General Chemistry for Preparatory Year Students

Chapter 2: Atoms, Molecules, Ions and Periodicity

Questions

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 b- Rutherford theory
   c-The law of multiple proportions d- Pauli-exclusion principle

3. **A cation is formed by ……**

   a- gaining negative charges b- losing electrons
   c- losing positive charges 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 b- Dalton
   c- Thomson 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 d- the law of conservation of energy

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- Hellium b- Neon c- Xenon d- Argon

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

a- Hellium b- Neon c- Xenon d- Argon

13. is used as a sterilizing and disinfecting agent.

a- Hellium 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 [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 b-Au
c- Ar d- Na

18. Which of the following contains 36 electrons?

a- Ni^{2+} b- S^{2-}
c- Br^- d- Cr^{3+}

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?

a- SO_2, H_2SO_4 b- CO, CO_2 c- H_2O, O_2 d- CH_4, $C_6H_{12}O_6$

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?

a-Xe^+ **b-** $^{128}_{52}$ **Te^{2-}** **c-** $^{118}_{50}$ **Sn^{2+}** **D)** $^{112}_{48}$ **Cd**

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

a- $^{40}Ar^+$ b- $^{34}S^{2-}$ c- $^{36}Cl^-$ d- ^{80}Br

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?

a- ^{1}H b- $^{40}Ca^{2+}$ c- ^{14}C d- $^{19}F^{-}$

31. What is the electron configuration of Al?

a- [Ne] $3S^2 3P^1$ b- [Ne] $3S^1 P^2$ c- [Ar] $3S^2 3P^1$ d- [Ne]$3S^2$

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

a- 1 b- 2 c- 3 d- 0

33. The number of 2*P* 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- ^{o}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 radium 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- $Cl(g) - 1e^- \rightarrow Cl(g)$ b-$Cl(l) + 1\ e^- \rightarrow Cl^-(l)$ c- $Cl(g) + 1e \rightarrow Cl^-(g)$ 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- Hellium b- Neon c- Xenon d- Argon

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

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49. is used as a sterilizing and disinfecting agent.

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c- Magnesium d- Vanadium

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c- Si and P d- Cl and Br

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c- Br^{-} d- Cr^{3+}

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a- Li 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?

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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 $^{132}_{54}$Xe.

a- 132, 132, 54 b- 54, 54, 132 c- 78, 78, 54 d- 54, 54, 78

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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 Br_2 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 Br_2 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 Br_2 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- $0.025x10^{21}$ b- $4.99x10^{21}$ c- $2.5x10^{21}$ d- 4.17