



CHEMISTRY

BOOKS - SAI CHEMISTRY (TELUGU ENGLISH)

ATOMIC STRUCTURE

Mcq 5

1. Which of the following sets of quantum numbers is correct for an electron in 3d orbital.

$$\text{A. } n = 3, l = 2, m = -3, s = +\frac{1}{2}$$

$$\text{B. } n = 3, l = 3, m = +3, s = -\frac{1}{2}$$

$$\text{C. } n = 3, l = 2, m = -3, s = -\frac{1}{2}$$

$$\text{D. } n = 3, l = 2, m = -3, s = -\frac{1}{2}$$

Answer: c



Watch Video Solution

2. If the kinetic energy of a particle is reduced to half, its de Broglie wavelength becomes.

A. 2 times

B. $\frac{1}{\sqrt{2}} \times$

C. 4 times

D. $\frac{1}{\sqrt{2}}$ times

Answer: d



Watch Video Solution

3. The number of radial nodes present in 3p orbital is

A. 0

B. 1

C. 2

D. 3

Answer: b



Watch Video Solution

4. The radiation with maximum frequency is

A. X-rays

B. Radio waves

C. UV rays

D. IR -rays

Answer: a



Watch Video Solution

5. In an atoms ,the order of increasing energy

of electrons with number quantum numbers.(i)

$n=4, l=1$ (ii) $n=4, l=0$ (ii) $n=3, l=2$ (iv) $n=3, l=1$ is

A. $iii < i < iv < ii$

B. $ii < iv < i < iii$

C. $i < iii < ii < iv$

D. $iv < ii < iii < i$

Answer: d



Watch Video Solution

6. The number of angular and radial nodes of 4d orbita l respectively are

A. 3,1

B. 1,2

C. 3,0

D. 2,1

Answer: d



Watch Video Solution

7. The oxidation state and covalency of Al on

$[AlClH_2O_5]^{2+}$ ARE respectively

A. + 6, 6

B. + 3, 6

C. + 2, 6

D. + 3, 3

Answer: b



Watch Video Solution

8. The number of radial nodes of 3s and 2p orbitals respectively are

A. 0,2

B. 2,0

C. 1,2

D. 2,1

Answer: b



Watch Video Solution

9. The basis of quantum mechanical model of an atom is

A. Angular momentum of electron

B. Quantum numbers

C. Dual nature of electron

D. Black body radiation

Answer: c



Watch Video Solution

10. A compound absorbs light in the wavelength region 490-500 nm. Its complementary colour is

A. Red

B. Blue

C. Orange

D. Blue-green

Answer: a



Watch Video Solution

11. The quantum number which explains the line spectrum observed as doubled in case of

hydrogen and alkali metals and doublets and
triples in case of alkali earth metals is

A. Spin

B. Azimuthal

C. Magnetic

D. Principal

Answer: a



Watch Video Solution

12. Which one of the following frequencies of radiation (in Hz) has a wavelength of 600 nm?

A. 2.0×10^{13}

B. 5.0×10^{16}

C. 2.0×10^{14}

D. 5.0×10^{14}

Answer: d



Watch Video Solution

13. According to Bohr theory which one of the following values of angular momentum of hydrogen atom is not permitted ?

A. $\frac{1.25h}{\pi}$

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

C. $\frac{1.5h}{\pi}$

D. $\frac{0, 5h}{\pi}$

Answer: a



Watch Video Solution

14. Which of the following transitions of an electron in hydrogen atom emits of the lowest wavelength?

A. $n_2 = \infty$ to $n_1 = 2$

B. $n_2 = 4$ to $n_1 = 3$

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

D. $n_2 = 5$ to $n_1 = 3$

Answer: c



Watch Video Solution

15. Which one of the following conditions is incorrect for a well behaved wave function ψ ?

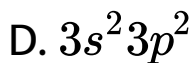
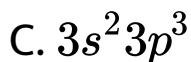
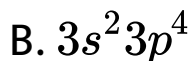
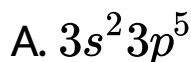
- A. ψ must be finite
- B. ψ_2 must be single valued
- C. ψ must be infinite
- D. ψ must be continuous

