## Matter in our Surroundings

1. A student poured an equal amount of water into 4 containers as shown below.



What result does this experiment show?

- (a) Water has definite volume.
- (b) Water has no definite shape.
- (c) Water has definite mass.
- (d) Water has no definite volume.
- **2.** Which of the following has a direct effect on the K.E. of particles?
  - (a) Pressure
  - (b) Potential energy
  - (c) Temperature
  - (d) All of the above  $% \left( {{{\mathbf{d}}_{\mathbf{r}}}^{\mathbf{r}}} \right)$
- **3.** Look at the venn diagram given below.



Which of the following can be placed in 'Z'? (a) Water

- (b) Dry ice
- (c) Salt
- (d) Jelly
- **4.** Based on the statements given below choose the correct answer.

P. Some sugar can be added to a glassful of water without causing an overflow.
Q. Liquids have spaces present between the molecules.

- (a) P and Q are true and Q explains P.
- (b) P and Q are true but Q does not explain P
- (c) Only P is true.
- (d) Only Q is true.

- **5.** What happens to a substance when the space between its particles is decreased?
  - (a) The volume of the substance increases.
  - (b) The volume of the substance decreases.
  - (c) The mass of the substance increases.
  - (d) The mass of the substance decreases.
- 6. Match the entries in Column I with those in Column II.

	Column-I		Column-II
(a)	Evaporation	1.	Liquid to gas at a fixed temperature
(b)	Boiling	2.	Solid to gas
(c)	Sublimation	3.	Gas to solid
(d)	Hoar frost	4.	Liquid to gas at any temperature

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

- **7.** Which of the following have a regular, repeated molecular pattern and large number of free surfaces in three dimensional space?
  - (a) Solids and liquids
  - (b) Liquids and gases
  - (c) Solids
  - (d) Gases
- **8.** Which of the following is used for determining the mass of a solid?
  - (a) Microscope (b) Balance
  - (c) Thermometer (d) Telescope
- 9. Which element has neither a definite shape nor volume?
  - (a) Sodium (b) Hydrogen
  - (c) Iodine (d) Lithium
- **10.** Which of the following statements is NOT true?
  - (a) All forms of matter have volume.
  - (b) All forms of matter have colour.
  - (c) All forms of matter have mass.
  - (d) Matter can be living or non-living.
- **11.** Three containers X, Y and Z as shown below were filled with water and then left near an open window. The purpose was to find out whether the exposed surface area of the water affects the rate of evaporation of water.



Why was the experiment NOT a fair one?

- (a) The exposed surface areas were different.
- (b) Different types of containers were used.
- (c) The amount of water in the containers was different.
- (d) The containers were not covered.

- **12.** What happens to the inter-particle attractive forces with an increase in the distance between the particles? (a) They increase.
  - (b) They decrease.
  - (c) They increase moderately.
  - (d) They remain the same.
- **13.** Bromine has a melting point of  $-7.2^{\circ}C$  and a boiling point of  $59^{\circ}C$ . At what temperature will bromine have a definite volume but no definite shape?
  - (a) 65°C
  - (b) 36°C
  - (c)  $-26^{\circ}C$
  - (d) 98 K
- **14.** What happens when a solid melts?
  - (a) Its molecules move farther apart.
  - (b) Its molecules move closer.
  - (c) The movement of its molecules decreases.
  - (d) The temperature decreases although heat is supplied.
- **15.** Calculate the temperature at which both the Celsius and Fahrenheit scales show the same reading? (a) 40 K
  - (b) 100°F
  - (c)  $-40^{\circ}C$
  - (d)  $-100^{\circ}C$
- **16.** Why does a gas from a small container when transferred to a larger container occupy all the space available? (a) Gas has no definite mass.
  - (b) Gas has no definite shape.
  - (c) Gas has no definite volume.
  - (d) Gas has no definite density.
- **17.** Which of the following metals is NOT a solid at room temperature?
  - (a) Iron
    - (b) Aluminium
    - (c) Mercury
    - (d) Steel
- **18.** Why can't solids be compressed?
  - (a) The inter-particle attractive forces are very weak.
  - (b) The movement of the constituent particles are not restricted.
  - (c) The constituent particles are closely packed.
  - (d) None of the above.
- **19.** Find the rise in temperature of 1 kg of water if 1000 J of heat is supplied to it.

(a)  $\left(\frac{1000}{4186}\right)^{\circ} C$ (b)  $\left(\frac{4186}{1000}\right)^{\circ} C$ (c)  $(1000 \times 4186)^{\circ} C$ (d)  $(4186 - 1000)^{\circ} C$ 

- **20.** When the vapour pressure of a liquid is equal to the atmospheric pressure, what happens to the liquid? (a) The liquid freezes.
  - (b) The liquid evaporates.
  - (c) The liquid boils.
  - (d) The liquid does not undergo any change.
- **21.** Which of the following water molecules *W*, *X*, *Y* or *Z* can easily escape to form water vapour?



