

General Chemistry for Preparatory Year Students

Questions

Chapter 2

Atoms, Molecules, Ions and Periodicity

1. The discovery of the electron is attained by

a- Rutherford gold foil experiment

b- Millikan's oil drop experiment

c- Cathode ray tube experiment

d- Dalton's experiment

**2. The statement “No two electrons in an atom have the same four quantum numbers”,
refers to**

a-Dalton's theory

c-The law of multiple proportions

b- Rutherford theory

d- Pauli-exclusion principle

3. A cation is formed by

- a- gaining negative charges
- c- losing positive charges

- b- losing electrons
- d- gaining electrons

4. The number of valence electrons in Germanium Ge is

a- 2

b- 14

c- 32

d- 4

5. The charge of the electron is determined by

a- Rutherford gold foil experiment

b- Millikan's oil drop experiment

c- Cathode ray tube experiment

d- Dalton's experiment

6. Who is postulated that electrons are held within a positive charge sphere?

a- Rutherford

c- Thomson

b- Dalton

d- Millikan

7. A molecule of water contains hydrogen and oxygen in a 1:8 ratio by mass. This is a statement of _____.

a- the law of multiple proportions

b- the law of definite proportions

c- the law of conservation of mass
energy

d- the law of conservation of

8. The gold foil experiment performed in Rutherford's lab _____.

a- confirmed the plum-pudding model of the atom

b- led to the discovery of the atomic nucleus

c-was the basis for Thomson's model of the atom

d-utilized the deflection of beta particles by gold foil

9. Cathode rays are _____.

a- neutrons

b-X-rays

c-electrons

d-protons

10. Which alkali metal has the highest radius?

a- Cs

b-Li

c- Na

d-Ra

e- both a & c

11. The noble gas which is used to fill buoyant balloons called ----- .

a- Helium

b- Neon

c- Xenon

d- Argon

12. The noble gas which is often used in electronic signs called----- .

a- Helium

b- Neon

c- Xenon

d- Argon

13. is used as a sterilizing and disinfecting agent.

a- Helium

b- Neon

c- Argon

d- Chlorine

14. Elements in a periodic table is listed in order of increasing----- .

a- atomic number

b- mass number

c- letter

d- name

15. The number of electrons of sulphide ions, S^{2-} is

a- 14

b- 18

c- 30

d- 34

16. The electronic configuration $[\text{Ne}] 3s^2 3p^3$, corresponds to

a- N

b- Si

c- S

d- P

17. Which of the following is non-metal?

a- Be

c- Ar

b- Au

d- Na

18. Which of the following contains 36 electrons?



19. Which of the following element has higher ionization energy?

a- Li

b- O

c- N

d- C

20. Which of the following belongs to the transition metals?

a- Sodium

b- Aluminum

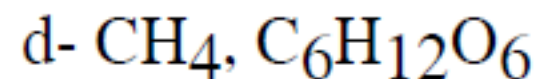
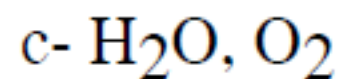
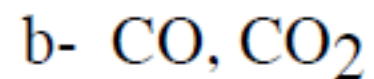
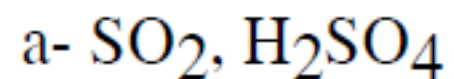
c- iron

d- chlorine

21. Which one of the following is not one of the postulates of Dalton's atomic theory?

- a- Atoms are composed of protons, neutrons, and electrons.
- b- All atoms of a given element are identical; the atoms of different elements are different and have different properties.
- c- Atoms of an element are not changed into different types of atoms by chemical reactions: atoms are neither created nor destroyed in chemical reactions.
- d- Compounds are formed when atoms of more than one element combine; a given compound always has the same relative number and kind of atoms.

22. Which pair of substances could be used to illustrate the law of multiple proportions?



23. Of the following, the smallest and lightest subatomic particle is the _____.

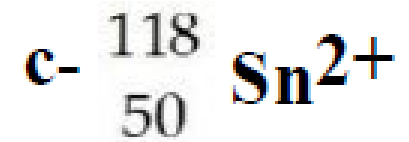
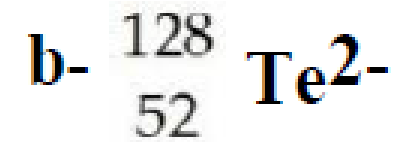
a- neutron

