CHEMISTRY

BOOKS - PATHFINDER CHEMISTRY (BENGALI ENGLISH)

ATOMIC STRUCTURE

Question Bank

1. Calculate the number of protons, neutrons and electrons in $\underset{35}{80Br}$.

Watch Video Solution

2. Calculate the charge of one mole of electrons.

Watch Video Solution

3. What type of metals are used in photoelectric cells? Give one example.

Watch Video Solution

4. In summer we are advised not to wear black clothes. Why?

Watch Video Solution

5. When is the energy of electron regarded as zero?

Watch Video Solution

6. What is the deviation from Aufbau Principle in case of electronic configuration of La (Z=57).

Watch Video Solution

7. Describe the orbitals with the following quantum numbers (using s, p, d, f notations)

n = 1,

Watch Video Solution

8. Describe the orbitals with the following quantum numbers (using s, p, d, f notations)

$n = 2, l = 0$

Watch Video Solution

9. Describe the orbitals with the following quantum numbers (using s, p, d, f notations)

$n = 4, l = 2,$

Watch Video Solution

10. Describe the orbitals with the following quantum numbers (using s, p, d, f notations)

n = 4, l = 3,

Watch Video Solution

11. Define Isotope

Watch Video Solution

12. Define Isobar

Watch Video Solution

13. Define Isotone

Watch Video Solution

14. Write the electronic configurations of B(5), Ca(20), Al(13).

Watch Video Solution

15. Which among the following has equal number of protons

(i) Hydrogen (ii) Deuterium (Iii) fluorine (iv) Chlorine

Watch Video Solution

16. What are the values of N, I, m for 3p orbitals?

Watch Video Solution

17. Write the electronic configurations of $Cu^{+}1$ (At No Cu = 29)

Watch Video Solution

18. According tode Broglie, matter also has wave character, then don't we see a car moving like a wave?

Watch Video Solution

19. Can we overcome the uncertainty in position and velocity of an electron by making more precise devices?

Watch Video Solution

20. Write the electronic configuration of $Ni^{+}2$ (Ni = 28).

Watch Video Solution

21. Write all quantum numbers of outermost shell electron of Rb(37).

Watch Video Solution

22. A neutral atom has 2k, 8L, 8M and 2N electrons. Find out the total number of s-electron.

Watch Video Solution

23. Write the number of waves made by an electron moving in an orbit having maximum magnetic quantum no.+3.

Watch Video Solution

24. Which d-orbitals has different shape from rest of all d-orbitals?

Watch Video Solution

25. Which principle / rule limits the maximum number of electrons in an orbital to two?

Watch Video Solution

26. If the velocity of an electron in the Bohr first orbit of hydrogen atom is x, then find the velocity of the electron in the third Bohr's orbit.

Watch Video Solution

27. If N-atom has 7 electrons, then the find the no. of protons and electrons in $N^{3-} Ion.$

Watch Video Solution

28. If principle which excludes the possibility of presence of a third electron in an orbital is :

A. Aufbar rule

B. Hund's rule

C. Pauli's exclusion principle

D. None of these

Answer: C

Watch Video Solution

29. Calculate (i) wave number (ii) frequency of yellow radiations having wavelength $5800\overset{\circ}{A}$.

Watch Video Solution

30. A certain element 'A' undergoes photoelectric effect when bombarded by one photon of indigo light. When the same element was bombarded with two photon of red light no emission took place. Explain the observation.

Watch Video Solution

31. What are the characteristic differences between Rutherford's atomic theory and

Bohr's theory.

Watch Video Solution

32. A golf ball has a mass of 40g and speed 45 m/s. If the speed can be measured within accuracy of 2% Calculate the uncertainty in the position.

Watch Video Solution

33. Find the ratio of energy difference between the first and second orbit to second and third orbit of Bohr's atomic model of hydrogen.

Watch Video Solution

34. A tennis ball of mass 60 g is moving with a velocity of 10 m/sec. Find the de Broglie wavelength of the ball approximately. $(h = 6.63 \times 10^{34} J \sec)$

Watch Video Solution

35. When 4f level of an atom is completely filled with electrons, the next electron will enter into which orbital?

Watch Video Solution

36. How many electrons with l =2 are there in on atom having atomic number 23?

Watch Video Solution

37. If the photon of the wavelength 150 pm strikes an atom, one of its inner bound electrons is ejected out with a velocity of $1.5 \times 10^7 ms^{-1}$. Calculate the energy with which it is bound to the nucleus.

Watch Video Solution

38. If an electron is travelling with uncertainty in velocity of 1 m/s, what is the theoretical uncertainty in its position?

Watch Video Solution

39. If an electron is travelling with uncertainty in velocity of 1 m/s, what is the theoretical uncertainty in its position?

Watch Video Solution

40. What do you mean by 'Dual nature of electron? Derive De-Broglie's equation.

Calculate the wavelength of the radiation emitted, producing a line in the Lyman series when an electron falls from fourth stationary state in hydrogen atom.

$(R_H = 1.1 \times 10^7 m^{-1})$

Watch Video Solution

41. What do you mean by 'Dual nature of electron? Derive De-Broglie's equation.

The number of unpaired electrons in Cr^3+ ion is _____

Watch Video Solution

42. Calculate the wavelength and energy of radiation emitted for the electronic transition from infinity to stationary state one of the hydrogen atom.

Watch Video Solution

43. The shape of the orbital is determined by _____ quantum number.

Watch Video Solution

44. If the radius of first Bohr orbits of Hydrogen atom is $0.5\overset{\circ}{A}$, Find the radius of the fourth Bohr Orbit of the atom.

Watch Video Solution

45. Why is ionisation Energy also known as ionisation Potential?

Watch Video Solution

46. The ionisation Energy of $He^{+} ion$ is $19.6x10^{-18} Ja \rightarrow m^{1}$. Find the energy of the last orbit of

Watch Video Solution

47. The atomic number of elements A and B is 9 and 17 respectively. Why is element a better oxidant than B?

Watch Video Solution

48. Indicate the number of unpaired electrons in a) P(15), b) Si(14), c) Cr(24), d) Fe(26).

Watch Video Solution

49. Give the difference between orbit and orbital.

Watch Video Solution

50. Write the isoelectronic species of $Na^{+}, K^{+}, Mg^{+}2, Ca^{+}2, S^{-2}, Ar.$

Watch Video Solution

51. What should be the ratio of velocities of CH_4 molecule and O_2 molecule, so that they are associated with de-Broglie waves of equal wavelength?

Watch Video Solution

52. The mass of an electron is $9.1 \times 10^{-31} kg$. If its $K.E. is 5 \times 10^{-25} J$. Calculate its wavelength.

Watch Video Solution

53. An electron in a Bohr orbit of hydrogen atom in quantum level n_2 has an angular momentum of $4.2176 \times 10^{-34} kgm^2 s^{-1}$. If this electron drops from this level to the next lower level, find the wavelength of this spectral line.

Watch Video Solution

54. Match the column:

Column I	Column II
A. $E = hc\overline{\nu}$	(p) Rydberg formula
B. $\Delta x.\Delta p \geq \frac{h}{4\pi}$	(q) de-Broglie relation
C. $\overline{\nu} = 109677\left[\frac{1}{n_1^2} - \frac{1}{n_2^{'2}}\right]$	(r) Heisenberg uncertainty principle.
D. $\lambda = \frac{h}{p}$	(s) Energy of photon

Watch Video Solution

55. Match the column:

Column I	Column II
A. 4	(p) Number of nodes in 3s
B. 5	(q) Number of sub-shells in third energy level.
C. 3	(r) Number of unpaired electrons in Fe^{2+}
D. 2	(s) Number of electrons with $m_l = 0$ and $m_s = +\frac{1}{2}$ in an atom of phosphorus.

Watch Video Solution

56. A subshell with n = 6 and l = 3 is designated as _____.

Watch Video Solution

57. Find the change in velocity of an electron which has been excited from 1 s atom 2 s in the Hydrogen atom.

Given:- Radius of 1 s of Hydrogen atom is 0.53 $\overset{\circ}{A}$.

Watch Video Solution

58. A bulb emits light of wavelength $4500A^{\circ}$ .The bulb is rated as 150 watt and 8% of the energy is emitted as light.how many photons are emitted by the bulb per second?

Watch Video Solution

59. A photon of 300 nm is absorbed by a gas and then re emitted as two photons. One photon is red with lambda=760 nm.What would be the wave number of the second photon?

Watch Video Solution

60. An electron is moving in 3rd orbit of Li^{+2}

calculate

Radius

Watch Video Solution

61. An electron is moving in 3rd orbit of Li^{+2}

calculate

velocity

Watch Video Solution

62. An electron is moving in 3rd orbit of Li^{+2}

calculate

potential energy

Watch Video Solution

63. An electron is moving in 3rd orbit of Li^{+2}

calculate

kinetic energy

Watch Video Solution

64. An electron is moving in 3rd orbit of Li^{+2} calculate

energy

Watch Video Solution

65. The energy of second orbit of hydrogen is equal to the energy of

A. 4th orbit of He^{+}

B. 4th orbit of Li^{+2}

C. 2nd orbit of He^{+}

D. 2nd orbit of Li^{+2}

Answer:

Watch Video Solution

66. An electron is moving in an orbit of circumference of $14.92 A^{\circ}$ in He^{+} Calculate Energy of orbit

Watch Video Solution

67. An electron is moving in an orbit of circumference of $14.92A^{\circ}$ in He^{+} Calculate ionisation energy

Watch Video Solution

68. An electron is moving in an orbit of circumference of $14.92A^{\circ}$ in He^{+} Calculate separation energy

Watch Video Solution

69. Calculate the wavelength of radiations in the Lyman series when an electron falls from fourth stationary state of hydrogen atom: $(R_H = 1.1 \times 10^7 m^{-1})$

Watch Video Solution

70. Calculate the energy emitted when electrons of 1g atom of hydrogen undergo transition giving the spectral line of lowest energy in the visible region of its spectrum.

Watch Video Solution

71. What is the energy in joules required to shift the electron of a hydrogen atom from first Bohr orbit to fifth Bohr orbit and what is the wavelength of the light emitted when the electron returns to the ground state?the ground state electron energy is $-2.18x10^{-11}$ erg.

Watch Video Solution

72. What is the maximum number of emission lines when the excited electron of H atoms in n=6 drops to the ground state?

Watch Video Solution

73. When the electromagnetic radiation of wavelength 300 nm falls on the surface of sodium electrons are emitted with a kinetic energy of $1.68x10^5 Jmol^{-1}$

What is the minimum energy needed to remove an electron from sodium?

Watch Video Solution

74. When the electromagnetic radiation of wavelength 300 nm falls on the surface of sodium electrons are emitted with a kinetic energy of $1.68x10^5 Jmol^{-1}$

What is the minimum energy needed to remove an electron from sodium?

Watch Video Solution

75. The maximum kinetic energy of the photoelectron is found to be $6.6x10^{-19}$J when the metal is irradiated with a radiation of frequency $2x10^{15}$Hz the threshold frequency of the metal is about

A. $1x10^{15}s^{-1}$

B. $2x10^{15}s^{-1}$

C. $3x10^{15}s^{-1}$

D. $1.5x10^{15}s^{-1}$

Answer: A

Watch Video Solution

76. Calculate the wavelength associated with an electron moving with a velocity of 10^{10} cm/sec.

Watch Video Solution

77. The kinetic energy of an electron is $4.55x10^{-25}J$ calculate the wavelength.

Watch Video Solution

78. Calculate the uncertainty in the position of a particle when the uncertainty in momentum is

`10^(-3)g cm/s

Watch Video Solution

79. Calculate the uncertainty in the position of a particle when the uncertainty in momentum is

zero

Watch Video Solution

80. Alveoli are tiny sacs in the lungs whose average diameter is $5x10^{-10}$m consider a oxygen molecule $(5.3x10^{-26}kg)$ trapped within a sac.Calculate uncertainty in the velocity of oxygen molecule.

