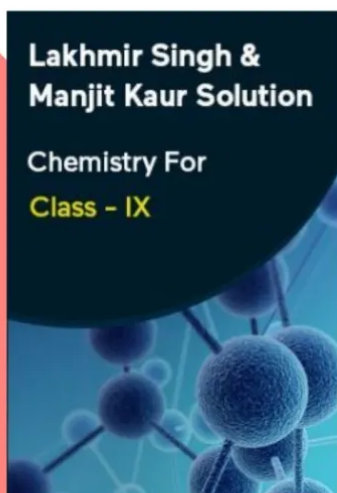


Lakhmir Singh Manjit Kaur Solutions for Class 9 Chemistry: Chapter 1- Matter In Our Surroundings



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CLASS 9 CHEMISTRY

Chapter 1: Matter In Our
Surroundings

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Lakhmir Singh Manjit Kaur 9th Chemistry Chapter 1, Class 9 Chemistry Chapter 1 solutions

Very Short Answer Type Questions

Page no: 17

1. What are the conditions for 'something' to be called 'matter'?

Solution:

The condition for something to be called as matter is that it should occupy space and have mass.

2. Name two processes which provide the best evidence for the motion of particles in matter.

Solution:

Diffusion and Brownian motion are the two processes which provide best evidence for the motion of particles in matter.

3. Which single term is used to describe the mixing of copper sulphate and water kept in a beaker, on its own?

Solution:

Diffusion is the term used to describe the mixing of copper sulphate and water kept in beaker on its own.

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4. When sugar is dissolved in water, there is no increase in the volume. Which characteristic of matter is illustrated by this observation?

Solution:

The characteristic of matter illustrated by this observation is that the particles of matter have spaces between them.

5. Even two or three crystals of potassium permanganate can impart colour to a very large volume of water. Which characteristic of particles of matter is illustrated by this observation?

Solution:

In this observation it displays that each crystal of Potassium Permanganate must be made up of millions of small particles i.e. particles of matter are very small.

6. When an incense stick (agarbatti) is lighted in one corner of a room, its fragrance spreads in the whole room quickly. Which characteristic of the particles of matter is illustrated by this observation?

Solution:

This illustration shows that the particles are constantly moving in all directions.

7. A piece of chalk can be broken into small particles by hammering but a piece of iron cannot be broken into small particles by hammering. Which characteristic of the particles of matter is illustrated by these observations?

Solution:

Matter is made up of small particles which attract each other and the attraction differs from substance to substance. Chalk breaks easily on hammering but iron cannot be broken which shows that the particles of iron attract each other with greater force.

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8. What is the scientific name of particles which make up matter?

Solution:

Atoms or molecules make up matter or matter is composed of atoms/molecules.

9. Name a process by which a drop of ink spreads in a beaker of water

Solution:

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Diffusion is the process by which a drop of ink spreads in a beaker containing water.

10. What is the general name of :

(a) Rigid form of matter?

(b) Fluid form of matter?

Solution:

(a) Solid is the rigid form of matter

(b) Liquid and Gas is the fluid form of matter.

11. Out of solids, liquids and gases, which one has:

(a) Maximum movement of particles?

(b) Maximum interparticle attractions?

(c) Minimum spaces between particles?

Solution:

(a) Gases have maximum movement of particles.

(b) Solids have maximum interparticle attractions

(c) Solids have minimum space between particles.

12. A substance has a definite volume but no definite shape'. State whether this substance is a solid, a liquid ,a gas.

Solution:

Liquid has a definite volume but no definite shape.

13. Name the physical state of matter which can be easily compressed.

Solution:

Gas can be easily compressed physical state of matter.

14. 'A substance has a definite shape as well as definite volume'. Which physical state is represented by statement?

Solution:

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Solid is the substance having definite shape as well as definite volume.

15. A substance has neither a fixed shape nor a fixed volume. State whether it is solid, a liquid or a gas.

Solution:

Gas does not have a fixed shape and fixed volume.

16. Name two gases which are supplied in compressed form in homes and hospitals.

Solution:

LPG (Liquefied Petroleum Gas) and Oxygen Gas are the two gases which are supplied in compressed form in houses and hospitals.

17. Write the full form of the following:

(a) LPG (b) CNG

Solution:

(a) LPG – Liquefied Petroleum Gas.

