a speed of 1.5×10^{8} m/s. The ratio of its mass to its rest mass is

A. 1.1

B. 1.5

C. 2.5

D. 5.2

Answer: A

Watch Video Solution

374. The rest mass of a proton is 1.67×10^{-27} kg. the kinetic energy of proton when it moves with a speed of 2.1×10^{8} m/s is

A. $6 \times 10^{-12} J$

B. $5 \times 10^{-11} J$

C. $6 \times 10^{-11} J$

D. $7 \times 10^{-11} J$

Answer: C

Watch Video Solution

375. The effective mass of a photon of the wavelength of the radiation 3000 Å is

A. 7.4×10^{-36} kg

B. 4.7×10^{-36} kg

C. 8.4×10^{-36} kg

D. 6.4×10^{-36} kg

Answer: A

Watch Video Solution

376. The percentage increase in the rest mass of an electron when it is moving at a speed of 0.6 c where c is the speed of light, is

A. 0.52

B. 0.75

C. 0.25

D. 0.5

Answer: C

Watch Video Solution

377. The radius of the nucleus of the atom with A=216 is (take $R_0 = 1.3$ fm)

A. 7.2 fm

B. 7.8 fm

C. 280 fm

D. 19 fm

Answer: B

Watch Video Solution

378. The ratio of the radii of the nuclei $._{13}A^{27}$ and $._{52}Te^{125}$ is approximately

A. $6 : 10$

B. $27 : 125$

C. $13 : 52$

D. $14 : 73$

Answer: A

Watch Video Solution

379. A radio active material has a half life of 2.5 hours. In 10 hrs, 1 gm of material is reduced to ..... Gm

A. $1/16$

B. $1/8$

C. $1/4$

D. $1/2$

Answer: A

Watch Video Solution

380. The half life period of radio active isotope is 5 minutes. The fraction of isotope, that will be remaining after 30 minutes is

A. $1/16$

B. $1/36$

C. $1/64$

D. $1/32$

Answer: C

Watch Video Solution

381. The energy of electron in an excited hydrogen atom is $-3.4eV$. Its angular momentum according to bohr's theory will be

A. 2.11×10^{-34} Js

B. $2.11 \times 10^{+34}$ Js

C. 2.11×10^{-34} erg s

D. zero

Answer: A

Watch Video Solution

382. The half-life of a certain radioactive element is such that 7/8 of a given quantity decays in 12 days. What fraction remains undecayed after 24 days?

A. 0

B. $\frac{1}{128}$

C. $\frac{1}{64}$

D. $\frac{1}{32}$

Answer: C

Watch Video Solution

383. The ratio of the speed of the electron in the first Bohr orbit of hydrogen and the speed of light is equal to (where e, h and c have their usual meanings)

A. $2\pi hc / e^2$

B. $e^2 h / 2\pi c$

C. $e^2 c / 2\pi h$

D. $2\pi \frac{e^2}{h} c$

Answer: D

Watch Video Solution

384. An electron has a mass of $9.1 \times 10^{-31} kg$. It revolves round the nucleus in a circular orbit of radius 0.529×10^{-10} metre at a speed of $2.2 \times 10^{6} m / s$. The magnitude of its linear momentum in this motion is

A. $1.1 \times 10^{-34} : kgms^{-1}$

B. $2.0 \times 10^{-24} \text{ kg ms}^{-1}$

C. $4.0 \times 10^{-24} \text{ kg ms}^{-1}$

D. $4.0 \times 10^{-31} \text{ kg ms}^{-1}$

Answer: B

Watch Video Solution

385. After an interval of one day , $1/16th$ initial amount of a radioactive material remains in a sample. Then, its half-life is .