Watch Video Solution

81. The uncertainty in the position of an electron moving with a velocity of $1x10^4 ms^{-1}$ (accurate up to $0.011\ \%$) will be

A. $5.27x10^{-7}m$

B. $5.27x10^{-5}m$

C. $0.167x10^{-10}m$

D. $1.2x10^5m$

Answer: B

Watch Video Solution

82. Arrange the electrons represented by the following sets of quantum numbers in the decreasing order of energy?

A. a) $n=4$ $l=0$ $m=0$ $s=+1/2$

B. b) $n=3$ $l=1$ $m=1$ $s=-1/2$

C. c) $n=3$ $l=2$ $m=0$ $s=+1/2$

D. d) $n=3l=0$ $m=0$ $s=-1/2$

Answer:

Watch Video Solution

83. Find out all the quantum numbers for the last electron of Cl atom

Watch Video Solution

84. Give the electronic configuration of an element whose K,L and M shells contain 2,8 and 12 electrons respectively find also the number of unpaired electrons.

Watch Video Solution

85. In the Rutherford scattering experiment the number of alpha particles scattered at an angle $\theta = 60^\circ$ is 12 per min.The number of alpha particles per min when scattered at angle of 90°

A. 160

B. 10

C. 6

D. 3

Answer: D

Watch Video Solution

86. The number of quanta of radiation of frequency $4.98x10^{14}\sec^{-1}$ required to melt 100 gm of ice (latent heat of melting of ice is 33 joul per gm)

A. 10^{20}

B. 10^{22}

C. 10^{24}

D. $6.023x10^{21}$

Answer: B

Watch Video Solution

87. The energy associated with the first orbit of hydrogen atom is $-2.18x10^{-18}$J.What is the energy associated with the fifth orbit?

Watch Video Solution

88. The energy associated with the first orbit of hydrogen atom is $-2.18x10^{-18}$J.What is the energy associated with the fifth orbit? Calculate the radius of Bohr's fifth orbit of hydrogen atom.

Watch Video Solution

89. The velocity of electron is v moving in 3rd orbit of He^{+} The velocity of electron moving in 2nd orbit of Li^{+2} is

A. 9/4v

B. 4/9v

C. v

D. none of these

Answer: A

Watch Video Solution

90. An electron is moving in 3rd orbit of hydrogen atom.The frequency of moving electron is

A. $2.19x10^{14}$rps

B. $7.3x10^{14}$rps

C. $2.44x10^{14}$rps

D. none of these

Answer: C

Watch Video Solution

91. H_{α} line of Balmer series is $6500A^{\circ}$ The wavelength of $H_{g}ama$ line is

A. $4815A^{\circ}$

B. $4300A^{\circ}$

C. $7800A^{\circ}$

D. $3800A^{\circ}$

Answer: B

Watch Video Solution

92. The electron energy in hydrogen atom is given by $E = 21.7XX\frac{10^{-12}}{n^2}$erg.

What is the longest wavelength (in cm)of light that can be used to cause this transition?

Watch Video Solution

93. The electron energy in hydrogen atom is given by $E = 21.7XX\frac{10^{-12}}{n^2}$erg.

What is the longest wavelength (in cm)of light that can be used to cause this transition?

Watch Video Solution

94. A photon of wavelength $4x10^{-7}$ m strikes a metal surface work function of the metal is

2.13eV calculate

the kinetic energy of the emitted photoelectrons in eV

Watch Video Solution

95. A photon of wavelength $4x10^{-7}$ m strikes a metal surface work function of the metal is 2.13eV calculate

the kinetic energy of the emitted photoelectrons in eV

Watch Video Solution

96. A photon of wavelength $4x10^{-7}$ m strikes a metal surface work function of the metal is 2.13eV calculate

the velocity of photoelectrons in ms^{-1}

Watch Video Solution

97. Photoelectric emission is observed from a surface when lights of frequency n_1 and n_2 if the ratio of maximum kinetic energy in two cases are1:K then (Assume n_1>n_2) threshold frequency is

A. $(K-1) \times (Kn_2 - n_1)$

B. Kn_1-n_2/1-K

C. K-1/Kn_1-n_2

D. Kn_2-n_1/K-1

Answer:

Watch Video Solution

98. The mass of an electron is $9.1x10^{-31}$kg if K.E. is 3×10^{-25}J calculate its wavelength in nm.

Watch Video Solution

99. If radius of 2nd orbit is a ,then de Broglie wavelength in 4th orbit of H atom is given by

A. 8 pi a

B. 2 pi a

C. 4 pi a

D. 6 pi a

Answer:

Watch Video Solution

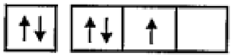
100. A microscope using suitable photons is employed to locate an electron in an atom within a distance of $1A^{\circ}$ What is the uncertainty involved in the measurement of its velocity?

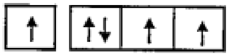
Watch Video Solution

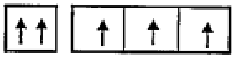
101. A golf ball has a mass of 40g and speed 45 m/s. If the speed can be measured within accuracy of 2% Calculate the uncertainty in the position.

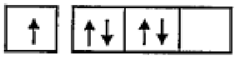
Watch Video Solution

102. The orbit diagram in which Hund's Rule and Aufbau principle are violated is

A. 

B. 

C. 

D. 

Answer:

Watch Video Solution

103. How many electrons in an atom may have the following quantum numbers?

n=4,m=-1/2

Watch Video Solution

104. How many electrons in an atom may have the following quantum numbers?

$n=3, l=0$

Watch Video Solution

105. Which electronic configuration is not allowed for either a neutral atom or an ion in ground state?

A. $1s^2 2s^2 2p^6 3s^1$

B. $1s^2 2s^2 2p^6 3d^5$

C. $1s^2 2s^2 2p^6$

D. none of these

Answer:

Watch Video Solution

106. Which of following species is paramagnetic?

A. Cu^{+}

B. $Fe^{+}3$

C. $Zn^{+}2$

D. $Sc^{+}3$

Answer:

Watch Video Solution

107. The increasing order (lower first)for the values of e/m(charge/mass) for electron(e) proton(p) neutron (n) and alpha particle (alpha) is

A. e,p,n,alpha

B. n,p,e,alpha

C. n,p,alpha,e

D. n,alpha,p,e

Answer:

Watch Video Solution

108. The triad of nuclei that is isotonic is

Watch Video Solution

109. A I kw radio transmitter operates at a frequency of 880 Hz how many photons per second does it emit?

A. 1.71×10^{21}

B. `1.71xx10^33

C. 6.02×10^{23}

D. 2.85×10^{26}

Answer:

Watch Video Solution

110. In a measurement of quantum efficiency of photosynthesis in plants it was found that 10 quanta of red light of wavelength $6850 A^{\circ}$ were needed to release one molecule of O_2 the average energy storage in this process is 112 kcal/mol of O_2 evolved.What is the energy conversion efficiency in this experiment?

Given=1 cal=4.18J: $N_A = 6 \times 10^{23} mol^{-1}$,

$h = 6.63 \times 10^{-34}$Js

A. 23.5

B. 26.9

C. 66.34

D. 73.1

Answer:

Watch Video Solution

111. The dissociation energy of H_2 is 430.53 kj/mole.if H_2 is dissociated by illumination with radiations of wavelength 253.7 nm the fraction of the radiant energy which will be converted into kinetic energy is given by

A. $8.88\ \%$

B. $2.33\ \%$

C. $1.3\ \%$

D. $90\ \%$

Answer:

Watch Video Solution

112. An electron in a hydrogen atom in its ground in its ground state absorbs 1.5 times as much energy as the minimum required for it escape from the atom what is the velocity of the emitted electron?

A. 1.54×10^6 m/s

B. 1.54×10^8 m/s

C. 1.54×10^3 m/s

D. 1.54×10^4 m/s

Answer:

Watch Video Solution

113. The difference in angular momentum associated with the electron in two successive orbits of hydrogen atoms is

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

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

C. h/2

D. $(n-1)\frac{h}{2}\pi$

Answer:

Watch Video Solution

114. Difference between nth and (n+1)th Bohr's radius of H atom is equal to its (n-1)th Bohr's radius.The value of n is

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

115. The velocity of an e^{-} in excited state of H atom is 1.093×10^{6} m/s what is the circumference of this orbit?

A. 3.32×10^{-10} m

B. 6.64×10^{-10} m

C. 1.33×10^{-9} m

D. 13.28×10^{-8} m

Answer:

Watch Video Solution

116. The ratio of the difference in energy between the first and the second Bohr orbit to that between the second and the third bohr orbit is

A. (1/3)

B. 27/5

C. (9/4)

D. (4/9)

Answer:

Watch Video Solution

117. If an electron in H atom has an energy of -78.4 kcal/mol the orbit in which the electron is present is

A. 1st

B. 2nd

C. 3rd

D. 4th

Answer:

Watch Video Solution

118. The energy of an electron in the first Bohr orbit of H atom is -13.6 eV the possible energy value of the first excited state for electron in Bohr orbits of hydrogen is

A. (-3.4eV)

B. (-4.2eV)

C. (6.8eV)

D. (+6.8eV)

Answer:

Watch Video Solution

119. The first emission line in the atomic spectrum of hydrogen in the Balmer series appears at

A. $9\frac{R_H}{400}cm^{-1}$

B. $7\frac{R_H}{144}cm^{-1}$

C. $3\frac{R_H}{4}cm^{-1}$

D. $5\frac{R_H}{36}cm^{-1}$

Answer:

Watch Video Solution

120. The angular momentum of an electron in a Bohr's orbit of He+ is

$3.1652 \times 10^{-34} kg - \frac{m^2}{\sec}$ what is the wavenumber in terms of Rydberg constant of the spectral line emitted when an electrons falls from this level to the first excited state [h=6.626×10^{-34}Js]

A. 3R

B. 5R/9

C. 3R/4

D. 8R/9

Answer:

Watch Video Solution

121. The shortest lambda for the Lyman series of hydrogen atom is ______(given $R_H = 109678 cm^{-1}$)

A. $911.7 A^\circ$

B. $700 A^\circ$

C. $600 A^\circ$

D. $811 A^\circ$

Answer:

Watch Video Solution

122. What element has a H like spectrum whose lines have wavelength four times shorter than those of atomic hydrogen?

A. He

B. He+

C. H

D. Li^{+2}

Answer:

Watch Video Solution

123. The second line of Lyman series of H coincides with the 6th line of Paschen series of an ionic species X find X assuming R to be same for both H and X?

A. He^{+}

B. Li^{+2}

C. Li^{+}

D. H

Answer:

Watch Video Solution

124. When the frequency of light incident on a metallic plate is doubled the KE of the emitted photoelectron will be

A. doubled

B. halved

C. increased but more than doubled of the previous KE

D. Remains unchanged with quantum number

Answer:

Watch Video Solution

125. When a certain metal was irradiated with a light of 8.1×10^{16}Hz frequency the photoelectron emitted had 1.5 times the kinetic energy as did the photoelectrons emitted when the same metal was irradiated with light 5.8×10^{16}Hz frequency if the same metal is irradiated with light 3.846 nm wavelength what will be the kinetic energy of the photoelectron emitted?