(b) CNG – Compressed Natural Gas.

18. Which of the two diffuses faster: a liquid or a gas?

Solution:

Gas diffuses faster than liquid because the particles of gases are more spacious and have high kinetic energy.

19. Which of the two diffuses slower: bromine vapour into air or copper sulphate into water?

Solution:

Copper sulphate diffuses slower as compared to bromine vapour in air because the rate of diffusion is faster in gases than in liquids.

20. State whether the following statement is true or false:

Red-brown bromine vapour diffuses into air in a gas jar but the colourless air molecules do not diffuse bromine vapour.

Solution:

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False. Air also diffuses into the bromine vapour but because air is colourless. It is not visible movement.

21. A bottle of perfume was opened in a room. The smell of its vapours spread in the entire room. Name the property of gases which is responsible for this behaviour of perfume vapours.

Solution:

Diffusion is the property of gases which is responsible for this behaviour of perfume vapours.

22. If a fish is being fried in a neighbouring home, we can smell it sitting in our own home. Name the property which brings this smell to us.

Solution:

Diffusion is the property which brings this smell to us.

23. Name one property of liquids and gases which tells us that their molecules are moving constantly.

Solution:

Diffusion is the property of liquids and gases which tells us that their molecules moving constantly.

24. Fill in the following blanks with suitable words:

(a) The best evidence that the particles of matter are constantly moving comes from the studies of..... and.....

(b) The smell of perfume gradually spreads across a room due to

(c) Solid, liquid and gas are the three.... of matter.

(d) At room temperature, the forces of attraction between the particles of solid substances are than those which exist in the gaseous state.

(e) The arrangement of particles is less ordered in the state. However, there is no order the ... state.

Solution:

(a) Diffusion; Brownian motion.

(b) Diffusion.

(c) States.

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(d) Much more.

(e) Liquid; Gaseous.

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Short Answer Type Questions

25. State two characteristics of matter demonstrated by:

(a) Diffusion

(b) Brownian motion

Solution:

(a) Diffusion:

(i) Matter is made up of tiny particles

(ii) The particles of matter are constantly moving.

(b) Brownian motion:

(i) The particles of matter are very small.

(ii) The particles of matter are constantly moving.

26. Name the scientist who studied the movement of pollen grains suspended in water through a microscope. What is the phenomenon known as?

Solution:

Robert Brown studied the movement of pollen grains suspended in water through a microscope. It was found that pollen grains moved rapidly through water in an irregular way. This phenomenon is Brownian motion.

27. When a crystal of potassium permanganate is placed in a beaker, its purple colour spreads throughout the water. What does this observation tell us about the nature of potassium permanganate and water?

Solution:

The observation of purple colour spreading throughout the water is that the crystal of potassium permanganate is made up of many small particles and these particles of water have spaces between them.

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28. When a gas jar containing air is inverted over a gas jar containing bromine vapour, the red-brown bromine vapour diffuse into air. Explain how bromine vapour diffuses into air.

Solution:

When a gas jar containing air is inverted over gas jar containing bromine vapour, both bromine and air molecules move and collide with one another and bounce back in all directions due to which we see a uniform red brown colour in both the jars.

29. Describe in your own words, what happens to the particles when salt dissolves in water.

Solution:

Salt when dissolves in water the tiny particles occupy the spaces between the water particles and mix with them, thus gives a taste to water. There won't be any increase in volume of water.

30. Explain why, we can easily move our hand in air but to do the same through a plank of wood, we need a karate expert.

Solution:

There will be a weak force of attraction between the particles in air. So we can move our hands on air whereas the particles in solid plank are closely packed and a strong force of attraction exists between them. Hence it needs a huge force to overcome the attraction which a karate expert can do.

31. Give one example of the diffusion of a solid in another solid.

Solution:

Diffusion of solid into another solid is an extremely slow process because the particles do not move from the fixed positions and they vibrate. When two metal blocks are packed close to each other the particles diffuse from one other after few years.

32. Explain why, the diffusion of the solid in another solid is a very slow process.

Solution:

Diffusion is a slow process in solids because the particles do not move from their fixed positions and only vibrate.

33. Which of the following diffuses fastest and which the slowest? Solid, Liquid and Gas. Give reasons for your answer.

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Solution:

Solids diffuse the slowest as the particles in solids do not move from their fixed positions.

