1. Matter in Our Surroundings

Very Short Answer Type Questions-Pg-17

1. Question

What are the conditions for ‘something’ to be called ‘matter’?

Answer

The main criteria for "something" to be called matter are as follow:-

1. It should have mass2. It should occupy space.3. It should have inter-molecular force of attraction

2. Question

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

Answer

Diffusion which is defined as the movement of particles in accordance with a concentration gradient and Brownian motion which is described as the zig-zag motion of particles of matter are the two processes which provide the best evidence for the motion of particles in a matter.

3. Question

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

Answer

The mixing of copper sulphate and water kept in a beaker on its own is called Diffusion.

4. Question

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

Answer

When sugar is dissolved in water, the Sugar molecules are dissociated and fit in the space of H2O molecule arrangements. Hence no increase in the volume.

5. Question

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?

Answer

There must be millions of tiny particles in just one crystal of potassium permanganate, which keep on dividing themselves into smaller and smaller particles. Ultimately a stage is reached, when the particles cannot divide further into smaller particles.

6. Question

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?

Answer

When an incense stick is burnt, the incense present in it vaporizes because of heat. The vapours move rapidly in all directions due to the diffusion. The vapour mixes with air and reaches to us. In similar way we sense the good or bad smell from a distance.

7. Question

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?

Answer

A chalk piece can be broken easily but not an iron piece because as compared to chalk, iron has greater intermolecular force of attraction which keeps the particles together. The strength of this force of attraction varies from one kind of matter to another.

8. Question

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

Answer

Atoms and molecules are the particles which make up matter.

9. Question

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

Answer

The process by which a drop of ink spreads in a beaker of water is called Diffusion. The molecules in the drop of ink will diffuse through the entire beaker of water. This will result in a homogeneous solution.

10. Question

What is the general name of:

(a) rigid form of matter?

(b) fluid forms of matter?

Answer

(a) Rigid form of matter- Solids

(b) fluid forms of matter- Liquids.

11. Question

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

(a) Maximum movement of particles?

(b) Maximum interparticle attractions?

(c) Minimum spaces between particles?

Answer

(a) Maximum movement of particles - Gaseous particles are in a continuous random movement.

(b) Maximum interparticle attractions- Solid particles attract each other very strongly.

(c) Minimum spaces between particles- Solid particles have least space between the particles.

12. Question

‘A substance has a definite volume but no definite shape’. State whether this substance is a solid, a liquid or a gas.

Answer

liquids have no definite shape but have a definite volume. They take up the shape of the container in which they are kept. Liquids flow and change shape, so they are not rigid and can be called fluid.

13. Question

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

Answer

Gases are highly compressible as compared to solids and liquids as they have very weak intermolecular forces of attraction as a result of which they can be compressed easily under pressure.

14. Question

‘A substance has a definite shape as well as a definite volume’. Which physical state is represented by this statement?

Answer

Solids have a definite shape, distinct boundaries and fixed volumes, that is, have negligible compressibility. Solids have a tendency to maintain their shape when subjected to outside force.

15. Question

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

Answer

Gases have neither a fixed shape nor a fixed volume, hence gases are highly compressible as compared to solids and liquids.

16. Question

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

Answer

The liquefied petroleum gas (LPG) cylinder gets supplied in our home for cooking and the oxygen gas gets supplied to hospitals in cylinders

are the two types of compressed gases.

17. Question

Write the full forms of the following:

(a) LPG (b) CNG

Answer

(a) LPG - Liquefied Petroleum Gas.

(b) CNG - Compressed natural gas.

18. Question

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

Answer

In the gaseous state, the particles move about randomly at high speed. Diffusion takes place because of the movements of particles of matters. The increase in the speed of movement increases the rate of diffusion. Hence, a gas will diffuse faster than a liquid.

19. Question

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

Answer

Diffusion of Copper sulfate into water will takes place at the slower rate Gas in gas diffusion is faster because of the large spaces present between the particles of the gases as compared to solids and liquids. Hence bromine vapour into air will diffuse quicker.

20. Question

State whether the following statement is true or false:

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

Answer

The statement is false.

21. Question

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 behavior of perfume vapours.

Answer

Diffusion is the property of gases which is responsible for this behavior of perfume vapours. In the gaseous state, the particles move about randomly at high speed.

Hence the perfume vapours spread in the entire room.

22. Question

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

Answer

The particles of the aroma of hot cooked food mix with the particles of air spread from the kitchen, reach us and even farther away, in seconds. Due to high speed of particles and large space between them, gases show the property of diffusing very fast into other gases. Hence diffusion is the process which brings smell to us.

23. Question

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

Answer

Diffusion is the property of matter that takes place because of the movement of particles of matters such as liquids and gases.

24. Question

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 in the……State.

Answer

(a) diffusion; Brownian motion

(b) diffusion

(c) states

(d) much more

(e) liquid; gaseous

Short Answer Type Questions-Pg-19

25. Question

State two characteristics of matter demonstrated by:

(a) Diffusion.