A. 6 hours

B. 12 hours

C. 1.5 hours

D. 3 hours

Answer: A

Watch Video Solution

386. The half - life of $\hat{}\ (215) At$ is $100\mu, s$. The time taken for the radioactivity of a sample of $\hat{}\ (215) At$ to decay to $1/16^{th}$ of its initially value is

A. $400\mu s$

B. $6.3\mu s$

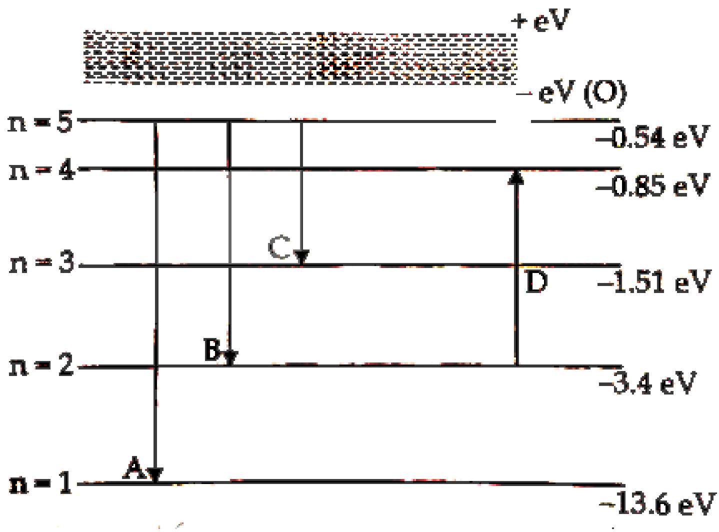
C. $40\mu s$

D. $300\mu s$

Answer: A

Watch Video Solution

387. Inm the figure, energy levels of hydrogen atom have been shown along with some transitions marked A, B, C and D. The transitions A, B, C, respectively respresent



A. The first member of Lymen series, third member of Balmer series and second member of Paschen series

B. The ionisation potential of H, second member of Balmer series and third member of Paschen series

C. The series limit of Lyman series, second member of Balmer series and third member of Paschen series

D. The series limit of Lymen series, third member of Balmer series and second member of Pashen series

Answer: A

View Text Solution

388. The radius of the nucleus $._8O^{16}$ is $3 \times 10^{-15} m$. The density of this nucleus will be

A. $2.35 \times 10^{-17}\ \mathrm{kg\,m}^{-3}$

B. $3.35 \times 10^{17}\ \mathrm{kg\,m}^{-3}$

C. $2.35 \times 10^{17}\ \mathrm{kg\,m}^{-3}$

D. $3.35 \times 10^{-17}\ \mathrm{kg\,m}^{-3}$

Answer: C

Watch Video Solution

389. Which of the following is stable?

A. proton

B. positron

C. neutron

D. electron

Answer: C

Watch Video Solution

390. The radius of nucleus is:

A. directly proportional to its mass number

B. inversely proportional to its atomic weight

C. directly proportional to the cube root of its mass number

D. none of these

Answer: C

Watch Video Solution

391. Charge on an α-particle is

A. $1.6 \times 10^{-19} C$

B. $3.2 \times 10^{-19} C$

C. $1.6 \times 10^{-20} C$

D. $4.8 \times 10^{-19} C$

Answer: B

Watch Video Solution

392. The radius of hydrogen atom, in its ground state, is of the order of

A. $10^{-8}cm$

B. $10^{-6}cm$

C. 10^{-5} cm

D. 10^{-4} cm

Answer: A

Watch Video Solution

393. The ionization potential of a hydrogen atom is 13.6 eV. What will be the energy of the atom corresponding to n=2?

A. $-6.8eV$

B. $-3.4eV$

C. $-27.2eV$

D. $-4.4eV$

Answer: B

Watch Video Solution

394. If a radioactive element is placed in an evacuated container, its rate of disintegration

A. decrease

B. remains unchanged

C. increase

D. none of these

Answer: B

Watch Video Solution

395. The ratio of the speed of the electron in the first Bohr orbit of hydrogen and the speed of light is equal to (where e, h and c have their usual meaning in cgs system)