Gases diffuse the fastest as the particles in gases move very quickly in all directions.

34. Explain the following:

When an incense stick is lighted in the corner of a room, its fragrance spreads quickly in the entire room.

Solution:

The fragrance of incense stick spreads quickly because the particle moves continuously in all directions. Both the air and fragrance have large intermolecular spaces thus they can easily occupy the spaces of the other.

35. Name the three states of matter. Give one example of each.**Solution:**

(i) The solid state – Ice.

(ii) The liquid state – Water.

(iii) The gas state – Air.

36. State two characteristic properties each of:

(a) a solid (b) a liquid (c) a gas

Solution:

Solid:

1. It has strong intermolecular force of attraction between particles
2. It has definite shape and volume

Liquid:

1. It does not have definite shape but has fixed volume
2. They generally flow

Gas:

1. It can be compressed easily

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2. It has the ability to fill their container completely.

37. Why do gases have neither a fixed shape nor a fixed volume?

Solution:

Gases do not have a fixed shape or volume so that the particles are freely moving. They do not have a fixed position or spaces between them.

38. How do solid, liquids and gases differ in shape and volume?

Solution:

(i) Solids – They have a fixed shape and a fixed volume.

(ii) Liquids – They have a fixed volume but no fixed shape.

(iii) Gases – They neither have a fixed shape nor a fixed volume.

39. Arrange the following substances in increasing order of force of attraction between their particles (keeping the substance having the minimum force of attraction first): Water, Sugar, Oxygen

Solution:

Oxygen < Water < Sugar

Oxygen has minimum force of attraction as it is a gas and then water and then sugar.

40. Give two reasons to justify that:

(a) Water is a liquid at room temperature.

(b) An iron almirah is a solid.

Solution:

(a) (i) Water has fixed volume but no fixed shape.

(ii) Water flows freely.

(b) (i) The iron almirah has fixed shape and volume.

(ii) Particles of the iron almirah do not flow freely and have fixed position.

41. (a) When an incense stick (agarbatti) is lighted in one corner of a room, its fragrance quickly spreads in the entire room. Name the process involved in this.

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(b) A girl is cooking some food in the kitchen. The smell of food being cooked soon reaches her brother's room. Explain how the smell could have reached her brother's room.

Solution;

(a) Diffusion is the process involved in this as the fragrance quickly spreads in the entire room.

(b) The smell of food being cooked reaches the other room by the diffusion of gases released into the air during the cooking of food.

42. (a) what does the diffusion of gases tell us about their particles ? (b) Give one example of diffusion of gases in a liquid.

Solution:

(a) Diffusion of gases tells us that the matter comprises of tiny particles and has space between them. The particles of matter are in constant motion.

(b) Gases like carbon dioxide and oxygen present in the atmosphere diffuse into water (of ponds, lakes etc.) and dissolve in it.

43. Give reason of the following observation:

The smell of hot sizzling food reaches us even from a considerable distance but to get the smell from cold food, we have to go close to it.

Solution:

The rate of diffusion of a hot gas is faster than the cold gas. So the particles have greater kinetic energy when the gas is hot and moves faster.

44. Explain how, the smell of being cooked in the kitchen reaches us even from a considerable distance.

Solution:

The smell of food being cooked reaches us even from a considerable distance is because of the process of diffusion.

45. Explain why, when a bottle of perfume is opened in a room, we can smell it even from a considerable distance.

Solution:

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The particles of perfume start diffusing around the air and moves from lower concentration by virtue of their kinetic energy.

46. When a crystal of copper sulphate is placed at the bottom of a beaker containing water, the water slowly turns blue. why?

Solution:

When a crystal of copper sulphate is placed at the bottom of a beaker containing water, the water slowly turns blue because of the diffusion of copper sulphate particles into water.

47. Honey is more viscous than water. Can you suggest why?

Solution:

Honey is more viscous than water because the force of attraction between the particles of honey is much more than that of the force of attraction of particles in water.

48. Explain why:

(a) Air is used to inflate tyres.

(b) Steel is used to make railway lines.

Solution:

(a) When air is blown the particles in air pushes the tyre walls from inside and exerts a pressure on them.

(b) Steel is used to make railway lines because it is a rigid object having a definite shape and volume and strong also.