b- proton

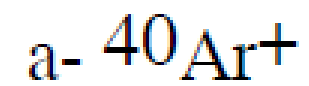
c- electron

d- nucleus

24. Which species has 54 electrons?



25. Which species is an isotope of ^{39}Cl ?



26. Which of the following belongs to the main-groups

a- Manganese

b- Iron

c- Magnesium

d- Vanadium

27. Which pairs of elements, do you expect to be most similar?

a- N and Ni

b- Mo and Sn

c- Si and P

d- Cl and Br

28. Which alkaline earth metal has the highest radius?

a- Cs

b-Li

c- Na

d-Ra

29. Which of the following is not a normal characteristic of metals?

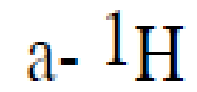
a- conduction of electricity

b- ability to form cations

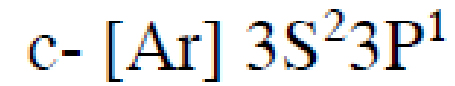
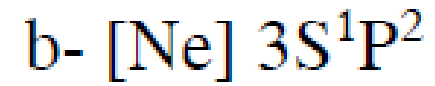
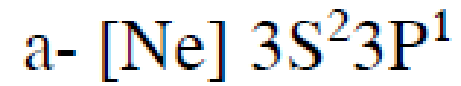
c- low electron affinity

d- high ionization energy

30. Which one of the following species has the same number electrons and neutrons?



31. What is the electron configuration of Al?



32. The number of unpaired electrons in Lithium (Li) is ----- .

a- 1

b- 2

c- 3

d- 0

33. The number of $2P$ electrons in Mg is ----- .

a- 4

b- 6

c- 4

d- 2

34. What is the number of valence electrons in Ba?

a- 5

b- 1

c- 2

d- 4

35. What is the number of core electrons in Si?

a- 5

b- 1

c- 2

d- 10

36. Each element is defined by its unique ----- .

a- atomic number

b- atomic mass

c- mass number

d- distance

37. Which of the following has the smallest first ionization energy?

a- Cs

b- Ga

c- K

d- As

38. ----- is a common unit used to express the masses of atoms and subatomic particles?

a- A

b- mol

c- amu

d- °F

39. Reactive metals in group 2A called ----- .

a- alkaline earth metals

b- Transition metals

c- Nonmetals

d- Gases

40. What is the number of valence electrons in Ge?

a- 5

b- 1

c- 2

d- 4

41. Which is the highest atomic radius among Ca, Rb, S, Si, Ge, F?

a- Ca

b- S

c- Ge

d- F

42. The electron affinity of chlorine can be represented by----- .

- a- $\text{Cl}(\text{g}) - 1\text{e}^- \rightarrow \text{Cl}(\text{g})$ b- $\text{Cl}(\text{l}) + 1\text{e}^- \rightarrow \text{Cl}(\text{l})$ c- $\text{Cl}(\text{g}) + 1\text{e}^- \rightarrow \text{Cl}(\text{g})$ d- None

43. Which element is the most metallic character among P, Sb, As, Bi?

a- P

b- Bi

c- Sb

d- As

44. Which pair of elements have similar chemical properties?

a- N and Ni

b- Cl and F

c- Na and Mg

d- Si and P

45. Which of the following is a nonmetal?

a- Na

b- Mn

c- S

d- Al

46. Which of the following is an alkali metal?

a- K

b- He

c- C

d- Mg

47. The noble gas which is used to fill buoyant balloons called ----- .

a- Helium

b- Neon

c- Xenon

d- Argon

48. The noble gas which is often used in electronic signs called----- .

a- Helium

b- Neon

c- Xenon

d- Argon

49. is used as a sterilizing and disinfecting agent.

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- a- Dalton's theory
- b- Rutherford theory
- c- The law of multiple proportions
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b- Iron

c- Magnesium

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c- Si and P

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b- Au

c- Ar

d- Na

59. Which of the following contains 36 electrons?



60. Which of the following element has higher ionization energy?

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b- O

c- N

d- C

61. The charge of the electron is determined by

a- Rutherford gold foil experiment

b- Millikan's oil drop experiment

c- Cathode ray tube experiment

d- Dalton's experiment

62. Who had been postulated that electrons are held within a positive charge sphere?

a- Rutherford

b- Dalton

c- Thomson

d- Millikan

63. The ratio of electron to neutron in is

a- 4:5

b- 3:4

c- 1:2

d- 6:2

64. Which of the following belongs to the transition metals?

a- Sodium

b- Aluminum

c- iron

d- chlorine

65. Which alkaline earth metal has the highest radius?

a- Cs

b-Li

c- Na

d-Ra

66. Which of the following is not a normal characteristic of metals?

a- conduction of electricity

b- ability to form cations

c- low electron affinity

d- high ionization energy

67. Which of following is cation?

a- Li^+

b- Na

c- H_2

d- Cl^-

68. Elements in a periodic table is listed in order of increasing ----- .

a- atomic number

b- mass number

c- letter

d- name

69. Atoms often loss or gain electrons to form charged particles called ----- .

a- atoms

b- compounds

c- ions

d- metal

70. The ratio of electron to neutron in is

a- 4:5

b- 3:4

c- 1:2

d- 6:2

71. Rb which has two isotopes, Rb-85 with abundance 72.15% and atomic mass = 84.911 amu and Rb-87 with abundance 27.85%, atomic mass = 86.909 amu, The average atomic mass of Rb is.....

