Matter and Its Composition

1. **What is Matter?**
   Ans. Matter is the basic substance which occupies space, has mass and can be perceived by the sense and of which all materials living and nonliving are made of.

2. **What are the characteristics of Matter?**
   Ans. Characteristics of Matter are:
   a. Particles of Matter are very small
   b. Particles of matter have interparticle space between them
   c. Particles of matter are in constant random motion.
   d. Particles of Matter attract each other.

3. **What is Brownian Motion?**
   Ans. The haphazard random motion of suspended particles on the surface of a liquid or in air is called Brownian Motion.

4. **What is Diffusion?**
   Ans. The intermixing of two or more substances due to the motion of their particles in order to get a uniform mixture is called Diffusion.

5. **What are the main postulates of Kinetic Theory matter?**
   Ans. The postulates of Kinetic Theory of Matter are
   a. Matter is composed of very small particles called atoms and molecules.
   b. The constituent particles of a kind of matter are identical in all respects.
   c. These particles have spaces or gaps between them which are known as interarticular space.
   d. There is a force of attraction between the particles. This attraction force is called Intermolecular attraction, which hold them together.
   e. Particles of matter are always in a state of random motion and possess kinetic energy, which increase with increase with temperature and vice versa.

6. **What are the states of matter?**
   Ans. There are three states of matter
   a. Solid
   b. Liquid
   c. Gas
7. **What is Solid?**
   Ans. A material that has a definite shape and definite volume, such that it can have any number of free surfaces, is called solid.
8. **What are the properties of Solid?**
   Ans. The properties of solid are:
   a. Solids have definite shape and volume
   b. Solids are rigid and retain their shape.
   c. Solids do not flow.
   d. Solids are incompressible. Except- Sponge
   e. Solids have high density.
   f. Solids can have a number of free surfaces.
   g. Solids exert pressure at their base due to their weight.
   h. Solids show low thermal expansion.
   i. Solids do not diffuse easily into the other solid.

9. **What is Liquid?**
   Ans. A material which has a definite volume, but no definite shape and has only one free surface is called liquid.

10. **Write the properties of liquid?**
    Ans. The properties of liquid are
    a. Liquid do not have definite shape
    b. Liquids have definite volume
    c. Liquids are not rigid
    d. Liquids can flow easily
    e. Liquids are slightly compressible.
    f. Liquids have low density in comparison to solid.
    g. Liquid has only one free surface.
    h. Liquid exert pressure in all direction.
    i. Liquids show high thermal expansion
    j. Liquids can easily diffuse into other liquid
    k. Liquids tend to adequate minimum surface area, So they have a tendency to form a drops.

11. **What is Gas?**
    Ans. A material which has neither definite shape nor definite volume and is easily compressed and has no free surface is called Gas.

12. **Write the properties of Gas.**
    Ans. The properties of gas are
    a. Gases neither have a definite shape nor a definite volume.
    b. Gases are not rigid
    c. Gases flow in all direction.
    d. Gases are highly compressible, due to the molecules are far apart and large space are between them.
    e. Gases have very low density
    f. Gases do not have any free surface.
    g. Gases exerts pressure from all direction on the walls of the container in which they kept.
    h. Gases show very high thermal expansion.
    i. Gases can diffuse into other gases very fast.

13. **Write the differences of the three states of the matter according to their properties.**
Ans.

Characteristics	Solid	Liquid	Gas
Mass	Have mass	Have mass	Have mass
Space	Occupies Space	Occupies Space	Occupies Space
Volume	Have a definite volume	Have a definite volume	Have no definite volume
Shape	Have a definite Shape	Have no definite shape	Have no definite shape
Compressibility	Have no compressibility	Have slight compressibility	Have high Compressibility
Density	Have high density	Have less Density	Have least density
Free surface	Have any number of free surfaces	Have one upper free surface	Have no free surfaces
Diffusion	Have no diffusibility	Have slight diffusibility	Have high diffusibility
Arrangements of Atoms	Very closely packed	No closely packed	Far apart.
Space between atoms	Minimum	More than solid	Maximum
Force of attraction between atoms	Very strong	Less Strong	Very weak
Movement of Atoms	About their own position	In continuous motion	In any random direction

14. **Why Solid have a fixed shape and volume?**
Ans. The intermolecular force of attraction of solid is very strong, thus the molecules in a solid cannot move away from one another easily. They only vibrate about their fixed positions. This is why solid have a fixed shape and volume.

15. **Why Solids cannot be compressed easily?**
Ans. Solids cannot b compressed easily because the molecules are closely packed and the intermolecular space is small.

16. **How solids can expand on heating?**
Ans. On heating, the molecules gain energy and vibrate more. This increases the space between molecules and decreases the intermolecular force.
Hence, solids expand on heating.