A. $2e^2 / \in_0 hn^2c$

B. $2e^2 / \in_0 hc$

C. $e^2 / \in_0 hc$

D. $e^2 / 2 \in_0 hc$

Answer: D

Watch Video Solution

396. unit of $'\lambda'$ in radioactivity is

A. microwave region

B. $(\text{unit of half-life})^{-1}$

C. $(\text{year})^{-1}$

D. sec

Answer: B

Watch Video Solution

397. The γ radiations are

A. electromagnetic radiation with high energy

B. electromagnetic radiation with low energy

C. charged particles emitted by the nucleus

D. electrons orbiting the nucleus

Answer: A

Watch Video Solution

398. What is the amount of energy released when 3 kg mass is annihilated?

A. $22 \times 10^{16} J$

B. $18 \times 10^{16} J$

C. $27 \times 10^{16} J$

D. $9 \times 10^{16} J$

Answer: C

Watch Video Solution

399. The shortest wavelength for Lyman series is 912 Å. What will be the longest wavelength in Paschen series?

A. 1216 Å

B. 3646 Å

C. 18751 Å

D. 8208 Å

Answer: C

View Text Solution

400. Balmer series lies in which spectrum?

A. visible

B. ultravolet

C. infrared

D. partially visible, partially infrared

Answer: A

View Text Solution

401. Balmer series is obtained in

A. visible region

B. ultraviolet region

C. infrared region

D. visible as well as ultraviolet region

Answer: A

Watch Video Solution

402. $\lambda_a / \lambda_\beta$ in Balmer series is

A. $27 : 20$

B. $20 : 27$

C. $5 : 36$

D. $12 : 64$

Answer: A

Watch Video Solution

403. An electron in first orbit of hydrogen moves in circular orbit of radius r with velocity v. find the current through the loop.

A. 2π ev/r

B. ev/2π r

C. 3 ev

D. evr

Answer: B

Watch Video Solution

404. The electron in the first orbit of hydrogen has velocity 2.18×10^6 m/s. If radius of first orbit is 0.53 Å then orbital current in the orbit is

A. 0.41 mA

B. 1.04 mA

C. 1.84 mA

D. 2.4 mA

Answer: B

Watch Video Solution

405. 1.5 kg mass is annihilated. Energy liberated in this process is

A. $1.35 \times 10^{16} J$

B. $13.5 \times 10^{16} J$

C. $23.5 \times 10^{16} J$

D. $33.5 \times 10^{16} J$

Answer: B

Watch Video Solution

406. For electron moving in n^{th} orbit of the atom , the angular velocity is proportional to:

A. inversely proportional to n^2

B. inversely proportional to n^3

C. directly proportional to n

D. independent of n

Answer: B

Watch Video Solution

407. The least energetic wave number in the Paschen series is

A. 5R/16

B. R/4

C. R/9

D. 7R/144

Answer: D

Watch Video Solution

408. Planck's constant has the same dimensions as that of

A. energy

B. angular momentum

C. mass

D. force

Answer: B

Watch Video Solution

409. Wavelength of first line in Lymen series is λ. What is wavelength of first line in Balmer series?

A. $\frac{5\lambda}{27}$

B. $\frac{27\lambda}{5}$

C. $\frac{36\lambda}{5}$

D. $\frac{5\lambda}{36}$

Answer: B

Watch Video Solution

410. If 8g of a radioactive substance decays into 0.5 g in 1 h, then the half-life of the substance is

A. 45 min

B. 10 min

C. 15 min

D. 30 min

Answer: C

Watch Video Solution

411. Maximum energy is evolved during which of the following transitions ?

A. n=1 to n=2

B. n=2 to n=1

C. n=2 to n=6

D. n=6 to n=2

Answer: B

Watch Video Solution

412. A ground state hydrogen atom has an energy of -13.6 eV. If the electron is excited to the energy state $n = 3$, its energy ebcomes