- **22.** Which of the following statements is TRUE of matter?
  - (a) The states of matter are inter-convertible.
  - (b) Force of attraction varies from one kind of matter to another
  - (c) The states of matter can be changed by changing the temperature or pressure,
  - (d) All of the above
- Which of the following will diffuse faster than the others?
  (a) Water
  (b) Petrol
  (c) Perfume
  (d) Milk
- **24.** Identify the normal temperature of the human body.

(a) $40^{\circ}F$	(b) $40^\circ C$
(c) 37° <i>C</i>	(d) 37° <i>F</i>

- **25.** What is the *S.I.* unit of temperature?
  - (a) Centigrade (b) Fahrenheit
  - (c) Kelvin (d) All of the above
- **26.** Which of the following processes involve absorption of energy?

(i)	Boiling	-
(ii)	Sublimation	and the second se
(iii)	Condensation	Provincial and

- (a) Only (i) and (ii)
- (b) Only (ii) and (iii)
- (c) Only (i) and (iii)
- (d) (i), (ii) and (iii)
- **27.** When does the thermal energy of a body increase?
  - (a) When the K.E, of the body decreases.
  - (b) When the P.E. of the body increases
  - (c) When the mechanical energy of the body decreases
  - (d) When the K.E. of molecules in a body increases
- **28.** A student finds that as he blows air into a balloon, it becomes bigger. What inference can he make from the above? (a) Air is a gas. (b) Air has mass
  - (c) Air is matter (d) Air occupies space

- **29.** What happens when ice is converted into water?
  - (a) Heat is absorbed
  - (b) Heat is released
  - (c) Temperature increases
  - (d) Temperature decreases
- **30.** Identify the freezing point of pure water,

(a) $-4^{\circ}C$	(b) $100^{\circ}C$
(c) $10^{\circ}C$	(d) $0^{\circ}C$

- **31.** Under what conditions, can a gas be cooled and converted into liquid?
  - (a) At its critical temperature by decreasing pressure on it
  - (b) Above its critical temperature by increasing pressure on it
  - (c) Above its critical temperature by decreasing pressure on it
  - (d) Below its critical temperature by increasing pressure on it
- **32.** Which of the following substances can be compressed?
  - (a) Sponge
  - (b) Stone
  - (c) Magnet
  - (d) Diamond
- **33.** A class teacher demonstrates the effect of impurities on the boiling point of water using the arrangement of apparatus as shown below.



What could be the probable thermometer readings recorded during the experiment?

- (a)  $97^{\circ}C$
- (b)  $100^{\circ}C$
- (c)  $102^{\circ}C$
- (d)  $99^{\circ}C$
- **34.** At what temperature should all the gases occupy zero volume?
  - (a)  $0^{\circ}C$
  - (b)  $-273^{\circ}C$
  - (c) 273°*C*
  - (d)  $100^{\circ}C$
- **35.** On which of the following factors/ does the molecular arrangement of a substance depend? (a) Temperature and pressure
  - (b) Concentration and temperature
  - (c) Temperature, pressure and concentration
  - (d) Volume and pressure

- **36.** What does conversion of 475 *K* into celsius scale give?
  - (a) 301.85°C
  - (b) 273°C
  - (c)  $207^{\circ}C$
  - (d) 201.85°C
- **37.** Which of the following properties is different for solids, liquids and gases?
  - (a) Movement of molecules
  - (b) Particle size of the substance
  - (c) Mass of the substance
  - (d) Energy changes
- **38.** Non-reacting gases have the tendency to mix with each other. What is this phenomenon called?
  - (a) Evaporation
  - (b) Diffusion
  - (c) Effusion
  - (d) Explosion
- **39.** The figures given below show the state of molecules of different types of matter. Which figure shows that water is being heated?









- **40.** What could be the diameters of the molecules of matter?
  - (a)  $10^{-7}m$ (b)  $10^{-11}m$ (c)  $10^{-9}m$ (d)  $10^{-15}m$