A. 1.8×10^{2}eV

B. 3.65×10^{-17}J

C. 2.28×10^{2}eV

D. 4.37×10^{-17}J

Answer:

Watch Video Solution

126. A body of mass x kg is moving with velocity of 100 m $\sec^{-1}$ its de Broglie wavelength is 6.625×10^{-35} m hence x is

A. 0.25 kg

B. 0.15kg

C. 0.2kg

D. 0.1kg

Answer:

Watch Video Solution

127. An electron has wavelength $1A^{\circ}$ the potential by which the electron is accelerated will be

A. 92.5V

B. 203V

C. 150V

D. 51.2V

Answer:

Watch Video Solution

128. If the radius of first Bohr orbit of H atom is x then de Broglie wavelength of electron in 3rd orbit is nearly

A. 2pix

B. 6pi x

C. 9x

D. x/3

Answer:

Watch Video Solution

129. Number of waves on third Bohr's orbit of hydrogen will be

A. 3

B. 6

C. 9

D. 12

Answer:

Watch Video Solution

130. If uncertainly in position and momentum are equal then uncertainty in velocity is

A. $\frac{\sqrt{H}}{\pi}$

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

C. $\frac{1}{2}m\frac{\sqrt{h}}{\pi}$

D. none

Answer:

Watch Video Solution

131. The mass of a particles is 10^{-10} g and its radius is 2×10^{-4} cm if its velocity is $10^{-6} cm \sec^{-1}$ with $0.0001\,\%$ uncertainty in measurement the uncertainty in its position is

A. 5.2×10^{-8}

B. 5.2×10^{-7}m

C. 5.2×10^{-6}m

D. 5.2×10^{-9}

Answer:

Watch Video Solution

132. The first orbital of H is represented by $\psi = 2\left(\frac{1}{a_0}\right)^{\frac{3}{2}} e^{-\left(\frac{r}{a_0}\right)}$ where a_0 is Bohr's radius the probability of finding the electron at a distance r from the nucleus in the region dV is

A. $\psi^2 dr$

B. $\int \psi^2 4\pi r^2 dr$

C. $\psi^2 4\pi r^2 dr$

D. $\int \psi dv$

Answer:

Watch Video Solution

133. The orbital represented by $\psi_{4.2.0}$ is

A. $4d_z^2$

B. $4p_x$

C. $4p_z$

D. $4d_{xy}$

Answer:

Watch Video Solution

134. For a d electron the orbital angular momentum is

A. $\sqrt{6}h$

B. $\sqrt{2}h$

C. h

D. 2h

Answer:

Watch Video Solution

135. Which of the following set(s) of quantum numbers is are not permitted?

A. n=3 l=3 m=0 s=+1/2

B. n=3 l=2 m=2 s=-1/2

C. n=3 l=1 m=0 s=-1/2

D. n=3 l=0 m=0 s=+1/2

Answer:

Watch Video Solution

136. If the nitrogen atoms had electronic configuration $1s^7$ it would have energy lower than that of the normal ground state configuration $1s^2 2s^2 2p^3$ because the electrons would be closer to the nucleus yet $1s^7$ is not observed because it violates

A. Heisenberg's uncertainty principle

B. Hund's rule

C. Pauli exclusion principle

D. Bohr's postulates of stationary orbits

Answer:

Watch Video Solution

137. Magnetic moments of V(Z=23)Cr(Z=24) Mn(Z=25) are x,y,z hence

A. x=y=z

B. xltyltz

C. xltzlty

D. zltyltx

Answer:

Watch Video Solution

138. Ratio of energy of a photon of wavelength $3000A^{\circ}$ and $6000A^{\circ}$ is

A. 1:3

B. 1:2

C. 2:1

D. 1:6

Answer:

Watch Video Solution

139. According to Bohr's theory the angular momentum for an electron of fifth orbit is

A. 5h/pi

B. 2.5 (h/pi)

C. 5(pi/h)

D. 2h(h/pi)

Answer:

Watch Video Solution

140. The frequency of first line of Balmer series in hydrogen atom is v_0 the frequency of corresponding line emitted by singly ionised helium atom is

A. $2v_0$

B. $4v_0$

C. $\frac{v_0}{2}$

D. $\frac{v_0}{4}$

Answer:

Watch Video Solution

141. Total number of spectral lines emitted when an electron jumps from n=5 to n=1 in hydrogen atom is

A. 1

B. 2

C. 10

D. 6

Answer:

Watch Video Solution

142. If kinetic energy of a proton is increased nine times the wavelength of the de-broglie wave associated with it would become

A. 3 times

B. 9 times

C. 1/3 times

D. 1/9times

Answer:

Watch Video Solution

143. How many radial nodes are present in 4 d subshell?

A. 0

B. 1

C. 2

D. 3

Answer:

Watch Video Solution

144. Which of the electron is not permissible arrangement of electrons in an atom?

A. $n=5, l=3, m=0, s=+1/2$

B. n=3,l=2,m=-3,s=-1/2

C. n=3,l=2,m=-2,s=-1/2

D. n=4,l=0,m=0,s=-1/2

Answer:

Watch Video Solution

145. Which set has the same number of s electrons?

A. C,Cu^{+2},Zn

B. $Cu^{+2}, Fe^{+2}, Ni^{+2}$

C. S^{-2}, Ni^{+2}, Zn

D. none of these

Answer:

Watch Video Solution

146. An electron is not deflected on passing a certain region because

A. there is no magnetic field in that region

B. there is a magnetic field but velocity of the electron is parallel to the direction of magnetic field

C. electron is a chargeless particle

D. none of these

Answer:

Watch Video Solution

147. Which concerning Bohr's model is/are true?

A. it can predict that the probability of electron near nucleus is more

B. Angular momentum of electron in H atom=nh/2 pi

C. it introduces the idea of stationary states

D. it explains the line spectrum of hydrogen

Answer:

Watch Video Solution

148. In a H like sample electrons make transition from 4th excited state to 1st state then

A. 10 different spectral lines are observed

B. 6 different spectral lines are observed

C. Number of lines belonging to the Balmer series

D. Number of lines belonging to Paschen series is 2

Answer:

Watch Video Solution

149. For the energy levels in an atom which of the following statement(s) is/are correct?

A. There are seven principle electron energy levels depend on quantum numbers n and l

B. The second principal energy level can have 4 subshell energy and contain a maximum of 6 electrons

C. The M energy level can have maximum of 32 electrons

D. The 4s sub energy level is at a lower energy than the 3d sub energy level

Answer:

Watch Video Solution

150. Which of the following statement(s) is/are correct?

A. There is no probability of finding a p_z electron right at the nucleus

B. the orbital d_z^2has two lobes of electron density directed along the z axis and a ring of electron density centred in the xy plane

C. The orientation of p and d orbitals minimise electron electron repulsion in multi electron atoms

D. none of these

Answer:

Watch Video Solution

151. If there were three positive values for spin quantum number (+1/2,0,-1/2)rather than two,which of the following is/are correct regarding a hypothetical periodic table based on this condition?

A. maximum on two opposite sides of the nucleus along x axis

B. zero at the nucleus

C. zero on the xy plane

D. zero on the yz plane

Answer:

Watch Video Solution

152. Which of the following is/are the valid set(s) of four quantum numbers?

A. $n=2, l=1, m=0, s=-1/2$

B. n=4,l=3,m=-2,s=+1/2

C. n=3,l=2,m=-3,s=+1/2

D. n=3,l=3,m=-3,s=+1/2

Answer:

Watch Video Solution

153. Which of the following statement(s)is/are correct for an electron that has n=4 and m=-2?

A. the electron may be in a d orbital

B. the electron is in the fourth principle electronic shell

C. the electron may be in 4p orbital

D. the electron may have the spin quantum number=+1/2

Answer:

Watch Video Solution

154. Which of the following is/are correct for H atom?

A. 1slt2slt2plt3slt3p

B. 1slt2s=2plt3s=3p

C. 1slt2plt3dlt4s

D. 1slt2slt4slt3d

Answer:

Watch Video Solution

155. If there were three positive values for spin quantum number (+1/2,0,-1/2)rather than two,which of the following is/are correct regarding a hypothetical periodic table based on this condition?

A. first period would have only 2 vertical columns

B. second period would have 12 elements

C. periodic table would contain 27 groups

D. third period would have 12 elements

Answer:

Watch Video Solution

156. According to Bohr's atomic model the electrons move around the nucleus in a circular orbit the electrons can move only in that orbit in which a angular momentum of electrons I sintegral multiple of $\frac{h}{2}\pi$ i.e. $mvr = n\frac{h}{2}\pi$ where n=principle quantum number r=radius of orbit v=velocity of electron h=plank's constant the energy of orbit in which electron is moving is given by

$$E_n = -13.6\left(\frac{z^2}{n^2}\right) eV\,/\,\mathrm{atom}$$

The radius of which of the following orbits is the same as that of the first Bohr's orbit of hydrogen atom?

A. $He^{+}(n=2)$

B. $Li^{+2}(n=2)$

C. $Li^{+2}(n=3)$

D. $Be^{+}3(n=2)$

Answer:

Watch Video Solution

157. The observed wavelength in the line spectrum of hydrogen atom were first expressed in term of a series of johann jakob Balmer a series teacher Balmer's empirical formula is $\frac{1}{\lambda}=R_H\left(\frac{I}{2^2}-\frac{I}{N^2}\right)$________ $n \geq 3$,$R_H=109678cm^{-1}$ is Rydberg constant. Niele Bohr derived this expression theoretically in 1913 the formula is generalized to any uni-electronic species.

Calculate the longest wavelength in the Balmer series of singly ionized He^{+}

A. $2651 A^{\circ}$

B. $1641 A^{\circ}$

C. $6569 A^{\circ}$

D. $3249 A^{\circ}$

Answer:

Watch Video Solution

158. The observed wavelength in the line spectrum of hydrogen atom were first expressed in term of a series of johann jakob Balmer a series teacher Balmer's empirical formula is

$$\frac{1}{\lambda} = R_H\left(\frac{I}{2^2} - \frac{I}{N^2}\right) \rule{3cm}{0.4pt} n \geq 3$$

,R_H=109678cm^-1`is Rydberg constant.Niele Bohr derived this expression theoretically in 1913 the formula is generalised to any uni electronic species.

How many lines in the spectrum will be

observed when an electron returns from 7th shell to 2nd shell?