A. -12.09 eV

B. -13.6 eV

C. -4.5 eV

D. -1.51 eV

Answer: D

Watch Video Solution

413. Which of the following transitions give the highest frequency for electron emission?

A. $n_1 = 1$ to $n_2 = 2$

B. $n_1 = 2$ to $n_2 = 1$

C. $n_1 = 2$ to $n_2 = 5$

D. $n_1 = 5$ to $n_2 = 2$

Answer: B

Watch Video Solution

414. The magnetude of the P.E. of the electron in the first orbit of the Bohr's atom is E. Its K.E. is

A. E

B. 2E

C. E/2

D. E/4

Answer: C

Watch Video Solution

415. The current in the first orbit of Bohr's hydrogen atom is

A. 0.01 mA

B. 1 mA

C. 2.63 mA

D. 10 mA

Answer: B

Watch Video Solution

416. The radii of Bohr's orbit are directly proportional to

A. n

B. $\sqrt{n}$

C. n^{-1}

D. n^2

Answer: D

Watch Video Solution

417. The ratio of magnetic dipole moment to angular momentum of electron is

A. e/2m

B. e/m

C. 2e/m

D. m/2e

Answer: A

Watch Video Solution

418. The force of repulsion between two electrons kept at a distance of 1 m is F. if m is the mass of the electron, h is the planck's constant and c is the velocity of light, then the Rydberg's constant of

A. $\frac{m\pi F}{h^3C}$

B. $\frac{2m\pi^2F}{h^3C}$

C. $\frac{2m\pi^2F^2}{h^3C}$

D. $\frac{m\pi F^2}{h^3C}$

Answer: C

Watch Video Solution

419. If the velocity of an electron in its first orbit of hydrogen atom is 2.1×10^6 m/s, then its velocity in the third orbit is

A. $7 \times 10^6 m/s$

B. $7 \times 10^5 m/s$

C. $7 \times 10^4 m/s$

D. $2 \times 10^4 m/s$

Answer: B

Watch Video Solution

420. The de Broglie wavelenth of $1mg$ grain of sand blown by a $20ms^{-1}$ wind is :

A. $33.15 \times 10^{-36}m$

B. $33.15 \times 10^{-33}m$

C. $33.15 \times 10^{-30}m$

D. $33.15 \times 10^{30}m$

Answer: C

Watch Video Solution

421. For the Bohr's first orbit of circumference $2\pi r$, the de - Broglie wavelength of revolving electron will be

A. πr

B. $2\pi r$

C. $\frac{1}{2\pi r}$

D. $\frac{1}{4\pi r}$

Answer: B

Watch Video Solution

422. If an electron is revolving around the hydrogen nucleus at a distance 0.1 mm. What should be its speed

A. 2.188×10^{6} m/s

B. 1.094×10^{6} m/s

C. 4.376×10^{6} m/s

D. 1.59×10^{6} m/s

Answer: A

Watch Video Solution

423. Which of the following series in the spectrum of the hydrogen atom lies in the visible region of the electromagnetic spectrum

A. Paschen

B. Balmer

C. Lyman

D. Bracket

Answer: B

Watch Video Solution

424. If the electron in a hydrogen atom jumps from an orbit with level $n_1 = 2$ an orbit with level $n_2 = 1$. The emitted radiation has a wavelength given by

A. $\lambda = \frac{5}{3R}$

B. $\lambda = \frac{4}{3R}$

C. $\lambda = \frac{R}{4}$

D. $\lambda = \frac{3R}{4}$

Answer: B

Watch Video Solution

425. In hydrogen atom, the electron is making $6.6 \times 10^{15} rev/\sec$ around the nucleus in an orbit of radius $0.528 A$. The magnetic moment `(A-m^(2)) will be

A. $1 \times 10^{-15} Am^2$

B. $1 \times 10^{-10} Am^2$

C. $1 \times 10^{-23} Am^2$

D. $1 \times 10^{-27} Am^2$

Answer: C

Watch Video Solution

426. The radius of hydrogen atom in its ground state is $5.3 \times 10^{-11} m$. After collision with an electron it is found to have a radius of $21.2 \times 10^{-11} m$. What is the principle quantum number of n of the final state of the atom ?