17. **Why liquid have only one free surface?**
Ans. Since the intermolecular force is weaker, liquids cannot maintain a fixed shape. This is why they have only one free surface.

18. **Why Liquid has no definite shape?**
Ans. The intermolecular force of attraction between the molecules of the liquid are slightly less than solid so the intermolecular space is large. So that Liquid has no definite shape.

19. **Why Liquids cannot be compressed easily?**
Ans. The intermolecular space is only slightly larger and the intermolecular force only slightly weaker in liquids than in solids. Because of this, liquids cannot be compressed easily.

20. Why liquids can expand on heating?

Ans. When a liquid is heated, the molecules gain energy and move more easily. The intermolecular space increases. This is why liquids expand on heating.

21. How gases can expand easily?

Ans. The intermolecular space is the largest among the three states of matter, and thus the intermolecular force is the weakest. So, gases can change their shape and volume easily and expand to fill any container.

22. Why Gases have no definite volume & no definite shape?

Ans. The intermolecular force of attraction between the molecules of the gas are very less so that the intermolecular space is very high. So that Gases have no definite shape and volume.

23. Particles of matter possess energy due to their random motion. Compare the particles in a solid, liquid & in a gas with reference to the amount of kinetic energy possessed by each.

Ans.

Characteristics	Solid	Liquid	Gas
Kinetic Energy	The kinetic energy of the molecules of the solid are very less, because the molecules are attracted each other with strong intermolecular attraction force. So the intermolecular space between he molecules are very less.	The kinetic energy of the molecules of the liquid are more than solid and less than gas, because the intermolecular attraction force of the molecules are less than solid. So the intermolecular space between he molecules are very more than solid but less than gas.	The kinetic energy of the molecules of the gas are highest, because the intermolecular attraction force between molecule are very less. So the intermolecular space is very much high.

24. What is interconnection of matter?

Ans. The phenomenon of change from one state to other state and then back to the original state is called interconnection of states of matter.

25. What is Melting or Fusion?

Ans. The process in which solid substances changes into liquid on heating is called Melting.

26. **What is Melting Point?**

Ans. The melting point of a substance is the temperature at which it changes state from solid to liquid.

Ex: The melting point of Water is 0^0 C.

27. What is Vaporization or Evaporation?

Ans. The process in which liquid substance changes into a gas rapidly on heating, is called boiling.

28. What is Boiling?

Ans. The process at which liquid changes to gases by heating is called Boiling or Vaporization.

29. What is Boiling Point?

Ans. The temperature at which liquid changes to gases is called Boiling point.
The Boiling Point of water is 100^0C.

30. What is the difference between Evaporation and Boiling?

Evaporation	Boiling
It is a slow process.	It is a rapid process.
It takes place at the surface of liquid.	It takes place throughout the mass of liquid.
It takes place at a temperature.	It takes place at a specific constant temperature which is called the boiling point of the liquid.
The temperature of surrounding falls.	The temperature of surrounding remains constant.

31. What is Condensation?

Ans. The change of state of a substance from gas to liquid is called condensation.

32. What is Condensation Point?

Ans. The fixed temperature at which the state of a substance changes from gas to liquid on cooling is called the Condensation Point.

33. What is Liquification?

Ans. The process by which a gas changes into liquid state by applying pressure and lowering the temperature is called Liquification.

34. What is Freezing or Solidification?

Ans. The process in which liquid substance changes into solid is called Freezing.

35. What is Freezing Point?

Ans. The temperature at which temperature at which a liquid becomes a solid is called Freezing Point.
Ex: The freezing point of Water is 0^0 C.

36. What is Sublimation?

Ans. The process by which certain substance changes directly from solid to gas on heating is called Sublimation.

37. What is Laws of Convention of Mass?

Ans. Laws of Convention of Mass said that, Mass can neither be changed nor be destroyed in chemical reaction.
However, it may change from one form to another during the reaction.
It can also be stated as-
In a Chemical reaction, the total mass of the reactants is equal to the total mass of the products.

38. **When sodium chloride is added to a definite volume of water and stirred well. a solution is formed, but there is no increase in the level of water. Why?**
Ans. This is because there is intermolecular space between the molecules of water in which the salt particles get accommodated when dissolved.

39. **Why can a piece of chalk be broken easily into smaller pieces while a coal piece cannot be broken easily?**
Ans. The strength of this force of attraction is lesser in chalk, hence it could be broken easily into smaller pieces. But the strength of the intermolecular force of attraction is very strong in coal. therefore, it is not possible to break them into small pieces.

40. **What do you observe when a gas jar which appears empty is inverted over a gas jar containing Bromine vapours?**
Ans. When a gas Jar full of bromine vapours (reddish brown) is inverted over a gas jar containing air over it. It is observed that after sometime, the reddish-brown vapours of bromine also spread out into the upper jar. This mixing is called diffusion. The rate of diffusion is the fastest in gases and the slowest in solids.