49. Explain why, diffusion occurs more quickly in a gas than in a liquid.

Solution:

Diffusion occurs more quickly in a gas than liquids because the particles in gases move very quickly in all directions and freely but in the case the liquids the particle movement will be slow because of the intermolecular force of attraction.

Long Answer Type Questions

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50. (a) What is meant by 'diffusion'? Give one example of diffusion in gases.

(b) Why do gases diffuse very fast?

(c) Name two gases of air which dissolve in water by diffusion. What is the importance of this process in nature?

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Solution:

- (a) Diffusion is the mixing of a substance with another substance due to the motion of its particles. The smell of perfume spreads over a whole room is an example for diffusion.
- (b) Gases diffuse fast because of the large space between the particles in gases and high kinetic energy.
- (c) Carbon dioxide and oxygen are the two gases in air which dissolve in water by diffusion. Carbon dioxide is important for aquatic plants for the photosynthesis. Oxygen is used by aquatic animals for breathing.

51. (a) Compare the properties of solids, liquids and gases in tabular form.

(b) Give two reasons for saying that wood is a solid.

Solution:

Solids	Liquids	Gases
(i) Has definite shape and volume (ii) Cannot be compressed (iii) Have high density (iv) Do not fill their container completely	(i) Have fixed volume but no fixed shape (ii) Cannot be compressed much (iii) Moderate to high densities (iv) Do not fill their container completely	(i) They have neither fixed shape nor fixed volume (ii) It can be compressed easily (iii) It has very low densities (iv) It fills their container completely

(b) (i) Wood is a rigid object which has a tendency to maintain its shape when subjected to outside force.

(ii) It has a definite shape and definite volume.

52. (a) Why does a gas exert pressure ?

(b) Why does a gas fill a vessel completely?

(c) Why are gases so easily compressible whereas it is almost impossible to compress a solid or a liquid?

Solution:

(a) When gas is stored in a container, the fast moving particles of the gas collide with each other thus exert pressure on the walls of container

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(b) They have high kinetic energy and negligible force of attraction so it can move constantly moving with high speed in all directions

(c) Gases are easily compressible as they have large inter-molecular spaces. The gas particles can come closer when external pressure is applied on gases.

53. (a) Define matter. Give four examples of matter.

(b) What are the characteristics of matter?

Solution:

(a) Matter is anything that occupies and has mass. Wood, air, water are the examples for matter.

(b)1. Matter is made up of tiny particles

2. The particles of matter attract each other.

3. The particles of matter have spaces between them.

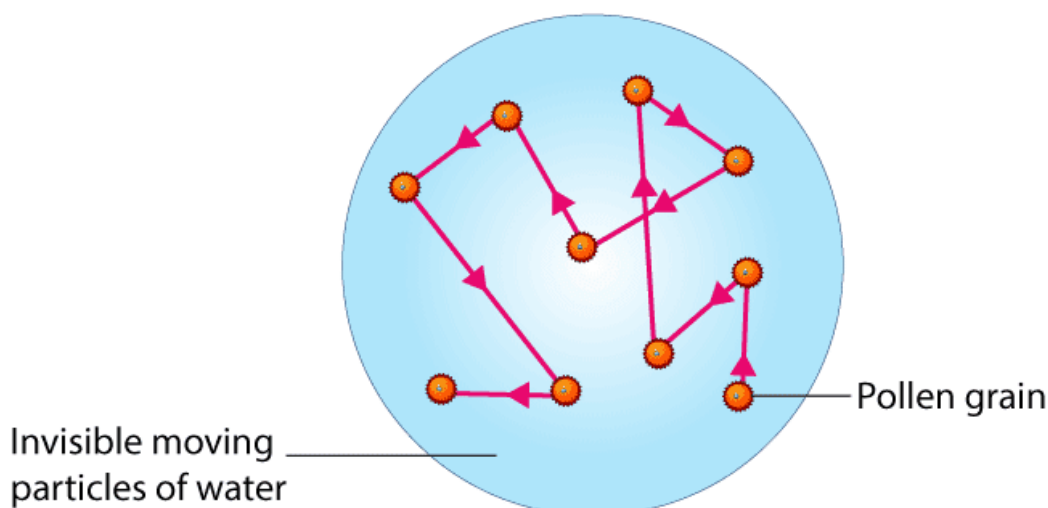
4. The particles of matter are constantly moving.

