

Chemistry Vacation Worksheet

Class: Nine

Chapter-2: States of matter

1. What is matter?
2. What is kinetic energy?
3. What is intermolecular attraction force?
4. Discuss the characteristics of three states of matter according to the kinetic theory of particles.
5. What are diffusion and effusion?
6. What are distillation and sublimation?
7. What are melting and boiling?
8. What are melting point and boiling point?
9. What are vaporization and condensation?
10. Discuss the heating curve of matter(ice).
11. Discuss the cooling curve of matter(water vapour)
12. Discuss the heating curve for naphthalene or iodine.
13. Which one has the higher diffusion rate between NH_3 and HCl (or between CH_4 and CO_2) and why?

Chapter-3: Structure of matter

1. What are element and compound?
2. What are atom and molecule?
3. What are symbol and formula?
4. What are atomic number and mass number?
5. Describe the atomic particles of element (proton, neutron and electron).
6. Describe the postulates and limitations of Rutherford's atomic model.
7. Describe the postulates, success and limitations of Bohr's atomic model.
8. Mention the Aufbau principle about electronic configuration?
9. Why the 19th electron of potassium enters into 4s orbital instead of 3d orbital?
10. Why the last two electrons of Ca enter into 4s orbital instead of 3d orbital?
11. Why chromium and copper show exception in their electronic configurations?
12. Show the electronic configurations of the following elements using box method (Hund's Rule)
O, N, Li, Cl, S, Cr, Cu and Ne
13. Show the electronic configurations of the following elements
Cr, Cu, Fe, N, C, O, Br, Cl, Mg, Ca and Zn
14. What are isotopes, isobars and isotones?
15. Differentiates among isotopes, isobars and isotones.
16. What are radioactive isotopes? Discuss the uses of radioactive isotopes.
17. What are atomic mass and relative atomic mass?
18. There are two isotopes of chlorine (^{35}Cl and ^{37}Cl) in nature and their percentages are 75% and 25%, respectively. Calculate the average relative mass of chlorine.
19. If $^{63}\text{Cu} = 75\%$ and $^{65}\text{Cu} = 25\%$ are available in nature then determine the relative atomic mass of the element.

Chapter-5: Chemical Bond

1. What are valence electron and valency?
2. What is radical? Mention its types with examples.
3. What are octate and duet rules?

4. What are cation and anion ?
5. What is chemical bond?
6. What are ionic bond and covalent bond?
7. What are lone pair and bond pair electron?
8. What are molecular formula and structural formula?
9. Discuss the stability of inert gases with electronic configurations of first four elements of the group.
10. Discuss the bond formations of NaCl, MgO, NaF, CaCl₂ and NaH with diagram.
11. Discuss the bond formations of NH₃, CH₄, H₂O, O₂ and F₂ with diagram.
12. Non-metals (such as Cl, O and F) can form both covalent bond and ionic bond- Explain.
13. Explain the melting point and boiling point of ionic compounds (NaCl, AlCl₃, CaCl₂ etc.) are higher than that of covalent compounds.
14. Ionic compounds conduct electricity in molten and solution state but covalent compounds do not. Explain.
15. What is polar compound?
16. Why is H₂O/ ethanol(CH₃CH₂OH)/ methanol(CH₃OH) polar compound?
17. Ionic compounds (NaCl, CaCl₂) are soluble in polar compound (H₂O, alcohol etc.)- Explain.
18. Which one is soluble in water between CH₄ and MgO? Explain.
19. Calculate the number of bond pair and lone pair electrons in molecule of NH₃, CH₄, H₂O and O₂ showing the shape of molecule.
20. What is metallic bond?
21. Discuss the formation of bonding in sodium, aluminium and calcium.
22. Why is melting point of aluminium higher than sodium?
23. Why is aluminium used for making cooking utensils and overhead cables?
Discuss the heat conductivity and electric conductivity of metals (Na, Cu, Fe and Al).

MCQ

Chapter-2(States of Matter)

1. Which one is a spontaneous process?

| | |
|--------------|----------------|
| a) Diffusion | c) Boiling |
| b) Effusion | d) Sublimation |
2. Which states are noticed when the heat of wax reaches the melting point?

| | |
|------------------------------|----------------------|
| a) Solid, liquid and gaseous | c) Solid and liquid |
| b) Liquid and gaseous | d) Solid and gaseous |
3. Intermolecular force of which of the following is maximum?

| | |
|--------------------|---------------------|
| a) SO ₂ | c) H ₂ S |
| b) CO ₂ | d) NaCl |
4. Changing the situation with temperature which does not change?

| | |
|-----------------------------|------------------------|
| a) Structure of molecule | c) Concentration |
| b) Inter-molecular distance | d) Own characteristics |
5. Which one has highest rate of diffusion?