Answer: c



Watch Video Solution

16. The electron affinity values of elements A, B and C are respectively -135 , -60 , -200 and -348 kJ mol^{-1} . The outer electronic configuration of element B is



Answer: c



Watch Video Solution

17. The wavelength of electron waves in two orbits is 3:5. The ratio of kinetic energy of electrons will be

A. 25:9

B. 5:3

C. 9:25

D. 3:5

Answer: a



Watch Video Solution

18. Electrons with a kinetic energy of $6.023 \times 10^4 \text{ J/mol}$ are evolved from the surface of a metal, when it is exposed to radiation of wavelength of 600 nm. The minimum amount of energy required to remove an electron from the metal atom is

A. $2.3125 \times 10^{-19} \text{ J}$

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

C. $6.02 \times 10^{-19} \text{ J}$

$$D. 6.62 \times 10^{-32} J$$

Answer: C



Watch Video Solution

19. An electronic transition in hydrogen atom results in the formation of H_{α} line of hydrogen in Lyman series the energies associated with the electron in each of the electron in each of the orbits involved the transition (in kcal mol^{-1}) are

A. $-313.6, -34.84$

B. $-313.6, -78.4$

C. $-78.4, -34.84$

D. $-78.4, -19.6$

Answer: b



Watch Video Solution

20. The velocities of two particles A and B are 0.05 and 0.02 ms^{-1} respectively. The mass of B is

five times the mass of A. The ratio of their De-
Broglie wavelength is

A. 2:1

B. 1:4

C. 1:1

D. 4:1

Answer: a



Watch Video Solution

21. Match the following

Column I	Column II (At STP)
(A) 10 g CaCO_3 $\xrightarrow{\Delta}$ Decomposition	(1) 0.224 L CO_2
(B) $1.06 \text{ g Na}_2\text{CO}_3$ $\xrightarrow{\text{Excess HCl}}$	(2) 4.48 L CO_2
(C) 2.4 g C $\xrightarrow{\text{Excess O}_2}$ Combustion	(3) 0.448 L CO_2
(D) 0.56 g CO $\xrightarrow{\text{Excess O}_2}$ Combustion	(4) 2.24 L CO_2
	(5) 22.4 L CO_2

A. A4,B1,C2,D3

B. A5,B1,C2,D3

C. A4,B1,C3,D2

D. A1,B4,C2,D3

Answer: a



Watch Video Solution

22. Assertion (A) Equal masses of different substances contain same number of constituent particles.

Reason (R) Equal weight of different substances contain the same number of constituent particles.

The correct answer is s

- A. Both (A) and (R) are true (R) is the correct explanation of (A)
- B. Both (A) and (R) are true, but (R) is not correct explanation of (A)
- C. (A) is true, but (R) is false
- D. (A) is false, but (R) is true

Answer: c



Watch Video Solution

23. The wavelength of spectral line emitted by hydrogen atom in the Lyman series is $\frac{16}{15R}$ cm.

What is the value of n_2 ? (R-Rydberg constant)

A. 2

B. 3

C. 4

D. 1

Answer: c



Watch Video Solution

24. The maximum number of sub-level, orbital and electrons in N shell of an atom are respectively

A. 4,12,32

B. 4,16.,32

C. 4,16,32

D. 4,32,64

Answer: c



Watch Video Solution

25. The uncertainties in the velocities of two particles A and B are 0.05 and 0.02ms^{-1} respectively. The mass of B is five times that of A. What is the ratio of uncertainties $\left[\frac{\Delta x_A}{\Delta x_B} \right]$ in their positions?

A. 2

B. 0.25

C. 4

D. 1

Answer: a



Watch Video Solution

26. The energy of a photon is $3 \times 10^{-12} \text{ erg}$

.What is its wavelength in nm?

$$(h = 6.62 \times 10^{-27} \text{ erg} - \text{s}, 3 \times 10^{10} \text{ cms}^{-1})$$

A. 662

B. 1324

C. 66.2

D. 6.62

Answer: a



Watch Video Solution

27. The atomic number of elements X, Y and Z are 19, 21 and 25 respectively. The number of electrons present in the M shell of these elements follow the order

A. $Z > X > Y$

B. $X > Y > Z$

C. $Z > Y > X$

D. $Y > Z > X$

Answer: c



Watch Video Solution

28. An electrons is moving in Bohr's fourth orbits De-Broglie wavelength s λ .What is the circumference of the fourth orbit?