A. 13

B. 14

C. 15

D. 16

Answer:

Watch Video Solution

159. Match column I with column II

Column - I (Expresion)		Column - II (Variables)	
(A)	Radius of n th orbit	(P)	Inversely proportional to z
(B)	Energy of n th orbit	(Q)	integral multiple of $\frac{h}{2\pi}$
(C)	Velocity of electron in the nth orbit	(R)	Proportional to n^2
(D)	Angular momentum of electron	(S)	Inversely Proportional to n
		(T)	Proportional to z^2

Watch Video Solution

160. Match column I with column II

Q2. Match Column - I with Column - II

Column - I (Species)	Column - II (Radius or Energy or Velocity)
(A) H	(P) Radius of 4^{th} orbital $0.53 \times 4Å$
(B) He^{+}	(Q) Eenrgy of 2^{nd} orbit $= -13.6eV$
(C) Be^{3+}	(R) Radius of 2^{nd} orbit $= 0.53 \times 4Å$
(D) Li^{2+}	(S) Velocity of electron in the 3 rd orbit $= 2.18 \times 10^{8}$ cm/s
	(T) Energy of 4th orbit $= -13.6$ eV

Watch Video Solution

161. Match column I with column II

Q3. Match Column - I with Column - II

	Column - I (Expresions)		Column - II (Values)
(A)	PE / KE = ?	(P)	0
(B)	If radius of nth orbit $\propto E_n^x, x = ?$	(Q)	-1
(C)	Angular momentum in lowest orbital	(R)	-2
(D)	$\frac{1}{r_n} \alpha Z^y, y = ?$	(S)	1

Watch Video Solution

162. Match column I with column II

Q4. Match Column - I with Column - II

Column - I (Orbitals)		Column - II (Specifications)	
(A)	2p orbital	(P)	Number of spherical nodes =0
(B)	3d orbital	(Q)	Number of nodal plane = 0
(C)	2s orbital	(R)	Orbital angular momentum number = 0
(D)	4f orbital	(S)	Azimuthal quantum number = 0

Watch Video Solution

163. Match column I with column II

Q5. Match Column - I with Column - II

Column - I (Electronic Property)		Column - II (Dependence)	
(A)	Orbtial angular momentum of the electron in a hydrogen-like atomic orbital	(P)	Principal quantum number
(B)	A hydrogen - like one-electron wave function obeying Pauli principle	(Q)	Azimuthal quantum number
(C)	Shape, size and orientation of hydrogen-like atomic orbitals	(R)	Magnetic quantum number
(D)	Probability density of electron at the nucleus in hydrogen like-atom	(S)	Electron spin quantum number

Watch Video Solution

164. An oil drop has 8.01×10^{-19}C charge calculate the number of electrons in this drop.

Watch Video Solution

165. The wavelength of m^{th} line in Balmer series for an orbitals is $4103A\circ$ what is the value of m?

Watch Video Solution

166. The velocity of an electron in a certain Bohr's orbit of H atom bears the ratio 1:275 to the velocity of light then find the quantum number (n)of orbit

Watch Video Solution

167. An ion Mn^{a+} has the magnetic moment equals to 4.9 BM what is the value of 'a'?

Watch Video Solution

168. The number of waves made by a Bohr electron in an orbit of maximum magnetic quantum number +2 is

Watch Video Solution

169. Iodine molecule dissociates into atoms after absorbing light of $4500A^{\circ}$ if one quantum of radiation is absorbed by each molecule calculate the kinetic energy of iodine atoms.

Watch Video Solution

170. After the collision of two H atoms each atom emits a photon of wavelength 121.6 nm which transition leads to this wavelength ? how fast were the hydrogen atoms travelling before collision?(Mass of H atom= 1.69×10^{-27}kg)

Watch Video Solution

171. Find the quantum number 'n' corresponding to the excited state of He^+ ion if on transition to the ground state that ion emits two photons in succession with wavelengths 108.5 and 30.4 nm

Watch Video Solution

172. What is highest frequency of the photon that can be emitted from H atom?What is the wavelength of this photon?

Watch Video Solution

173. Calculate the longest wavelength for the transition in the Paschen series of He

Watch Video Solution

174. Calculate the ratio of the wavelength of first and the ultimate line of Balmer series of Li^{+2}?

Watch Video Solution

175. What hydrogen like ion has wavelength difference between the first lines of Balmer and Lyman series equal to 59.3 nm?($R_H = 109678 cm^{-1}$)

Watch Video Solution

176. The wavelength corresponding to a transition when electron falls from a certain quantum level to the ground state of an He^+ ion is 24.31 nm find the ratio of velocity of the

electron in the next quantum level to that of velocity of light?

Watch Video Solution

177. When certain metal was irradiated with light of frequency 1.6×10^{16}Hz the photoelectrons emitted had twice the kinetic energy as did photoelectrons emitted when the same metal was irradiated with light of frquency 1×10^{16} Hz Calculate threshold frequency of the metal

Watch Video Solution

178. Assume that 2×10^{-17}J of light energy is needed by the interior of the human eye to see an object.How many photons of yellow light with $\lambda = 595.2$ nm are needed to generate this minimum energy?

A. 6

B. 30

C. 45

D. 60

Answer: D

Watch Video Solution

179. What is the energy content per photon (J) for light of frequency 4.2×10^{14}

A. 2.8×10^{-21}

B. $2.5 \times 10^{-(12)}$

C. 2.8×10^{-19}

D. 2.5×10^{-18}

Answer: C

Watch Video Solution

180. The number of photons of light having wave number x in 10 J of energy source is :

A. 10 hcx

B. hc/10x

C. 10/hcx

D. none of these

Answer: C

Watch Video Solution

181. The nucleus of an atom can be assumed to be spherical. The radius of the nucleus of mass number-A is given by (1.25×10^{-13})cm. Radius of atom is one A. If the mass number is 64 then the fraction of the atomic volume that is occupied by the nucleus is

A. 1×10^{-3}

B. 5×10^{-5}

C. 2.5×10^{-2}

D. 1.25×10^{-13}

Answer: D

Watch Video Solution

182. If the radius of 2nd Bohr orbit of H-atom is r_2 the radius of third Bohr orbit of H-atom?

A. $\frac{\frac{4}{9}}{r_2}$

B. $4r_2$

C. $\left(\frac{9}{4}\right)r_2$

D. $9r_2$

Answer: C

Watch Video Solution

183. What atomic number of an element "X" would have to become so that the 4th orbit around one electron species of X ion would fit inside the first Bohr orbit H-atom?

A. 3

B. 4

C. 16

D. 25

Answer: C

Watch Video Solution

184. Calculate the velocity of an electron which must be able to ionize a Li^{2+} in ground state.

A. $6.56 \times 16^{6} m / s$

B. $11.25 \times 10^{9} m / s$

C. $3.45 \times 10^{8} m / s$

D. $9.56 \times 10^{7} m / s$

Answer: A

Watch Video Solution

185. In Bohr's model of the H-atom the ratio between the period of revolution of an electron in the orbit n=1 to the period of revolution of the electron in the orbit n=2 is

A. 8

B. $\frac{1}{6}$

C. $\frac{1}{8}$

D. $\frac{1}{9}$

Answer: C

Watch Video Solution

186. What is the time periods $\left(\frac{T_1}{T_2}\right)$ In second orbit of hydrogen atom to third orbit of He^+ ion?

A. 44435

B. 32/27

C. 27/32

D. none of these

Answer: B

Watch Video Solution

187. The ratio of potential energy and total energy of an electron in a bohr orbit of hydrogen like species is :

A. 0.08402777777778

B. #VALUE!

C. 0.04236111111111

D. #VALUE!

Answer: A

Watch Video Solution

188. If the total energy of an electron in the ist shell of H-atom =-13.6eV then its potential energy in the ist excited state would be :

A. (+6.8eV)

B. (+20.4eV)

C. (-6.8eV)

D. (3.4eV)

Answer: C

Watch Video Solution

189. What is the potential energy of an electron present in N-shell of the Be^{+3} ion?

A. -3.4ev

B. -6.8eV

C. -13.6eV

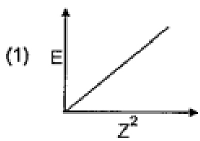
D. -27.2eV

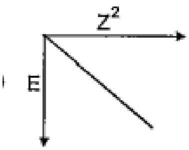
Answer: D

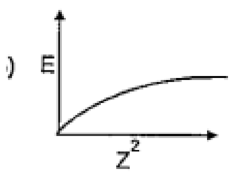
Watch Video Solution

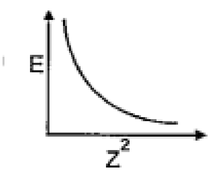
190. The energy of an electron moving in nth bohr's orbit of an element is given by $E_n = -\frac{13.6}{n^2} Z^2$ ev/atom (Z=atomic number)

The graph of E vs Z^2 will be

A. 

B. 

C. 

D. 

Answer: B

Watch Video Solution

191. The energy of the electron in the hydrogen atom is given by the expression $E_N = -\frac{1312}{n^2} KJ$ where n is an integer . The smallest amount of energy that a hydrogen atom in the ground state can absorb is

A. 1312 KJ

B. 328 KJ

C. 656 KJ

D. 984 KJ

Answer: D

Watch Video Solution

192. The ratio of the energy of the electron in ground state of H to the electron in first excited state of Be^{+3} is

A. 0.1673611111111

B. 0.04722222222222

C. 0.05277777777778

D. 0.6673611111111

Answer: A

Watch Video Solution

193. The ratio $(E_2 - E_1)$ to $(E_4 - E_3)$ for the hydrogen atom is approximately equal to

A. 10

B. 15

C. 17

D. 12

Answer: B

Watch Video Solution

194. If the ionization energy of Li^{+2} is 19.6×10^{-18} J per atom then energy of Be^{+3} ion in the second stationary state is

A. $-4.9 \times 10^{-18} J$

B. $-19.6 \times 10^{-18} J$

C. $-11.025 \times 10^{-18} J$

D. none of these

Answer: D

Watch Video Solution

195. The spectrum produced from an element is

A. atomic spectrum

B. line spectrum

C. absorption spectrum

D. any one of the above

Answer: D

Watch Video Solution

196. The wave number of first line of Balmer series of hydrogen is 15200 cm^{-1} . The wave number of the first balmer line of Li^{2+} ion is

A. 15200 c/m

B. 60800 c/m

C. 76000 c/m

D. 136800 c/m

Answer: D

Watch Video Solution

197. Find the value of wave number In terms of Rydberg's constant , when transition of electron takes place between two levels of He^{+} ion whose sum is 4 and difference is 2

A. $8R/9$

B. $32R/9$

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

D. none of these

Answer: B

Watch Video Solution

198. The radiation emitted when a hydrogen atom goes from a higher energy state to a lower energy state. The wavelength of one line in visible region of atomic spectrum of hydrogen is 6.63×10^{-7}m. Energy difference between the two state is

A. $3 \times 10^{-19} J$

B. $1 \times 10^{-18} J$

C. $5 \times 10^{-10} J$

D. $6.5 \times 10^{-7} J$

Answer: A

Watch Video Solution

199. H- atoms in ground state (13.6eV) are excited by monochromatic radiations of photon of energy 12.1eV. Find the number of spectral lines emitted in H-atom.

A. one

B. two

C. three

D. four

Answer: C

Watch Video Solution

200. A hydrogen atom in the ground state is excited by monochromatic radiation of wavelength $\lambda \circ$. The resulting spectrum consists of maximum 15 different lines. What is the wavelength λ?

A. $937.3A\circ$

B. $1025 \overset{A}{\frown} \circ$

C. $1236A\circ$

D. none of these

Answer: A

Watch Video Solution

201. For silver metal the thershold frequency ν_0 is 1.13×10^{17} Hz what will be the KE of the photoelectrons produced by shining uv light of $15A\circ$ wavelength of the metal?

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

B. $1.32 \times 10^{-16} J$

C. $2.9 \times 10^{-17} J$

D. None

Answer: B

Watch Video Solution

202. The number of elliptical orbits excluding circular orbits in the N-shell of an atom is

A. 3

B. 4

C. 2

D. 1

Answer: A

Watch Video Solution

203. The wavelength associated with a golf ball weighing 200g and moving at a speed of 5m/h is of the order

A. $10^{-10}m$

B. $10^{-20}m$

C. $10^{-30}m$

D. $10^{-40}m$

Answer: C

Watch Video Solution

204. What should be velocity of an electron so that its momentum becomes equal to that of a photon of wavelength $5200A^{\circ}$?