| | |
|-------------------|--------------------|
| a) N ₂ | c) CH ₄ |
| b) O ₂ | d) CO ₂ |
6. Which compound converts to gaseous state directly from solid state by heating?

| | |
|--------------------|-----------------------------------|
| a) NH ₃ | c) C ₆ H ₆ |
| b) SO ₂ | d) C ₁₀ H ₈ |
7. Which one is the sublimated element?

| | |
|-------|-------|
| a) Cl | b) Br |
|-------|-------|

- c) S
d) I
8. What is the melting point of urea?
a) 130°
b) 133°
c) 142°
d) 150°
9. There are four gases CH_4 , NH_3 , CO_2 and N_2 are collected in jars respectively. Which gas jar will be empty first when the lid is open?
a) 1st
b) 2nd
c) 3rd
d) 4th
10. Which gas is volatile at solid state?
a) CO
b) CO_2
c) NO_2
d) NH_3

Chapter-3(Structure of matter)

1. Which orbital does the 21st electron of Sc enter?
a) 3p
b) 3d
c) 4s
d) 4p
2. What is the electron configuration of nitrogen?
a) 2, 3
b) 2, 5
c) 2, 7
d) 2, 4, 1
3. Value of 'l' depends on –
a) Orbital
b) Electron configuration
c) Primary energy level
d) Energy of electron
4. Possible value of 'l' –
a) 0 to n-1
b) 0 to n
c) 1 to n-1
d) 0 to n+ 1
5. By which isotope, age of the earth is determined?
a) ^{60}Co
b) ^{13}C
c) ^{14}C
d) ^{137}Cs
6. How many isotopes of Hydrogen are present?
a) 7
b) 4
c) 3
d) 1
7. In which way you can explain the structure of atom?
a) X-ray
b) Rutherford model
c) Quantum mechanics
d) UV spectroscopy
8. What is the real mass of a proton?
a) 1.765×10^{-24} g
b) 1.67×10^{-24} g
c) 2.75×10^{-24} g
d) 1.765×10^{-24} kg
9. Which symbol expresses the elemental characteristics of element?
a) p
b) n
c) e^{-}
d) A
10. How many energy shells are present in the electronic configuration of Argon?
a) 1
b) 2
c) 3
d) 4
11. Which one is the outermost electronic configuration of Cr?
a) $4s^2$
b) $4s^1$
c) $3d^5$
d) $3d^4$
12. How many electrons are there in 3rd shell of Cr?
a) 12
b) 13
c) 14
d) 18
13. Which electronic configuration is more stable?
a) $(n-1)d^9ns^2$
b) $(n-1)d^8ns^2$

- c) $(n-1)d^7ns^2$ d) $(n-1)d^5ns^2$
14. How many electrons are present in Al^{3+} ion?
 a) 27 c) 13
 b) 14 d) 10
15. Which one of the following elements contains 10 electrons and 12 neutrons?
 a) ${}^{23}_{11}Na^+$ c) ${}^{17}_8Na^{2-}$
 b) ${}^{23}_{11}Na$ d) ${}^{16}_8O$
16. Number of electrons of which ion is equal to the number of electrons of argon?
 a) Ca^{2+} c) F^-
 b) Al^{3+} d) Mg^{2+}
17. Which is the real formula of sulphur?
 a) S_8 c) S_2
 b) S_4 d) S
18. Relative molecular mass of sulphuric acid (H_2SO_4) is –
 a) 50 c) 98
 b) 78 d) 84
19. What is the electronic configuration of Fe^{2+} ?
 a) 2, 8, 13 c) 2, 8, 15
 b) 2, 8, 14 d) 2, 8, 16
20. The mass of H^+ is—
 a) $9.11 \times 10^{-28} g$ c) $1.67 \times 10^{-29} kg$
 b) $1.67 \times 10^{-27} kg$ d) $1.78 \times 10^{-31} kg$
21. Which spectrum can explain Bohr atom model?
 a) Li^+ c) Be
 b) He d) H
22. No. of electrons in each orbital—
 a) $2n^2$ c) $2(2l + 1)$
 b) $n+1$ d) $(2l + 1)$
23. What is the value of l for d sublevel?
 a) 0 c) 2
 b) 1 d) 3
24. ${}^{16}_8X = 38\%$ and ${}^{15}_8X = 62\%$, then what is the relative atomic mass of X?
 a) 16 c) 15.62
 b) 8 d) 15.38
25. Which one is the stable configuration of Cu?
 a) $3d^84s^2$ c) $3d^94s^2$
 b) $3d^64s^2$ d) $3d^{10}4s^1$
26. The atomic mass in a periodic table is—
 a) Relative atomic mass c) Average relative atomic mass
 b) Isotopic mass d) Percentage of mass
27. How many electrons are there in the N shell of Potassium?
 a) 1 c) 6
 b) 2 d) 8
28. Which isotope is found in nature?
 a) 2H c) 5H
 b) 4H d) 6H
29. Mass of one fluorine atom—
 a) $3.15 \times 10^{-23} g$ c) $3.16 \times 10^{-22} g$
 b) $3.16 \times 10^{-23} g$ d) $3.16 \times 10^{-24} g$
30. Which element's atomic mass is 16 times heavy than compared to $1/12^{\text{th}}$ of C-12 isotope?
 a) P
 b) N
 c) O
 d) Si