A. $n = 4$

B. $n = 3$

C. $n = 2$

D. $n = 16$

Answer: C

Watch Video Solution

427. The orbital frequency of an electron in the hydrogen atom is proportional to

A. n^3

B. n^{-3}

C. n

D. n^0

Answer: B

Watch Video Solution

428. Balmer series of hydrogen atom lies in

A. microwave region

B. visible region

C. ultraviolet region

D. infrared region

Answer: B

Watch Video Solution

429. The de-Broglie wavelength of an electron in the ground state of the hydrogen atom is

A. πr^2

B. $2\pi r$

C. πr

D. $\sqrt{2}\pi r$

Answer: B

Watch Video Solution

430. The acceleration of electron in Bohr's 1^{st} orbit is given by

A. $\dfrac{h}{4\pi m^2 r^3}$

B. $\dfrac{h}{4\pi m^2 r}$

C. $\dfrac{h^2}{4\pi^2 m^2 r^3}$

D. $\dfrac{h}{4\pi m r}$

Answer: C

Watch Video Solution

431. An electron moves in Bohr's orbit. The magnetic field at the centre is proportional to

A. n^{-5}

B. n^{-3}

C. n^{-4}

D. n^{-2}

Answer: A

Watch Video Solution

432. The de-Broglie's wavelength in 1^{st} Bohr's orbit is

A. πr

B. $2\pi r$

C. $3\pi r$

D. $\pi r / 2$

Answer: B

Watch Video Solution

433. In Bohr's orbit angular momentum of an electron is proportional to

A. $\sqrt{r}$

B. $\sqrt{r^2}$

C. r

D. $r^{-1/2}$

Answer: C

Watch Video Solution

434. In Bohr's orbit, kinetic energy of an electron in the n^{th} orbit of an atom in terms of angular momentum is

A. $1/L$

B. $1/L^2$

C. L^2

D. $1/L^3$

Answer: C

Watch Video Solution

435. The de-Broglie wavelength λ associated with charged particle of charge q, mass m and potential difference V is

A. $\dfrac{h}{\sqrt{2mqV}}$

B. $\dfrac{h^2}{\sqrt{2mqV}}$

C. $\dfrac{h}{\sqrt{mqV}}$

D. $\dfrac{h}{\sqrt{2qV}}$

Answer: A

Watch Video Solution

436. Ratio of longest wave lengths corresponding to Lyman and Balmer series in hydrogen spectrum is

A. $\frac{3}{23}$

B. $\frac{7}{29}$

C. $\frac{9}{31}$

D. $\frac{5}{27}$

Answer: D

Watch Video Solution

437. A certain mass of hydrogen is changes to helium by the process of fusion. The mass defect in fusion reaction is $0.02866u$. The energy liberated per u is (given $1u = 931MeV$)

A. 26.7 Me V

B. 6.675 Me V

C. 13.35 MeV

D. 2.67 Me V

Answer: B

Watch Video Solution

438. The half-life of a radioactive isotope X is 20 years. It decays to another element Y which is stable. The two elements X and Y were found to be in the ratio of $1:7$ in a sample of a given rock. The age of the rock was estimated to be.

A. 60 years

B. 80 years

C. 100 years

D. 40 years

Answer: A

Watch Video Solution

439. If, an electron in hydrogen atom jumps from an orbit of lelvel n=3 to an orbit of level n=2, emitted radiation has a freqwuency (R= Rydbertg's contant ,c = velocity of light)

A. $\frac{3Rc}{27}$

B. $\frac{Rc}{25}$

C. $\frac{8Rc}{9}$

D. $\frac{5Rc}{36}$

Answer: D

Watch Video Solution

440. The de-Broglie wavelength of an electron in 4th orbit is (where, r=radius of 1st orbit)

A. $2\pi r$

B. $4\pi r$

C. $\frac{\pi r}{2}$

D. $16\pi r$

Answer: C

Watch Video Solution

441. For balmer series wavelength of first line is λ_1 and for brackett series wavelength of first line is λ_2 then $\frac{\lambda_1}{\lambda_2}$ is

A. 0.081

B. 0.162

C. 0.198

D. 0.238

Answer: B

Watch Video Solution

442. For the hydrogen atom the energy of radiation emitted in the transitation from 4th excited state to 2nd exicited state according to Bohr 's theory is

A. 0.567 eV

B. 0.667 eV

C. 0.967 eV

D. 1.267 eV

Answer: C

Watch Video Solution

443. The de Broglie wavelength λ of a particle

A. proportional to mass

B. proportional to impulse

C. inversely proportional to impulse

D. does not depend on impulase

Answer: C

Watch Video Solution