A. 700 m/sec

B. 100 m/sec

C. 1400 m/sec

D. 2800 m/sec

Answer: C

Watch Video Solution

205. The momentum of photon having 6Mev energy is

A. 3.2×10^{-21}

B. 2

C. 1.6×10^{-21}

D. none of these

Answer: A

Watch Video Solution

206. If the radius of first Bohr orbit of H atom is x then de Broglie wavelength of electron in 3rd orbit is nearly

A. $6\pi a_0$

B. $4\pi a_0$

C. $2\pi a_0$

D. none of these

Answer: B

Watch Video Solution

207. Write the number of waves made by an electron moving in an orbit having maximum magnetic quantum no.+3.

A. 3

B. 4

C. 2

D. 1

Answer: B

Watch Video Solution

208. The uncertainty in the position of electron (mass= $9.1 \times 10^{-31} kg$) moving with a velocity of 3×10^4 cm/sec accurate up to $0.011\,\%$ will be

A. 1.92cm

B. 7.68cm

C. 0.175cm

D. 3.84cm

Answer: C

Watch Video Solution

209. The number of spherical nodes in 3p orbitals is

A. one

B. three

C. two

D. zero

Answer: A

Watch Video Solution

210. which of the following orbitals has zero probability of finding the electron in xy plane

A. P_z

B. dyz

C. dzx

D. P_x

Answer: A

Watch Video Solution

211. The maximum number of electrons in subshell having the same value of spin quantum number is given by

A. l+2

B. 2l+1

C. l(l+1)

D. $\sqrt{l(l+1)}$

Answer: B

Watch Video Solution

212. Number of electrons having l+m value equal to zero in Fe^{3+} may be

A. 15

B. 8

C. 11

D. 12

Answer: C

Watch Video Solution

213. The orbital angular momentum of a 2p-electron is

A. $\sqrt{3}h$

B. $\sqrt{6}h$

C. zero

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

Answer: D

Watch Video Solution

214. Which of the following pairs have equal value of e/m.

A. A proton and neutron

B. A proton and Deuterium

C. Deuterium and α- particle

D. An electron and γ-rays

Answer: C

Watch Video Solution

215. The potential energy of an electron present in the ground state of LI^{+2} ion is represented by

A. $+3e^2 / 4\pi\varepsilon_0 r^2$

B. $-3e / 4\pi\varepsilon_0 r$

C. $-3e^2 / 4\pi\varepsilon_0 r^2$

D. $-3e^2 / 4\pi\varepsilon_0 r$

Answer: D

Watch Video Solution

216. If kinetic energy of a proton is increased nine times the wavelength of the de-broglie wave associated with it would become

A. 3 times

B. 9 times

C. 1/3 times

D. 1/9 times

Answer: C

Watch Video Solution

217. The uncertainty in momentum of an electron is $1 \times 10^{-5} kgms^{-1}$. The uncertainty in its position will be (h=$6.62 \times 10^{-34} Js$)

A. 5.27×10^{-30}m

B. 1.05×10^{-28}m

C. 1.05×10^{-26}m

D. 5.25×10^{-28}m

Answer: A

Watch Video Solution

218. If n and l are respectively the principal and azimuthal quantum numbers then expression for calculating total number of electrons in any energy level is

Watch Video Solution

219. If Afbau rule is not used 19 th electron in Sc(Z=21) will have

A. n=2, l=0

B. n=3, l=1

C. n=3, l=2

D. n=4, l=0

Answer: C

Watch Video Solution

220. The number of waves made by a Bohr electron in an orbit of maximum magnetic quantum number +2 is

A. 4

B. 2

C. 1

D. 3

Answer: D

Watch Video Solution

221. Number of unpaired electron in Cu^{2+} is

A. 0

B. 9

C. 3

D. 1

Answer: D

Watch Video Solution

222. Energy of level 1,2,3 of a certain atom corresponds to increasing value of energy $E_1 < E_2 < E_3$ If λ_1, λ_2 and λ_3 are the wavelength of radiation corresponding to transition $3 \rightarrow 2, 2 \rightarrow 1$ and $3 \rightarrow 1$

respectively . Which of following statements is /are correct?

A. $\dfrac{1}{\lambda_3} = \dfrac{1}{\lambda_1} + \dfrac{1}{\lambda_2}$

B. $\lambda_3 = \lambda_1 \lambda_2 / (\lambda_1 + \lambda_3)$

C. $\dfrac{1}{\lambda_2} = \dfrac{1}{\lambda_1} + \dfrac{1}{\lambda_3}$

D. $\lambda_2 = \lambda_1 \lambda_3 / (\lambda_1 + \lambda_3)$

Answer:

Watch Video Solution

223. Velocity of an electron in the 2nd stationary orbit of hydrogen atom

A. Equal to velocity of light

B. Equal to 1/137 times velocity of light

C. Equal to velocity of an electron in sixth stationary orbit of Li^{+2}

D. Equal to 1/274 times of velocity of light

Answer:

Watch Video Solution

224. In a certain electronic transition in Hydrogen atom from an initial state to a final state the difference of orbit radius is 8 times the first Bohr radius . Which transition does not satisfy the given condition?

A. 7rarr1

B. 6rarr1

C. 5rarr1

D. 3rarr1

Answer:

Watch Video Solution

225. Which statement is /are correct about hydrogen spectrum?

A. Energy of 2nd orbit is different for $\underset{1}{H^1}$, $\underset{1}{H^2}$ and $\underset{1}{H^3}$

B. Visible spectrum can be obtained in Lyman series and Balmer series

C. Infrared spectrum is obtained in Paschen, Brackett and Pfund series

D. Total number of emission lines obtained in Balmer series in (n-2), where n is principal quantum number and $n > 2$

Answer:

Watch Video Solution

226. The work function for Ag metal is 7.5×10^{-19} J. Ag metal is being exposed to the light of frequency $1200 A^{\circ}$. Which is/are correct statements?

A. Threshold frequency of metal is $1.13 \times 10^{15} \sec^{-1}$

B. Threshold frequency of metal is $1.135 \times 10^{20} \sec \wedge - 1$

C. stoppinfg potential is 5.49 volt

D. If light of wavelength $3600A^{\circ}$ is used then photoelectric effect take place.

Answer:

Watch Video Solution

227. An electron is moving in 3rd orbit of Hydrogen atom and radius of first orbit is x then

A. de-Broglie wavelength is $6\pi x$

B. de-Broglie wavelength is $2\pi x$

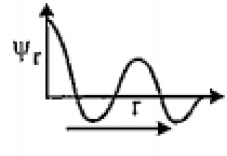
C. velocity of electron is $\frac{h}{6}\pi x m$

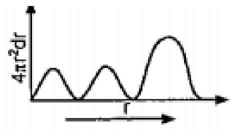
D. velocity of electron is $\frac{h}{2}\pi x m$

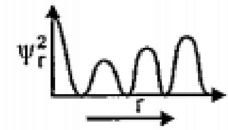
Answer:

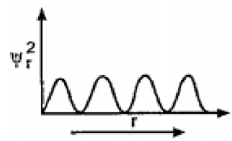
Watch Video Solution

228. Which of the following curve/curves belong to 4s orbital?

A. 

B. 

C. 

D. 

Answer:

Watch Video Solution

229. In which of the orbital/orbitals radial node and angular nodes are same?

A. 4p

B. 3p

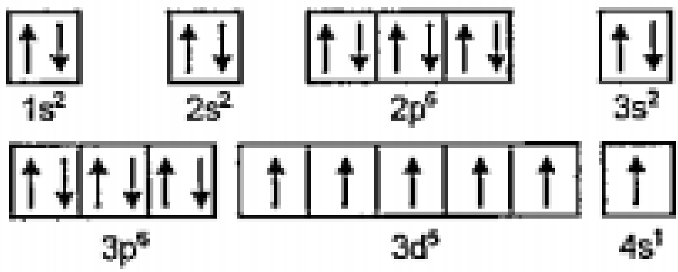
C. 5d

D. 6f

Answer:

Watch Video Solution

230. Electronic configuration of an atom :



Choose the incorrect statement regarding this E.C.

A. It represents the ground state of Cr

B. It violates Aufbau principle

C. it violates Hunds rule of maximum multiplicity

D. it is not a stable E.C.

Answer:

Watch Video Solution

231. Which of the following species have same magnetic moment?

A. Cr^{+3}

B. Fe^{+3}

C. Co^{+2}

D. Ni^{+2}

Answer:

Watch Video Solution

232. Which of the following is the purest form of Carbon ?

A. (A) Fullerene

B. (B)Graphite

C. (C)Diamond

D. (D)None of these

Answer: 1

Watch Video Solution

233. Draw the structure of metaphosphoric acid.

Watch Video Solution

234. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-I Bohr proposed that angular momentum of electron in an orbit is quantised

Statement-II de-broglie derived that :

$$\mu_r = n\left(\frac{h}{2\pi}\right)$$

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 2

Watch Video Solution

235. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-II Number of waves in an orbit is derived by $\frac{2\pi r_n}{\lambda}$

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 1

Watch Video Solution

236. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-Iforn=3 l may be 0,1 and 2 and m may be 0,± 1, ± 2

Statement-II For each value of n there are 0 to (n-1) possible values of l and for each value of l there are 0 to $\pm l$values of m.

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 1

Watch Video Solution

237. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I Transition of electron between p_x and p_y would not lead to a spectral line.

Statement-II p-orbitals are degenerate orbitals

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 1

Watch Video Solution

238. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-Electronic configuration of ${}_{23}V^{3+}$ ion is $[Ar]^{18}3d^2$ and not $[Ar]^{18}3d^04s^2$

Statement-II V^{3+} ion is diamagnetic in nature.

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 3

Watch Video Solution

239. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I The electronic configuration of nitrogen atom is represented as

Statement-II The electronic configuration of the ground state of an atom is the one which has the greatest multiplicity.

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 1

Watch Video Solution

240. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I Fe^{2+} has 24 electrons hence its electronic configuration is similar to that of $Cr(24)[Ar]3d^5 4s^1$

Statement-II All the five unpaired electrons in 3d gives stability to the ion.

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 4

Watch Video Solution

241. Arrange the of boiling point of hydrides of Group 15 in descending order.

Watch Video Solution

242. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I A triply ionised Be-atom has the same radius of 2nd orbit as that of ground state of H-atom.

Statement-II The radius of an orbit is

$$r_n = \frac{r_1 \times n^2}{Z}$$

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 1

Watch Video Solution

243. Give the structure of carbon suboxide.

Watch Video Solution

244. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-II Number of waves in an orbit is derived by $\frac{2\pi r_n}{\lambda}$

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 1

Watch Video Solution

245. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I The 3p orbital has higher energy level than 3s in He^{+} ion.

Statement-II The energy of an orbital depends upon n and l

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 2

Watch Video Solution

246. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I $_{24}Cr$ has more paramagnetic nature than $_{25}Mn$

Statement-II Cr has more than of unpaired electrons than Mn

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 2

Watch Video Solution

247. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I Afbau rule is violated in writing electronic configuration of Pd

Statement-II Pd shows diamagnetic nature.

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 2

Watch Video Solution

248. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I 2p orbital do not have any spherical node.

Statement-II The number of spherical and angular node is equal to (n-l-1) and l respectively.

A. Statement -I is true and Statement -II IS true Statement II is a correct explanation of Statement -I

B. Statement -I is true and Statement -II IS true Statement II is a nit a correct explanation of Statement -I

C. Statement -I is true , Statement -II is false

D. Statement -I is false , Statement -II is true

Answer: 2

Watch Video Solution

249. In this question has statement I and statement II of the four choice given after the statement choose the one that best describes the two statements

Statement-Number of waves in an orbit of atom is equal to number of that orbit.

Statement-I The ψ_{640} represents an orbital.

Statement-II The orbital may be 6g

Watch Video Solution

250. The french physicist Louis de Broglie in 1924 postulated that matter like radiation show a dual behaviour . He proposed the following relationship between the wavelength λ of a material particle its linear momentum p and planck constant h

$$\lambda = \frac{h}{p} = \frac{h}{mv}$$

The de broglie relation implies that the wavelength of a particle should decreases as its velocity increases . it also implies that for a given velocity heavier particles should have shorter wavelength than lighter particles. The waves associated with particles in motion are called matter waves or de broglie waves. These waves differ from the electromagnetic waves as they

(i) have lower velocities

(ii) have no electrical and magnetic fields and

(iii) are not emitted by the particle under consideration . The experimental confirmation of the de-broglie relation was obtained when Davisson ans Germer in 1927 observed that a beam of electrons is diffracted by a nickel crystal . as diffraction a characteristics property of waves hence the beam of electron behaves as a wave, as proposed by de-broglie.