Chapter-5(Chemical bond)

1. What type of bond exist in CaH_2 ?
 - a) Ionic
 - b) Covalent
 - c) Co-ordination
 - d) Metallic
2. If the electronegativity difference between two different elements is very high then the bond form between them is-
 - a) Covalent
 - b) Polar covalent
 - c) Metallic
 - d) ionic
3. If valence electron of an element is y then what will be the valency of that element?
 - a) y
 - b) $8-y$
 - c) $y-8$
 - d) y or $8-y$
4. Which compound has polarity?
 - a) HF
 - b) CH_4
 - c) CO_2
 - d) PCl_3
5. Which elements valency is zero?
 - a) Na
 - b) Ni
 - c) Ne
 - d) Fe
6. Which of the two element gain the electronic configuration of argon to form ion?
 - a) Ca, Cl
 - b) Sc, Cl
 - c) K, O
 - d) S, C
7. Which one of the following has Vander- waals force?
 - a) H_2S
 - b) MgCl_2
 - c) NaCl
 - d) MgO
8. Which one of the following has triple bond?
 - a) NH_3
 - b) N_2
 - c) BF_3
 - d) I_2
9. Which compound is soluble in water?
 - a) CCl_4
 - b) SiCl_4
 - c) $\text{C}_2\text{H}_5\text{OH}$
 - d) SiO_2
10. Which one is an electronic conductor?
 - a) Graphite
 - b) Alkali solution
 - c) Acid solution
 - d) Salt solution
11. Which element shows variable valency?
 - a) O
 - b) P
 - c) Na
 - d) F
12. Which one is the formula of lead (II) oxide?
 - a) PbO
 - b) PbO_2
 - c) Pb_2O
 - d) Pb_3O_4
13. In which anion and cation of compound of the following is equal no. of electron?
 - a) NaCl
 - b) CaS
 - c) K_2O
 - d) MgCl_2
14. During the formation of NaCl compound—
 - i) Na and Cl both attain electronic configuration of Ne
 - ii) Electrons are exchanged between Na and Cl
 - iii) Both Na and Cl follow octet rule

Which one is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii

15. Which one does not conduct electricity?

- a) Aluminium
- b) Silver
- c) Graphite
- d) Doamond

16. In which of the following compound each atom gain the electronic configuration of Neon?

- a) CaO
- b) Na₂O
- c) CaBr₂
- d) LiF

17. What is the latent valency of carbon in CO?

- a) 2
- b) 3
- c) 4
- d) 6

18. How many bond pair electrons are there in methane molecule?

- a) 3
- b) 4
- c) 5
- d) 6

19. How many lone pair electrons are present in H₂S?

- a) 1
- b) 2
- c) 3
- d) 4

20. For which two elements valency will be same?

- a) Ca, Zn
- b) Al, Cu
- c) Si, Na
- d) N, Cl

21. In which compound the octet is incomplete?

- a) CO₂
- b) BF₃
- c) CaCl₂
- d) CCl₄

22. In the compound PCl₅-

- i) Bond pair electrons are 5
- ii) Here the octet rules is failed
- iii) The central atom is P

Which one is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii

23. At the time of forming bond each molecule has gained the electron configuration of argon-

- i) in KF
- ii) in CaS
- iii) in KCl

Which one is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii

24. In water molecule is present—

- i) delocalized electrons
- ii) lone pair electrons
- iii) covalent bond

Which one is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii

25. Double bond have seen –

- i) In oxygen molecule
- ii) In butane molecule
- iii) In dichloro methane

Which one is correct?

- a) i
- b) ii & iii
- c) iii
- d) i, ii & iii

26. In case of chlorine molecule—

- i) It is a polar compound
- ii) It remain in gaseous state at normal temperature
- iii) Vander Waal's attraction remains effective

Which one is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii

27. How many lone pair electrons are there in the compound that is formed by the combination of Boron and Fluorine elements?

- a) 0
- b) 3
- c) 6
- d) 9

28. Which elements show variable valency?

- a) P, Al
- b) P, Si
- c) P, S
- d) Al, Si

29. Which covalent bond creates polarity?

- a) HF
- b) CO₂
- c) CH₄
- d) NH₃

30. O²⁻ and Mg²⁺ ions—

- i) Iso-electronic
- ii) Makes ionic bond
- iii) Compound is Mg₂O

Which one is correct?

- a) i & ii
- b) ii & iii
- c) i & iii
- d) i, ii & iii