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

B. 2λ

C. 4λ

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

Answer: c



Watch Video Solution

29. X grams of calcium carbonate was completely burnt in air. The weight of solid residue formed is 28g. What is the value of X (in grams)?

A. 44

B. 200

C. 150

D. 50

Answer: d



Watch Video Solution

30. Which of the following elements has least number of electrons in M shell?

A. K

B. Mn

C. Ni

D. Sc

Answer: a



Watch Video Solution

31. What is the volume (inL) of oxygen required at STP to completely convert in 1.5 moles of sulphur into sulphur dioxide?

A. 11.2

B. 22.4

C. 33.6

D. 44.8

Answer: c



Watch Video Solution

32. If the electron of a hydrogen atom is present in the first orbit. The total energy of the electrons is

A. $\frac{-e}{r}$

B. $\frac{-e^2}{r}$

C. $\frac{-e^2}{2\pi}$

D. $\frac{-e^2}{2\pi^2}$

Answer: c



Watch Video Solution

33. If the wavelength of an electromagnetic radiation is 2000 Å. what is its energy in ergs?

A. $9,94 \times 10^{-12}$

B. 9.94×10^{-19}

C. 4.97×10^{-12}

D. 4.97×10^{-19}

Answer: a



Watch Video Solution

34. X litre of carbon monoxide is present at mSTP. It is completely oxidised to CO_2 . Formed is 11.207 l. What is the value of X in litres?

A. 22.414

B. 11.207

C. 5.6035

D. 44.828

Answer: b



Watch Video Solution

35. The concentration of a 100 ml solution containing x g of Na_2CO_3 (molecular wt=106) is Y M. The value of X and Y are respectively

A. 2.12,0.05

B. 1.06,0.2

C. 1.06,0.1

D. 2.12,0.1

Answer: c



Watch Video Solution

36. Which of the following statements are correct?

A. Rydberg's constant and wave number have same units.

B. Lyman series of hydrogen spectrum occurs in the ultraviolet region

C. The angular momentum of the electron in the ground state of hydrogen atom is equal to $\frac{h}{2\pi}$

D. The radius of first Bohr orbit of hydrogen atom is 2.116×10^{-8} cm

Answer: d



Watch Video Solution

37. The energy of an electromagnetic radiation is $19.875 \times 10^{-13} \text{ erg}$. What is its wave number in cm^{-1} ?

$$(h = 6.625 \times 10^{-27} \text{ erg} \cdot \text{s}, c = 3 \times 10^{10} \text{ cm s}^{-1})$$

A. 1000

B. 10^6

C. 100

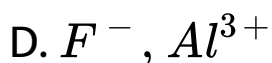
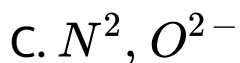
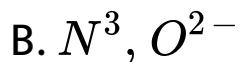
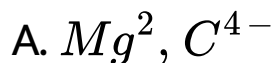
D. 10000

Answer: d



Watch Video Solution

38. Which of the following is not iso-electronic pair?



Answer: c



Watch Video Solution

39. The energy of an electron present in Bohr's second orbit of hydrogen atom is

A. $-1312J a \rightarrow m^{-1}$

B. $-328KJmol^{-1}$

C. $-328J, mol^{-1}$

D. $-164KJ, mol^{-1}$

Answer: b



Watch Video Solution

40. In the ground state, an element has 13 electrons in M shell. The element is

A. Copper

B. Chromium

C. Nickel

D. Iron

Answer: b



Watch Video Solution

41. What is the volume (in litres) of oxygen at STP required for complete combustion of 32g of CH_4 ? (Molecular weight of CH_4 .)