If proton, electron and α-particle are moving with same kinetic energy then the order of de-Broglie's wavelength

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

B. $\lambda_e$gtlambda_pgt lambda_alpha`

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

D. $\lambda_e = \lambda_p < \lambda_\alpha$

Answer: C

Watch Video Solution

251. The french physicist Louis de Broglie in 1924 postulated that matter like radiation show a dual behaviour . He proposed the following relationship between the wavelength λ of a material particle its linear momentum p and planck constant h

$$\lambda = \frac{h}{p} = \frac{h}{mv}$$

The de broglie relation implies that the wavelength of a particle should decreases as its velocity increases . it also implies that for a given velocity heavier particles should have shorter wavelength than lighter particles. The waves associated with particles in motion are called matter waves or de broglie waves. These waves differ from the electromagnetic waves as they

(i) have lower velocities

(ii) have no electrical and magnetic fields and

(iii) are not emitted by the particle under consideration . The experimental confirmation of the de-broglie relation was obtained when Davisson ans Germer in 1927 observed that a beam of electrons is diffracted by a nickel crystal . as diffraction a characteristics property of waves hence the beam of electron behaves as a wave, as proposed by de-broglie.

de- Broglie wavelength of an electron travelling with speed equal to 1% of the speed of light

A. 400 pm

B. 120 pm

C. 242 pm

D. 375 pm

Answer: C

Watch Video Solution

252. Spin angular momentum of an electron has no analog in classical mechanics. however, it turns out that the treatment is closely analogous to the treatment of orbital angular momentum. Spin angular momentum= $\sqrt{s(s+1)}\frac{h}{2}\pi$, Orbital angular momentum = $(l(l+1))\frac{h}{2}\pi$- Total spin of $Mn^{2}+$ (Z=25) ion will be

A. $+\left(\frac{3}{2}\right)$

B. $-\left(\frac{1}{2}\right)$

C. $+\left(\frac{5}{2}\right)$

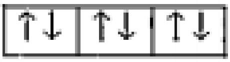
D. $+\left(\frac{7}{2}\right)$

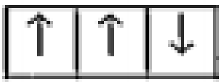
Answer: C

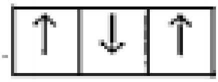
Watch Video Solution

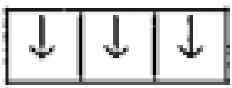
253. Spin angular momentum of an electron has no analog in classical mechanics. however, it turns out that the treatment is closely analogous to the treatment of orbital angular momentum. Spin angular momentum=

$\sqrt{s(s+1)}\frac{h}{2\pi}$, Orbital angular momentum = $(l(l+1))\frac{h}{2\pi}$-Which of the following electronic configuration have zero spin quantum number?

A. 

B. 

C. 

D. 

Answer: 1

Watch Video Solution

254. Match column -i with Column -ii

Match Column - I with Column - II

Column - I (Properties)	Column - II (Variables)
(A) Angular momentum	(P) Increases by increasing n
(B) Kinetic energy	(Q) Decreases by decreasing Z
(C) Potential energry	(R) Increases by decreasing Z
(D) Velocity	(S) Decreases by decreasing n

Watch Video Solution

255. Match column -i with Column -ii

Match Column - I with Column - II

	Column - I (Electronic Transition)		Column - II (Nature)
(A)	$n_1 \rightarrow n_\infty$ in H atoms	(P)	Visible radiations
(B)	$n_4 \rightarrow n_2$ in He^+	(Q)	Energy numerically equal to Rydberg energy
(C)	$n_\infty \rightarrow n_1$ in He^+	(R)	Energy numerically equal to ionisation energy
(D)	$n_1 \rightarrow n_2$ in H atom	(S)	Ultraviolet radiations

Watch Video Solution

256. Match column -i with Column -ii

Match Column - I with Column - II

BE $\Rightarrow$ Binding energy, IE $\Rightarrow$ Ionization energy

	Column - I		Column - II
(A)	B. E. of He^+ atom in an excited state	(P)	Infrared region
(B)	$7 \rightarrow 3$ transition in H-atom	(Q)	3.4 eV
(C)	$5 \rightarrow 1$ transition in H-atom	(R)	13.6 eV
(D)	Series limit of Balmer series in H-atom	(S)	10 Spectral lines observed

Watch Video Solution

257. Match column -i with Column -ii

Match Column - I with Column - II

Column - I		Column - II	
(A)	Orbital angular momentum $= \sqrt{2}\frac{h}{2\pi}$	(P)	d-subshell
(B)	$mvr = \frac{nh}{2\pi}, n = 1, 2, 3$	(Q)	Classical analogue momentum
(C)	Subshell which has degeneracy	(R)	p-subshell
(D)	4th Shell	(S)	Number of waves made by electron is 4
		(T)	Directional nature

Watch Video Solution

258. Match column -i with Column -ii

Match Column - I with Column - II

Column - I		Column - II	
(A)	Angular momentum	(P)	$\sqrt{l(l+1)}\frac{h}{2\pi}$
(B)	Orbital angular momentum	(Q)	mvr
(C)	Wavelength of matter	(R)	$\frac{nh}{2\pi}$
(D)	Quantized wave value	(S)	$\frac{h}{p}$

Watch Video Solution

259. In the Bohr orbits if the mass of electron is halved, the radius will become x times of original, keeping velocity constant. What is the value of x ?

Watch Video Solution

260. What is the ratio of wavelength of ii line of balmer series and i line of Lyman series ?

Watch Video Solution

261. H- atoms in ground state (13.6eV) are excited by monochromatic radiations of

photon of energy 12.1eV. Find the number of spectral lines emitted in H-atom.

Watch Video Solution

262. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$2s < 2p$

Watch Video Solution

263. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$3p < 3d$

Watch Video Solution

264. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$4s < 3d$

Watch Video Solution

265. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$4s < 4p$

Watch Video Solution

266. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$5s < 5p$

Watch Video Solution

267. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$4d < 4f$

Watch Video Solution

268. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$5s < 4d$

Watch Video Solution

269. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$6s < 4f$

Watch Video Solution

270. Out of the following in how many pairs energy sequence is reversed after filling electron (for all element $Z > 1$)

$6s < 5d$

Watch Video Solution

271. Magnetic moment of $A^3 + ion$ is $5.48 \times 10^{-23} \frac{J}{T}$. Find out the number of unpaired electrons in it.

$$\left(9.27 \times 10^{-24}\frac{J}{T} = 1B.\ M.\right)$$

Watch Video Solution

272. Find the ratio of frequencies of violet light $(\lambda = 4.10 \times 10^{-5} cm)$ to that of red light $(\lambda = 6.56 \times 10^{-5} cm)$. Also determine the ratio of energies carried by them.

Watch Video Solution

273. A 100 W power source emits green light at a wavelength $\lambda = 5000 A^{\circ}$. How many photons per minute are emitted by the source ?

Watch Video Solution

274. Photochemical dissociation of oxygen results in the production of two oxygen atoms,one in the ground state and one in the excited state. $O_2 \overset{h}{\nu} \rightarrow O + O^{\cdot}$. The maximum wavelength needed for this is 174nm. if the excitation energy $O \to O^{\cdot}$ is `3.15xx10^-19J, How much energy in kJ/mole is needed for the dissociation of one mole of oxygen into normal atoms in ground state?

Watch Video Solution

275. Determine the frequency of revolution of the electron in 2nd Bohr's orbit in hydrogen atom.

Watch Video Solution

276. Find the wavelength of radiation required to excite the electron in ground level of $Li^{2}+$ (Z=3) to third energy level. Also find the ionization energy of $Li^{2}+\left(R=1.09\times 10^{7}m^{-1}\right)$.

Watch Video Solution

277. Calculate the velocity of electron ejected from platinum surface when radiation of 200 nm falls on it. Work function of platinum is 5eV. $\left(1eV = 1.6 \times 10^{-19} J\right)$

Watch Video Solution

278. Calculate the uncertainty in position with uncertainty in momentum within 0.1% for a tenis ball weighing 0.2 kg and moving with a velocity of 10m/sec.

Watch Video Solution

279. Calculate the uncertainly in position with uncertainly in momentum within 0.1% for an electron moving in an atom with a velocity of $2 \times 10^6 \frac{m}{\sec}$.

Watch Video Solution

280. find the de Broglie's wavelength.

Watch Video Solution

281. Find the orbital angular momentum of 2p orbital of hydrogen atom in units of $\frac{h}{2}\pi$.

Watch Video Solution

282. Find the number of electrons in chromium (overset24Cr) which have orbital angular momentum equal to $h / \sqrt{2}\pi$.

Watch Video Solution

283. Which of the following is the energy of a possible excited state of hydroge ?

A. (+13.6eV)

B. (-6.8eV)

C. (-3.4eV)

D. (+6.8eV)

Answer: C

Watch Video Solution

284. The atomic number of cerioum (Ce) is 58.

The correct electronic configuration of $Ce^3 +$

ion is

A. $[Xe]4f^1$

B. $[Kr]4f^1$

C. $[Xe]4f^{13}$

D. $[Kr]4d^1$

Answer: A

Watch Video Solution

285. The number of d-electrons in $Fe^{2}+$ (Z=26) is not equal to the number of electrons in which one of the following ?

A. s-electrons in Mg(Z=12)

B. p-electrons in Cl (Z=17)

C. d-electrons in Fe (Z=26)

D. p-electrons in Ne (Z=10)

Answer: B

Watch Video Solution

286. The angular momentum of electrons in d-orbital is equal to

A. $\sqrt{6}h$

B. $\sqrt{2}h$

C. $2\sqrt{3}h$

D. h

Answer: A

Watch Video Solution

287. The correct set of four quantum numbers for the valence electrons of rubidium atom (Z=37) is

A. 5,0,0,(+1/2)

B. 5,1,0,(+1/2)

C. 5,1,1,(+1/2)

D. 5,0,1,(+1/2)

Answer: A

Watch Video Solution

288. $\left(Ge^{76}, Se^{76}\right)$ and `(Si^30, S^32) are examples of

A. Isotopes and Isobars

B. Isobars and Isotones

C. Isotones and isotopes

D. Isobars and isotopes

Answer: B

Watch Video Solution

289. The emission spectrum of hydrogen discovered first and the region of the electromagnetic spectrum in which it belongs, respectively are

A. Lyman, ultraviolet

B. Lyman, visible

C. Balmer, ultraviolet

D. Balmer, visible

Answer: D

Watch Video Solution

Watch Video Solution

290. As per de Broglie's formula a macroscopic particle of mass 100 gm and moving at a velocity of 100 cm/s will have a wavelength of

A. 6.6×10^{-29}cm

B. 6.6×10^{-30}cm

C. 6.6×10^{-31}cm

D. 6.6×10^{-32}cm

Answer: C

291. The electronic configuration of Cu is

A. $[Ne]3s^2 3p^6 3d^9 4s^2$

B. $[Ne]3s^2 3p^6 3d^{10} 4s^1$

C. $[Ne]3s^2 3p^6 3d^3 4s^2 4p^6$

D. $[Ne]3s^2 3p^6 3d^5 4s^2 4p^4$

Answer: B

292. In an atom, the total number of electrons having quantum numbers n=4, $|m_l|$ =1 and `m_s=-(1/2) is

A. 6

B. 8

C. 4

D. 3

Answer: A

Watch Video Solution

293. What is the maximum number of orbitals that can be identified, with the following quantum numbers ?

A. (A)1

B. (B) 2

C. (C) 3

D. (D) 4

Answer: A

Watch Video Solution

294. Calculate the energy in joule corresponding to light of wavelength 45nm. (Planck's constant h=6.63×10^{-34}Js, speed of light c=$3 \times 10^{8} \frac{m}{s}$).