## **Answers With Solutions**

- 1. (b) When equal amount of water is poured in containers of different shapes, it takes the shape of the container. Hence, the result of experiment shows that water has no definite shape.
- **2.** (c) Particles of matter are in continuous motion. That is, they possess kinetic energy. As the temperature increases, they move faster. So, we can say that increase in temperature causes increase in kinetic energy. Hence, temperature is a direct measure of *K*.*E*.
- **3.** (a) According to the venn diagram, Z is water which can exist in the three states of matter. Water exists as ice (solid), water (liquid) and water vapour, steam (gas).
- **4.** (a) In liquids, particles have greater intermolecular spaces compared to those of solids. Hence, a small amount of sugar or salt, when added to the liquid will occupy the space available in between the particles of the liquid. Hence, we do not observe any change in the volume.
- **5.** (b) The volume of the substance decreases when the particles come closer to each other.
- **6.** (a) The correct combination is
  - a -4, b 1, c 2, d 3
  - (a) Evaporation Liquid to gas at any temperature
  - (b) Boiling Liquid to gas at a fixed temperature
  - (c) Sublimation Solid to gas
  - (d) Hoar frost Gas to solid
- **7.** (c) Solids have the given characteristics. Hence, they have definite shape and volume.
- **8.** (b) A balance is used for determining the mass of a solid.
- **9.** (b) Hydrogen is a gas and hence it has no definite shape nor volume.
- **10.** (b) All forms of matter have mass and volume. Secondly, matter can be living or non-living. But the colour of matter is not mandatory.
- **11.** (c) The experiment was not a fair one as the amount of water taken in the four containers was different.
- **12.** (b) As the particles move apart, their inter- particle attractive forces decrease with increasing distance.
- **13.** (b) At a temperature greater than  $-7.2^{\circ}C$  but less than  $59^{\circ}C$ , bromine is a liquid. A liquid has a definite volume but no definite shape, it only takes the shape of the container. Hence, temperature is  $36^{\circ}C$  (in this case).
- **14.** (a) When a solid melts, the heat supplied is used up in changing the state. During the change of state, the molecules move farther apart by overcoming the forces of attraction among them.
- **15.** (c) C = F

 $\frac{C}{100} = \frac{F - 32}{180}$ 180 C = 100 C - 3200 80 C = -3200,  $C = -40^{\circ}C$  or  $-40^{\circ}F$ 

- **16.** (c) Particles in a gas move about freely and randomly in all directions spreading out as far as they can to fill the container or space that they can occupy because gases have no definite volume.
- 17. (c) Mercury is a liquid at room temperature whereas iron, aluminium and steel are solids.
- **18.** (c) The constituent particles of solids are closely packed and cannot be brought further nearer to each other. So, they cannot be compressed by applying external pressure.
- **19.** (a) 4186 *J* of heat raises the temperature of 1 kg of water by  $1^{\circ}C$  $\therefore$  1000 *J* of heat raises the temperature of 1 kg of water by

$$= \left(\frac{1}{4186} \times 100\right)^{\circ} C$$

- 20. (c) The boiling of a liquid depends on its vapour pressure and the atmospheric pressure around it.When the vapour pressure of a liquid becomes equal to the atmospheric pressure of the liquid, then the vapour formed above the liquid rises to the surface of the liquid in the form of bubbles and escapes into the air. This state of liquid is called boiling.
- **21.** (b) The water molecule 'X' at the surface can easily escape to form water vapour.
- **22.** (d) All the statements are true of matter.
- **23.** (c) Perfume is in a vapour state and so it can diffuse more readily than the other liquids.
- **24.** (c) The normal temperature of a human body is  $98.4^{\circ}F$  or  $37^{\circ}C$ .
- **25.** (c) The S.I. unit of temperature is Kelvin.
- 26. (a) During the process of boiling and sublimation, matter absorbs heat energy to undergo change of state.
- **27.** (d) Rise in the temperature increases *K.E.* of the particles, due to this the particles vibrate more frequently. Hence, heat content of the body increases.
- **28.** (d) Air when blown into a balloon occupies space.
- **29.** (a) Conversion of ice to water is melting which requires heat energy. It is absorbed from the surroundings.
- **30.** (d) The freezing point of pure water is  $0^{\circ}C$ .
- **31.** (d) A gas can be liquefied by applying pressure when it is below the critical temperature.
- **32.** (a) A sponge has many pores in which air is trapped, when we press it, air gets expelled out. So it can be compressed.

- **33.** (c) On addition of soluble impurities, the boiling point of water is increased. Boiling point of pure water is  $100^{\circ}C$ . In this case, it is above  $100^{\circ}C$  i.e.,  $102^{\circ}C$ .
- **34.** (b) Theoretically, at  $-273^{\circ}C$ , all the gases occupy zero volume.
- **35.** (c) The molecular arrangement of a substance depends on its temperature, pressure and concentration.
- **36.** (d)  $C = K 273.15 = 475 273.15 = 201.85^{\circ}C$
- **37.** (a) The movement of molecules is different for solids, liquids and gases.
- **38.** (b) Diffusion is responsible for non-reacting gases to mix with each other.
- **39.** (c) When water is heated, it turns into a gas. Particles in a gas move about freely and randomly in all directions, spreading out as far as they can to fill the container or any space that they can occupy, because gases have no definite volume.
- **40.** (c) The diameters of the molecules of matter is about  $10^{-9}m$ .