A. 44.8

B. 89.6

C. 22.4

D. 179.2

Answer: b



Watch Video Solution

42. What are the values of n_1 and n_2 for the $2nd$ line in the Lyman series of hydrogen atomic spectrum?

A. 3 and 5

B. 2 and 3

C. 1 and 3

D. 2 and 4

Answer: c



Watch Video Solution

43. How many electrons are present in the M shell of an atom of an element with atomic number (z)24?

- A. 5
- B. 6
- C. 12
- D. 13

Answer: d



Watch Video Solution

44. What is the value (in litres) of CO_2 liberated at STP when 2.12 g of sodium carbonate (mol.wt.106) is treated with

A. 2.28 l

B. 0.448 l

C. 44.8 l

D. 22.4 l

Answer: c



Watch Video Solution

45. In rutherford's $-164KJ, mol^{-1}$ -ray scattering experiment, the alpha Bracket series in hydrogen atomic spectra, which has the highest energy?

- A. Carbon black
- B. BalPlatinum blacker
- C. Zinc sulphide

D. Polytetrafluoro ethylene

Answer: c



Watch Video Solution

46. Among the first lines of Lyman, Balmer, Paschen and Brackett series in hydrogen atomic spectra, which has the highest energy?

A. Lyman

B. Balmer

C. Paschen

D. Brackett

Answer: a



Watch Video Solution

47. How many moles of potassium chlorate should be decomposed completely to obtain 67.2 L of oxygen at NTP?

A. 3

B. 4

C. 1

D. 2

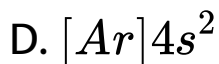
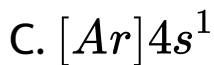
Answer: d



Watch Video Solution

48. The electronic configuration of sodium is





Answer: b



Watch Video Solution

49. Which one of the following sets of the quantum numbers is not possible for a 4p electron?

A. $n = 4, l = 1, m = +1, s = +\frac{1}{2}$

$$\text{B. } n = 4, l = 1, m = 0, s = +\frac{1}{2}$$

$$\text{C. } n = 4, l = 1, m = 2, s = +\frac{1}{2}$$

$$\text{D. } n = 4, l = 1, m = 1, s = -\frac{1}{2}$$

Answer: c



Watch Video Solution

50. How many litres of H_2 at STP will be formed when 100 ml of 0.1 M $(\text{H}_2\text{S})_4$ reacts with excess of Na_2CO_3 ?

A. 22.4

B. 2.24

C. 0.224

D. 5.6

Answer: c



Watch Video Solution

51. Be^{2+} is iso-electronic with

A. Mg^{2+}

B. Na^+

C. Li^+

D. H^+

Answer: c



Watch Video Solution

52. The first emission line of hydrogen atomic spectrum in the Balmer series appear at(R =Rydberg constant)

A. $\frac{5R}{36} \text{cm}^{-1}$

B. $\frac{3R}{4} \text{cm}^{-1}$

C. $\frac{7R}{36} \text{cm}^{-1}$

D. $\frac{9R}{400} \text{cm}^{-1}$

Answer: a



Watch Video Solution

53. in the Bohr hydrogen atom, the electronic transition emitting light of longest wavelength is

A. $n = 2$ to $n = 3$

B. $n = 4$ to $n = 3$

C. $n = 3$ to $n = 2$

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

Answer: b



Watch Video Solution

54. The De-Broglie wavelength of a particle with mass 1 g and velocity 100ms^{-1} is

A. $6.63 \times 10^{-35}m$

B. $6.63 \times 10^{-34}m$

C. $6.625 \times 10^{-33}m$

D. $6.63 \times 10^{-32}m$

Answer: c



Watch Video Solution

55. The De-Broglie wavelength associated with a particle of mass 1 mg moving with a velocity of $10ms^{-1}$ is

A. $6.63 \times 10^{-29}m$

B. $6.63 \times 10^{-31}m$

C. $6.63 \times 10^{-34}m$

D. $6.63 \times 10^{-22}m$

Answer: a



Watch Video Solution

56. The rule that explain the reason for chromium to have $[Ar]3d^54s^1$ configuration instead of $[Ar]3d^4, 4s^2$ is

A. Pauli's exclusion principle

B. Aufbau principle

C. Hund's rule

D. Heisenberg's principle

Answer: c



Watch Video Solution

57. The volume in litres of CO_2 liberated at STP when 10 g of 90% pure limestone is heated completely, is

A. 2.016

B. 20.16

C. 2.24

D. 22.24

Answer: a



Watch Video Solution

58. Ruthford's experiment on scattering of α -particle showed for the first time that the atom has

A. Nucleus

B. Electron

C. Proton

D. Neutron

Answer: a



Watch Video Solution

59. The radius of the second Bohr orbit is

A. 0.053 nm

B. 0.106 nm

C. 0.212 nm

D. 0,0265 nm

Answer: c



Watch Video Solution

60. The formula of a metal chloride is MCl_3 and it contains 20% of the metal. The atomic weight of the metal is approximately