A. 6.67×10^{15}

B. 6.67×10^{11}

C. 4.42×10^{-15}

D. 4.42×10^{-18}

Answer: D

Watch Video Solution

295. $Be^{2} +$ is isoelectronic with which of the following ions ?

A. H^{+}

B. Li^{+}

C. Na^{+}

D. $Mg^{2} +$

Answer: B

Watch Video Solution

296. Which of the followng molecules has the maximum dipole moment?

A. CO_2

B. CH_4

C. NH_3

D. NF_3

Answer: C

Watch Video Solution

297. The statement that is not correct is

A. Angular quantum number signifies the shape of the orbital

B. Energies of stationary states in hydrogen like atoms is inversely proportional to the square of the rpincipal quantum number

C. Total number of nodes for 3s-orbital is three

D. The radius of the first orbit of He^{+} is half that of the first orbit of hydrogen atom

Answer: C

Watch Video Solution

298. Among the elements from atomic number 1 to 36, the number of elements which have an unpaired electron in their s-subshell is

A. 2

B. 7

C. 6

D. 9

Answer: C

Watch Video Solution

299. What is the orbital angular momentum of an electron in 'f' orbital ?

A. $1.5h / \pi$

B. $\sqrt{6}h / \pi$

C. $\sqrt{3}h / \pi$

D. $\sqrt{3}h / 2\pi$

Answer: C

Watch Video Solution

300. When the electrons of hydrogen atom return to L shell from shells of higher energy, we get a series of lines in the spectrum. This series is called

A. Balmer series

B. Lyman series

C. Brackett series

D. Paschen series

Answer: A

Watch Video Solution

301. For a f -orbital the values of m are

A. -1, 0, +1

B. 0, +1, +2, +3

C. -2, -1.0, +1, +2

D. -3, -2, -1, 0, +1, +2, +3

Answer: D

Watch Video Solution

302. Which of the following is not true in Rutherford's nuclear model of atom?

A. Protons and neutrons are present inside nucleus

B. Volume of nucleus is very small as compared to the volume of atom

C. The number of protons and neutrons are always equal

D. The number of electrons and protons are equal

Answer: C

Watch Video Solution

303. The magnetic quantum number for d-orbital is given by

A. 2

B. $0, \pm 1, \pm 2$

C. 0,1,2

D. 5

Answer: B

Watch Video Solution

304. The transition of electrons in H atom that will emit maximum energy by

A. $n_3 \rightarrow n_2$

B. $n_4 \rightarrow n_3$

C. $n_5 \rightarrow n_4$

D. $n_6 \rightarrow n_5$

Answer: A

Watch Video Solution

305. how many electrons in $\underset{19}{K}$ have n=3, l=0?

A. 1

B. 2

C. 4

D. 3

Answer: B

Watch Video Solution

306. What is the maximum numbers of electrons that can be associated with the following set of quantum numbers? n=3, l=1, and m=1

A. 10

B. 6

C. 4

D. 2

Answer: D

Watch Video Solution

307. The value of Planck's constant is 6.63×10^{-34} Js. The speed of light is $3 \times 10^{17} nms^{-1}$. which value is closest to the wavelength in nanometer of a quantum of light with frequency of $6 \times 10^{15} s^{-1}$?

A. 10

B. 25

C. 50

D. 75

Answer: C

Watch Video Solution

308. Based on equation $E = -2.178 \times 10^{-18} J \left(\frac{Z^2}{N^2}\right)$ certain conclusions are written. which of them is not correct ?

A. The negative sign in equation simply means that the energy of electron bound to the nucleus is lower that it would be if the electrons were at the infinite distance from the nucleus

B. Larger the value of n, the larger is orbit radius

C. equation can be used to calculate the change in energy than it does for n =6 which means that the electron is more loosely bound in the smallest allowed orbit

D.

Answer: D

Watch Video Solution

309. The number of unpaired electrons in $Fe^{3}+$ (Z=26) are

A. 5

B. 6

C. 3

D. 4

Answer: A

Watch Video Solution

310. When the electrons of hydrogen atom return to L shell from shells of higher energy, we get a series of lines in the spectrum. This series is called

A. Balmer series

B. Lyman series

C. Brackett series

D. Paschen series

Answer: A

Watch Video Solution

311. The nitride ion in lithium nitride is composed of

A. 7 protons + 10 electrons

B. 10 protons + 10 electrons

C. 7 protons + 7protons

D. 10 protons + 7 electrons

Answer: A

Watch Video Solution

312. The value of azimuthal quantum numbers (l) is 2 then the value of principal quantum number (n) is

A. 2

B. 3

C. 4

D. 5

Answer: B

Watch Video Solution

313. Which is not correct ?

A. n=2, l=0, m=-1

B. n=2, l=1, m=-0

C. n=3, l=1, m=--1

D. n=3, l=0, m=0

Answer: A

Watch Video Solution

314. The atomic number of an element is 17. The number of orbitals containing electron pairs in its valence shell is

A. 3

B. 4

C. 6

D. 8

Answer: A

Watch Video Solution

315. The total number of electrons present in all the p - orbitals of bromine is

A. 5

B. 15

C. 17

D. 35

Answer: C

Watch Video Solution

316. Which of the following element is represented by electronic configuration $1s^2, 2s^2, 2p^1\_x, 2p^1\_y, 2p^1\_z$

A. Nitrogen

B. Oxygen

C. Fluorine

D. Sulphur

Answer: A

Watch Video Solution

317. The de- Broglie wavelength associated with particle of mass 10^{-6} kg moving with a velocity of 10 m/s is

A. 6.63×10^{-7}

B. 6.63×10^{-16}

C. 6.63×10^{-23}

D. 6.63×10^{-29}

Answer: D

Watch Video Solution

318. The quantum number m of a free gaseous atom is associated with

A. the effective volume of the orbital

B. the shape of the orbital

C. the spatial orientation of the orbital

D. the energy of the orbital in the absence of a magnetic field.

Answer: C

Watch Video Solution

319. The velocity of electron in second shell of hydrogen atom is

A. $10.94 \times 10^6 \frac{m}{s}$

B. $18.88 \times 10^6 \frac{m}{s}$

C. $1.888 \times 10^6 \frac{m}{s}$

D. $1.095 \times 10^6 \frac{m}{s}$

Answer: D

Watch Video Solution

320. For which of the following species Bohr's theory is not applicable?

A. $Be^3 +$

B. $Li^2 +$

C. $He^2 +$ `

D. h

Answer: C

Watch Video Solution

321. Which of the following statements about electromagnetic spectrum is not correct?

A. Infra red radiations have larger wavelength than cosmic ray

B. The frequency for microwaves is less than that of ultra violet rays

C. x-rays have larger wave number than microwaves

D. The velocity of X-rays is more than that of microwaves.

Answer: D

Watch Video Solution

322. The electron identified by quantum numbers n and l

(1) n=4 , l=1 (2) n=4 , l=0 (3) n=3 , l=2 (4) n=3 , l=1

can be replaced in order of increasing energy as

A. $3 < 4 < 2 < 1$

B. $4 < 2 < 3 < 1$

C. $2 < 4 < 1 < 3$

D. $1 < 3 < 2 < 4$

Answer: B

Watch Video Solution

323. which of the following orbitals has zero probability of finding the electron in xy plane

A. p_x

B. p_z

C. d_{yz}

D. $d_{x^2 - y^2}$

Answer: B

Watch Video Solution

324. Which of the following does not represent the mathematical expression for the Heisenberg uncertainty principle?

A. $\Delta x \cdot \Delta P \geq \frac{h}{4\pi}$

B. $\Delta x \cdot \Delta v \geq \frac{h}{4\pi m}$

C. $\Delta E \cdot \Delta t \geq \frac{h}{4\pi}$

D. $\Delta E \cdot \Delta x \geq \frac{h}{4\pi}$

Answer: D

Watch Video Solution

325. An element

A. is one type of atom

B. is two or more types of atom

C. has constant boiling point

D. has constant

Answer: A

Watch Video Solution

326. Which of the following are Isoelectronic?

A. Li and Be^{+}

B. H^{-} and He^{+}

C. He and H

D. Be^{+} and H

Answer: A

Watch Video Solution

327. Which of the following laws will represent the pairing of electron in a subshell after each orbital is filled with one electron ?

A. Pauli's exclusion principle

B. Hund's rule

C. Heisenberg's uncertainty principle

D. Hess's law

Answer: B

Watch Video Solution

328. Which of the following sets of quantum number is restricted?

A. n=3 , l=1 , $m = \pm 2$

B. n=3 l=1 m=0

C. n=3 l=1 $m = \pm 1$

D. n=3 l=1 m=-1

Answer: A

Watch Video Solution

329. Impossible orbital among the following is

A. 3r

B. 2p

C. 4d

D. 2s

Answer: A

Watch Video Solution

330. Which one of the following has a magnetic moment of 1.75 BM?

A. v^{3+}

B. Cr^{3+}

C. Fe^{3+}

D. Ti^{3+}

Answer: D

Watch Video Solution

331. Which of the following species have the same number of electrons in its outermost as well as penultimate shell ?

A. Cl^{-}

B. O^{2-}

C. Na^{+}

D. $Mg^{2} +$

Answer: A

Watch Video Solution

332. The triad of nuclei that is isotonic is

A. $\underset{6}{C}^{14}$, underset7N^(14) , underset 9F^(19)`

B. $\underset{6}{C}^{14}$, underset7N^(15) , underset9F^(17)`

C. $\underset{7}{C}^{14}$, underset7N^(14) , underset9F^(17)`

D. $\underset{6}{C}^{12}$, underset7N^(14) , underset9F^(19)`

Answer: B

Watch Video Solution

333. For the valence electron in copper the four quantum numbers are

A. n=4 , l=0 , m=0 s=+1/2

B. n=4 , l=0 , m=0 s=+1/2

C. n=4 , l=0 , m=+2 s=+1/2

D. n=4 , l=0 , m=+2 s=+1/2

Answer: A

Watch Video Solution

334. If the radius of H is $0.53\overset{0}{A}$ then will be the radius of $\underset{3}{Li}^{2+}$?

A. $0.17\overset{0}{A}$

B. $0.36\overset{0}{A}$

C. $0.53\overset{0}{A}$

D. $1.59\overset{0}{A}$

Answer: A

Watch Video Solution

335. Maximum number of electrons in a subshell with l=3 and n=4 is

A. 14

B. 16

C. 10

D. 12

Answer: A

Watch Video Solution

336. The correct set of four quantum numbers for the valence electrons of rubidium atom (Z=37) is

A. 5,1 , 1 ,+1/2

B. 6,0,0,+1/2

C. 5,0,0,+1/2

D. 5, 1, 0 , +1/2

Answer: C

Watch Video Solution

337. The orbital angular momentum of p-electron is given by as

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

B. $\sqrt{3}\left(\dfrac{h}{2\pi}\right)$

C. $\sqrt{\frac{3}{2}\frac{h}{\pi}}$

D. $\sqrt{6}\left(\frac{h}{2\pi}\right)$

Answer: A

Watch Video Solution

338. If the 1st ionisation energy of H atom is 13.6 eV then the 2nd ionisation energy of He atom is

A. 27.2eV

B. 40.8eV

C. 54.4eV

D. 108.8eV

Answer: C

Watch Video Solution

339. The correct set of four quantum numbers for the outermost electron of sodium (Z=11) is

A. 3,1,1,1/2

B. 3,2,1,1/2

C. 3,0,0, 1/2

D. 3,1,0, 1/2

Answer: C

Watch Video Solution

340. Which of the following laws will represent the pairing of electron in a subshell after each orbital is filled with one electron ?