54. a) What is Brownian motion? Draw a diagram to show the movement of a particle (like a pollen grain) during Brownian motion.

(b) In a beam of sunlight entering a room, we can sometimes see dust particles moving in a haphazard way in the air. Why do these dust particles move?

Solution:

(a)



The zig-zag movement of the small particles suspended in a liquid or a gas is called Brownian movement.

(b) (b) These dust particles move in a haphazard way because they are constantly hit by the fast moving particles of air.

Multiple Choice Questions (MCQ's)

55. When a crystal of potassium permanganate is placed at the bottom of water in a beaker, the water in the whole beaker turns purple on its own, even without stirring. This is an example of:

- (a) Distribution
- (b) Intrusion
- (c) Diffusion
- (d) Effusion

Solution:

Option (c) is the answer.

56. Which one of the following statement is correct in respect of fluids?

- (a) Only gases behave as fluids
- (b) Gases and solids behave as fluids

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(c) Gases and liquid behaves as fluids

(d) Only liquids are fluids.

Solution:

Option (c) is the answer.

57. A few substances are arranged in the increasing order of 'forces of attraction' between their particles. Which one of the following represents the correct arrangement?

(a) Water, air and wind

(b) Air, sugar, oil

(c) Oxygen, water, sugar

(d) Salt, juice, air

Solution:

Option (c) is the answer.

58 In which of the following conditions, the distance between the molecules of hydrogen gas would increase?

(i) Increasing pressure on hydrogen contained in a closed container

(ii) Some hydrogen gas leaking out of the container

(iii) Increasing the volume of the container of hydrogen gas

(iv) Adding more hydrogen gas to the container without increasing the volume of the container

(a) (i) and (iii)

(b) (i) and (iv)

(c) (i) and (iii)

(d) (ii) and (iv)

Solution:

Option (c) is the answer.

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59. Out of the following, an example of matter which can be termed as fluid is:

- (a) Carbon
- (b) Sulphur
- (c) Oxygen
- (d) Phosphorus

Solution:

Option (c) is the answer.

60. The best evidence for the existence and movement of particles in liquids was provided by:

- (a) John Dalton
- (b) Ernest Rutherford
- (c) J.J Thomson
- (d) Robert Brown

Solution:

Option (d) is the answer.

61. A form of matter has no fixed shape but it has a fixed volume. An example of this form of matter is:

- (a) Krypton
- (b) Kerosene
- (c) Carbon steel
- (d) Carbon dioxide

Solution;

Option (b) is the answer.

62. Which of the following statement is correct?

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- (a) The particles of matter are very, very small
- (b) The particles of matter attract one another
- (c) The particles of some of the matter are moving constantly
- (d) The particles of all the matter have spaces between them

Solution:

Option (c) is the answer.

63. When a gas jar full of air is placed upside down on a gas jar full of bromine vapours, the red-brown vapour of bromine from the lower jar go upward into the jar containing air. In this experiment:

- (a) Air is heavier than bromine
- (b) Both air and bromine have the same density
- (c) Bromine is heavier than air
- (d) Bromine cannot be heavier than air because it is going upward against gravity.

Solution:

Option (c) is the answer.

64. When a gas jar containing colourless air is kept upside down over a gas jar full of brown coloured bromine vapour, then after some time, the brown colour of bromine vapour spreads into the upper gas jar making both the gas jar appears brown in colour. Which of the following conclusion obtained from these observations is incorrect?

- (a) Bromine vapour is made of tiny particles which are moving
- (b) Air is made up of tiny particles which are moving
- (c) The particles of bromine are moving but those of air are not moving
- (d) Even though bromine vapour is heavier than air, it can move up against gravity

Solution:

Option (c) is the answer.

65. Which of the following statement is not true?

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- (a) The molecules in a solid vibrate about a fixed position
- (b) The molecules in liquid are arranged in a regular pattern
- (c) The molecules in a gas exert negligibly small forces on each other, except during collisions
- (d) The molecules of a gas occupy all the space available.

Solution:

Option (b) is the answer.

This chapter deals with the classification of matter based on physical properties and daily life examples.



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- Chapter 1- Matter In Our Surroundings
- Chapter 2- Is Matter Around Us Pure?
- Chapter 3- Atoms and Molecules
- Chapter 4- Structure of Atom

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