a- 84.48 amu

b- 86.48 amu

c- 87.48 amu

d- 85.48 amu

72. The number of mole in 40 g NaOH is

a- 1

b- 2

c- 3

d-4

73. The number of sulfur atoms present in 32 g of sulfur equals to atoms.

a- 6.022×10^{23}

b- 6.022×10^{24}

c- 6.022×10^{22}

d- 1.022×10^{25}

74. There are _____ electrons, _____ protons, and _____ neutrons in an atom of $^{132}_{54}\text{Xe}$.

a- 132, 132, 54

b- 54, 54, 132

c- 78, 78, 54

d- 54, 54, 78

75. Rb which has two isotopes, Rb-85 with abundance 72.15% and atomic mass = 84.911 amu and Rb-87 with abundance 27.85%, atomic mass = 86.909 amu, The average atomic mass of Rb is.....

a- 84.48 amu

b- 86.48 amu

c- 87.48 amu

d- 85.48 amu

76. The number of moles in 40 g NaOH is

a- 1

b- 2

c- 3

d-4

77. The number of sulfur atoms present in 32 g of sulfur equals to.....atoms.

a- 6.022×10^{23}

b- 6.022×10^{24}

c- 6.022×10^{22}

d- 1.022×10^{25}

78. How many grams of sodium chloride are formed when 7.7 g sodium react with 11.9 g of chlorine?

a- 19.6 g

b- 15 g

c- 13.5 g

d- 30 g

79. What is the number of protons in Cr^{+3} ?

a- 21

b- 24

c- 52

d- 49

80. What is the number of electrons in Ca^{+2} .

a- 18

b- 20

c- 38

d- 40

81. What is the number of neutrons in S^{-1} .

a- 32

b- 15

c- 16

d- 40

82. Calculate the number of copper atoms in 2.45 mol of copper (Cu).

a- 1.48 atoms

b- 1.48×10^{24} atoms

c- 2.55×10^{20} atoms

d- 300 atoms

83. How many moles in 2.54 g of silver (Ag)?

a- 2.24 mol

b- 0.024 mol

c- 3.24 mol

d- none

84. How many atoms in 83 mg carbon (C)?

a- 4.17×10^{12} atom

b- 4.17×10^{11} atom

c- 4.17×10^{21} atom

d- 4.17 atom

85. The distance between Br atoms in Br₂ is 228 pm. What is the Br covalent radius?

a- 228 pm

b- 114 pm

c- 57 pm

d- 40 pm

86. The number of sodium atoms present in 2.3 g of sodium equals to atoms.

a- 6.022×10^{23}

b- 6.022×10^{24}

c- 6.022×10^{22}

d- 1.022×10^{25}

87.Rb which has two isotopes, Rb-85 with abundance 72.15% and atomic mass = 84.911 amu and Rb-87 with abundance 27.85%, atomic mass = 86.909 amu, The average atomic mass of Rb is.....

a- 84.48 amu

b- 86.48 amu

c- 87.48 amu

d- 85.48 amu

88. Which of the following element has higher ionization energy?

a- Li

b- O

c- N

d- C

89. What is the number of valence electrons in Ca?

a- 5

b- 1

c- 2

d- 4

90. What is the number of core electrons in Al?

a- 5

b- 1

c- 2

d- 10

91. The distance between Br atoms in Br₂ is 228 pm. What is the Br covalent radius?

a- 228 pm

b- 114 pm

c- 57 pm

d- 40 pm

92. Which of the following element has higher ionization energy?

a- Na

b- O

c- Li

d- N

93. The number of unpaired electrons in iron Fe (III) is----- .

a- 1

b- 2

c- 3

d- 5

94. The distance between Br atoms in Br₂ is 228 pm. What is the Br covalent radius?

a- 228 pm

b- 114 pm

c- 57 pm

d- 40 pm

95. How many sodium atoms in 220 mg sodium carbonate (Na_2CO_3)?

a- 0.025×10^{21}

b- 4.99×10^{21}

c- 2.5×10^{21}

d- 4.17