A. Pauli's exclusion principle

B. Hund's rule

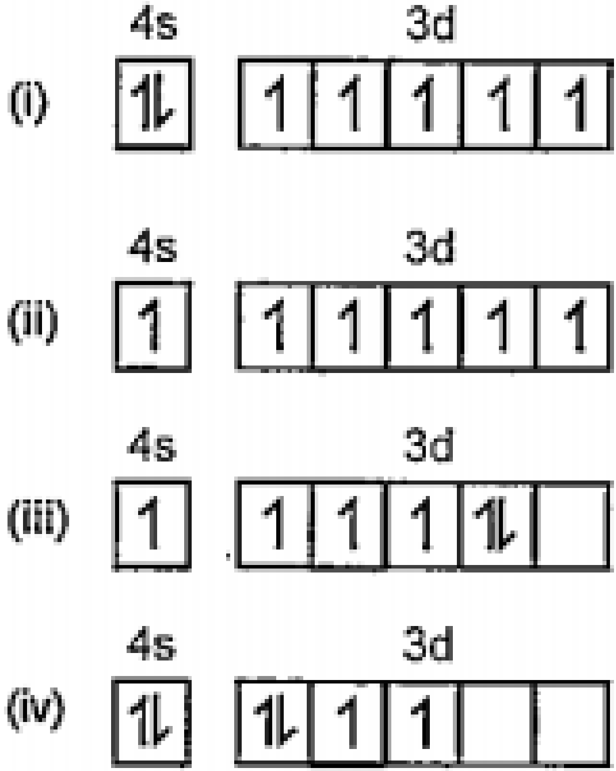
C. Heisenberg's uncertainty principle

D. Hess's law

Answer: B

Watch Video Solution

341. Out of the following electronic arrangement for outer electronic configuration



The most stable arrangement

A. i

B. ii

C. iii

D. iv

Answer: A

Watch Video Solution

342. If E_e, E_α and E_p represent the kinetic energies of an electron alpha particle and a proton respectively , each moving with same de-Broglie wavelength then

A. $E_e = E_a = E_p$

B. $E_a = E_\alpha = E_p$

C. $E_\alpha = E_p = E_e$

D. $E_a = E_p = E_\alpha$

Answer: D

Watch Video Solution

343. Which of the following statements in relation to the hydrogen atom is correct?

A. 3s , 3p and 3d orbitals all have the same energy

B. 3s and 3p orbitals are of lower energy than 3d-orbital

C. 3p orbital is lower in energy than 3d orbital

D. 3s orbital is lower in energy than 3p orbital

Answer: A

Watch Video Solution

344. The electronic configuration of Cr^{3+} is

A. [Ar] $3d^4 4s^2$

B. [Ar] $3d^3 4s^0$

C. [Ar] $3d^2 4s^1$

D. [Ar] $3d^5 4s^1$

Answer: B

Watch Video Solution

345. An f-shell containing 6 unpaired electrons can exchange

A. 6 electrons

B. 9 electrons

C. 12 electrons

D. 15 electrons

Answer: D

Watch Video Solution

346. A gas absorbs photon of 355 nm and emits at two wavelengths. If one of the emission is at 680 nm the other is at

A. 1035 nm

B. 325 nm

C. 743 nm

D. 518 nm

Answer: C

Watch Video Solution

347. The frequency of light emitted for the transition n=4 to n=2 of He^{+} is equal to the transition in H atom corresponding to which of the following?

A. n=3 to n=1

B. n=2 to n=1

C. n=3 to n=2

D. n=4 to n=3

Answer: B

Watch Video Solution

348. Which transition in the hydrogen atomic spectrum will have the same wavelength as the transition n=4 to n=2 of he^{+} spectrum?

A. n=4 to n=3

B. n=3 to n=2

C. n=4 to n=2

D. n=2 to n=1

Answer: D

Watch Video Solution

349. The energy of an electron in first bohr orbit of H atom is -13.6 eV . The possible energy value of electron in the excited state of Li^{2+} is

A. (-122.4eV)

B. 30.6eV

C. (-30.6eV)

D. 13.6eV

Answer: C

Watch Video Solution

350. The electronic transition from n=2 to n=1 will produce shortest wavelength in (where n= principal quantum number)

A. Li^{2+}

B. He^{+}

C. H

D. H^{+}

Answer: A

Watch Video Solution

351. Ionisation energy of He^{+} is $19.6 \times 10^{-18} Ja \to m^{-1}$ The energy of the first stationary state (n=1) of `Li^(2+)?

A. $4.41 \times 10^{-16} Ja \to m^{-1}$

B. $-4.41 \times 10^{-17} Ja \to m^{-1}$

C. $-2.2 \times 10^{-15} Ja \to m^{-1}$

D. $8.82 \times 10^{-17} Ja \to m^{-1}$

Answer: B

Watch Video Solution

352. The wave number of spectral line in the emission spectrum of hydrogen will be equal to 8/9 times the Rydberg's constant if the electrons jumps from

A. n=3 to n=1

B. n=10 to n=1

C. n=9 to n=1

D. n=2 to n=1

Answer: A

Watch Video Solution

353. The radius of the first bohr orbit of hydrogen atom is $0.529\overset{0}{A}$. The rdius of the third orbit of H^{+} will be

A. $8.46\overset{0}{A}$

B. $0.705\overset{0}{A}$

C. $1.59\overset{0}{A}$

D. $4.79\overset{0}{A}$

Answer: D

Watch Video Solution

354. Find the ratio of energy difference between the first and second orbit to second and third orbit of Bohr's atomic model of hydrogen.

A. 1/2

B. 1/3

C. 4/9

D. 27/5

Answer: D

Watch Video Solution

355. The wave number of the first line in the Lyman series in hydrogen spectrum is

A. $72755.5\ cm^{-1}$

B. $109678\ cm^{-1}$

C. $82258.5\ cm^{-1}$

D. $65473.6cm^{-1}$

Answer: C

Watch Video Solution

356. Bohr's radius of 2nd orbit of Be^{3+} is equal to that of

A. 4th orbit of hydrogen

B. 2nd orbit of He^+

C. 3rd orbit of Li^{2+}

D. First orbit of hydrogen

Answer: D

Watch Video Solution

357. The number of photons emitted per second by a 60 W source of monochromatic light of wavelength 663 nm is (h= $6.63 \times 10^{-34} Js$)

A. 4×10^{-20}

B. 1.54×10^{20}

C. 3×10^{-20}

D. 1×10^{-20}

Answer: D

Watch Video Solution

358. Calculate the velocity of an electron having wavelength of 0.15 nm Mass of an electron is9.109×10^{-28} g $(h = 6.626 \times 10^{-27} erg - s)$

A. $2.062 \times 10^{-8} cms^{-1}$

B. $2.062 \times 10^{-15} cms^{-1}$

C. $4.84 \times 10^{8} cms^{-1}$

D. $2.062 \times 10^{-9} cms^{-1}$

Answer: C

Watch Video Solution

Watch Video Solution

359. Which one of the following sets of quantum numbers represents the highest energy level in an atom?

A. n=4 , l=0 , m=0 s=+1/2

B. n=3 , l=1 , m=1 , s=+1/2

C. n=3 , l=2 , m=-2 , s=+1/2

D. n=3 , l=0 , m=0 , s=+1/2

Answer: C

Watch Video Solution

360. Which of the following is correct for numbers of electrons number of orbitals and type of orbitals respectively in n-orbit?

A. 4 , 4 and 8

B. 4 , 8 and 16

C. 32, 16 and 4

D. 4 , 16 and 32

Answer: C

Watch Video Solution

361. The representation of the ground state electronic configuration of He by box -diagram as is wrong because it violates

A. Heisenberg's uncertainty principle

B. Bohr's quantization theory of angular moments

C. Pauli exclusion principle

D. Hund's rule

Answer: C

Watch Video Solution

362. What does the electronic configuration $1s^2, 2s^2, 2p^5, 3s^1$ indicate?

A. Ground state of fluorine

B. Excited state of fluroine

C. Excited state of neon

D. Excited state of the O^{2-} ions

Answer: C

Watch Video Solution

363. The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelength λ_1 and λ_2 will be

A. $\lambda_1 = \frac{1}{2}(\lambda_2)$

B. $\lambda_1 = \lambda_2$

C. $\lambda_1 = 2\lambda_2$

D. $\lambda_1 = 4\lambda_2$

Answer: C

Watch Video Solution

364. For balmer series in the spectrum of atomic hydrogen the wave number of each line is given by $\bar{v} = R_H\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$ where R_H is a constant and n_1 and n_2 are integers. Which of the following statement is correct?

As wavelength decreases the lines in the series converge.

The integer n_1 is equal to 2

(iii) The ionisation energy of hydrogen can be calculated from the wave number of these lines.

(iv) The line of longest wavelength corresponds to $n_2 = 3$

A. I ii and iii

B. ii iii and iv

C. I ii and iv

D. ii only

Answer: C

Watch Video Solution

365. In which one of the following pairs the two species are both isoelectronic and isotopic? (Atomic number : Ca=20 , Ar=18 , K =19 , Mg =12 , Fe=26 , Na =11)

View Text Solution

366. Calculate the velocity of an electron having wavelength of 0.15 nm Mass of an electron is9.109×10^{-28} g

$(h = 6.626 \times 10^{-27} erg - s)$

A. $4.85 \times 10^{8} cms^{-1}$

B. $2.062 \times 10^{-15} cms^{-1}$

C. $2.068 \times 10^{-10} cms^{-1}$

D. $4.85 \times 10^{-8} cms^{-1}$

Answer: A

Watch Video Solution

367. The total number of atomic orbitals in fourth energy level of an atom is

A. 4

B. 8

C. 16

D. 32

Answer: C

Watch Video Solution

368. If n=6 the correct sequence of filling of electron will be

A. $ns \rightarrow np \rightarrow (n-1)d \rightarrow (n-2)f$

B. $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$

C. $ns \rightarrow (n-1)d \rightarrow (n-2)\mathfrak{a}rrnp$

D. $ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$

Answer: B

Watch Video Solution

369. Which of the following is correct for numbers of electrons number of orbitals and type of orbitals respectively in n-orbit?

A. 4 , 4 and 8

B. 4,8 and 16

C. 32 , 16 and 4

D. 4 , 16 and 32

Answer: C

Watch Video Solution

370. The atomic masses of helium and neon are 4.0 and 20.0 amu respectively. The value of the de Broglie wavelength of helium gas at $-73^{\circ}C$ is M times the de Broglie wavelength of neon at $727^{\circ}C$. The value of M is

A. 2

B. 3

C. 5

D. 8

Answer: C

Watch Video Solution

371. The kinetic energy of an electron in the second bohr orbit of a hydrogen atom is (a_0 is Bohr radius)

A. $\frac{h^2}{4\pi^2 m a_0^2}$

B. $\frac{h^2}{16\pi^2 m a_0^2}$

C. $\frac{h^2}{32\pi^2 m a_0^2}$

D. $\frac{h^2}{64\pi^2 m a_0^2}$

Answer: C

Watch Video Solution

372. The work function (ϕ) of some metal is listed below. The number of metals which will show photoelectric effect when light of 300 nm wavelength falls on the metal is :

Metal	Li	Na	K	Mg	Cu	Ag	Fe	Pt	W
ϕ(eV)	2.4	2.3	2.2	3.7	4.8	4.3	4.7	6.3	4.75

A. 2

B. 4

C. 6

D. 8

Answer: B

Watch Video Solution

373. The maximum number of electrons that can have principal quantum number n=3 and spin quantum number $m_s = \left(-\frac{1}{2}\right)$ is

A. 3

B. 5

C. 7

D. 9

Answer: D

Watch Video Solution