A. 26.5

B. 11.8

C. 21.3

D. 106.5

Answer: a



Watch Video Solution

61. Which one of the following gases contains the least number of molecules ?

A. 4.0 laughing gas

B. 3.0 phosphorus

C. 2.0 g marsh gas

D. 10.0g phosgene

Answer: a



Watch Video Solution

62. The constancy of $\frac{e}{m}$ ratio for electrons insdpite of variation of gas present in the

discharge tube or of the material of the cathode shows that

A. Electrons are negatively charged

B. Electron are universal constituents of matter

C. Electrons are the lightest of all particle

D. Mass of the electron is $\frac{1}{1838}$ of the mass

H-atom

Answer: b



Watch Video Solution

63. The basic assumption of Bohr's model of hydrogen atom is that

A. The energy of the electron is quantised

B. The angular momentum of the electron is quantised

C. The radial distance of the electron is quantised

D. The orbital velocity of the electron is quantised

Answer: b



Watch Video Solution

64. According to Aufbau principle, the sub-shell which is occupied by the electron first has

- A. Higher energy
- B. Lower stability
- C. Lower energy
- D. Can't be predicted

Answer: c



Watch Video Solution

65. 0.84g of metal carbonate reacts exactly with 40 ml of $N/2H_2SO_4$. The equivalent weight of the metal carbonate is

A. 84g

B. 64g

C. 42g

D. 38g

Answer: c



Watch Video Solution

66. The number of molecules present in 3.5 g of CO at $0^\circ c$ and 760 nm pressure is

A. 6.02×10^{23}

B. $1.25 \times 6.02 \times 10^{23}$

C. $0.125 \times 6.02 \times 10^{23}$

D. $1.25N_A$

Answer: c



Watch Video Solution

67. Which of the gases contains the same number of molecules as that of 16 g oxygen?

A. 16 g of O_3

B. 32 g of SO_2

C. 16 g of SO_2

D. All of these

Answer: b



Watch Video Solution

68. When 4p orbital in any atom is filled completely, the next electron goes in

A. 5s

B. 3d

C. 4d

D. 4f

Answer: a



Watch Video Solution

69. Which one of the following series of line is found in the UV region of atomic spectrum of hydrogen

- A. Balmer
- B. Paschen
- C. Brackett
- D. Lyman

Answer: d



Watch Video Solution

70. The energy of the electron in the hydrogen atom is given by the expression

A. $\frac{-e^2}{r^2}$

B. $\frac{-n^2 h^2}{2\pi Z^2 e^4 m}$

C. $\frac{-2\pi^2 Z^2 e^4}{n^2 h^2}$

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

Answer: c



Watch Video Solution

71. One atom of ${}_{19}^{39}\text{K}$ contains

A. $19p$, $20n$ and $19e^{-}$

B. $19p$, $20n$ and $20e^{-}$

C. $20p$, $19n$ and $20e^{-}$

D. $20p$, $19n$ and $19e^{-}$

Answer: a



Watch Video Solution

72. Whwn the electron in an excited hydrogen atom jumps from an energy level for which $n = 5$ to level for which $n = 2$,the spectral line is obeserved in which series of the hydrogen spectrum?

A. Lyman

B. Balmer

C. Paschen

D. Brackett

Answer: b



Watch Video Solution

73. The number of moles of barium carbonate which contains 1.5 moles of oxygen atom is

A. 1.5

B. 1

C. 2

D. 0.5

Answer: d



Watch Video Solution

74. The maximum number of electrons that can be accommodated in all the orbitals for which

$$l = 3.$$

A. 15

B. 14

C. 10

D. 6

Answer: b



Watch Video Solution

75. The magnetic quantum number m for the outermost electron in the Na atom, is

A. 1

B. 2

C. 3

D. 0

Answer: d



Watch Video Solution