(b) Brownian motion.

Answer

(a) **Diffusion** (i) All the matter is made up of tiny particles, such as atoms and molecules.(ii) The particles are moving or they are in motion.

(b) **Brownian motion** (i) All the matter is made up of tiny particles, such as atoms and molecules.

(ii) The particles are moving or they are in motion.

26. Question

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

Answer

Robert Brown suspended extremely small pollen grains in water. It was found that the pollen grains were moving rapidly throughout water in a very irregular way. Water is made up of tiny particles which are moving very fast. The pollen grains move on the surface of water because they

are constantly being hit by the fast moving particles of water. The zigzag movement of the small particles suspended in a liquid (or gas) is called Brownian motion.

27. Question

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?

Answer

- When we place a few crystals of potassium permanganate in a beaker containing water, we get two layers:
- Colourless water at the top and pink colour at the bottom. After a few minutes, a light pink colour spreads and the entire solution turns pink due to diffusion.
- As potassium permanganate is a solid substance, it does not possess so much space.
- Water molecules due to a liquid state, collide with solid particles and intermix due to sufficient space between molecules.

28. Question

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 diffuse into air.

Answer

Air and bromine vapours are made of tiny moving particles. The moving particles of bromine collide with each other and bounce about in all directions, due to which they get mixed uniformly. This is an example of diffusion.

29. Question

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

Answer

When salt is dissolved in water, the particles of salt disappear in water. This happens because particles of salt get adjusted in the spaces between the particles of water. There is no rise in the water level.

30. Question

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.

Answer

Particles of air have large spaces between them. On the other hand, wood has little space between its particles. Also, it is rigid. For this reason, we can easily move our hand in air but to do the same through plank of wood, we need a karate expert.

31. Question

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

Answer

Some time we observe that the marks of chalk on the black board could not be wiped out easily after a long time. This happens because of the diffusion of particles of chalks with the particles of black-board and marks of chalk could not be wiped out.

32. Question

Explain why, the diffusion of a solid in another solid.

Answer

Diffusion takes place with slowest rate in the case of solids. The rate of diffusion is almost negligible in solids. Since the particles of solid have lowest kinetic energy so they do not move. Hence, diffusion is slowest in the case of solid.

33. Question

Whish of the following diffuses fastest and which the slowest?

Solid, Liquid, Gas

Give reasons for your answer.

Answer

Diffusion takes place at the fastest rate in gases. The particles of gas have more kinetic energy due to that they move with high speed. Because of the movement of particles with high speed, gas diffuses most rapid.

34. Question

Explain the following:

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

Answer

When an incense stick is burnt, the incense present in it vaporizes because of heat. The vapours move rapidly in all directions due to the diffusion. The vapour mixes with air and reaches to us. In similar way we sense the good or bad smell from a distance.

35. Question

Name the three states of matter. Give one example of each.

Answer

(a) Solids - Ice, Chalk

(b) Liquids - Cooking oils, Water

(c) Gases - Air, LPG, CNG.

36. Question

State two characteristic properties each of:

(a) A solid

(b) a liquid

(c) a gas

Answer

(a) A Solid- (i) Solids have a definite shape, distinct boundaries and fixed volumes, that is, they have negligible compressibility.

(ii) Solids may break under force but it is difficult to change their shape, so they are rigid.

(b) A Liquid- (i) liquids have no fixed shape but have a fixed volume

(ii) The rate of diffusion of liquids is higher than that of solids.

(c) A Gas-(i) Gases are highly compressible as compared to solids and liquids.

(ii) Due to high speed of particles and large space between them, gases show the property of diffusing very fast into other gases.

37. Question

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

Answer

In gases, the intermolecular attractions are very poor. The particles are loosely packed at random and the voids between particles are very large. As a result, a gas does not have a definite shape or a definite volume. It will assume the shape and the volume of the container in which it is placed.

38. Question

How do solids, liquids and gases differ in shape and volume?

Answer

Solids	Liquids	Gases
Solids have a fixed shape and volume	Liquids have fixed volume but they have no fixed shape	Gases have niether a fixed shape nor a fixed volume

39. Question

Arrange the following substances in increasing order of force of attraction between their particles (keeping the substance having them in imum force of attraction first):

Water, Sugar, Oxygen

Answer

Oxygen(gas), Water(liquid), Sugar(solids).

40. Question

Give two reasons to justify that:

(a) Water is a liquid at room temperature.

(b) An iron almirah is a solid.

Answer

(a) Water is a liquid at room temperature because-

(i) Water has a fixed volume (which does not change on changing its container).

(ii) Water has no fixed shape (it takes the shape of the container in which it is kept).

(b) An iron almirah is a solid because:

(i) It has a fixed shape (which cannot be changed by pressing it with hands).

(ii) It has a fixed volume (which depends on the dimensions according to which it is made).

41. Question

(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.

(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.

Answer

(a) When an incense stick is burnt, the incense present in it vaporizes because of heat. The vapours move rapidly in all directions due to the diffusion. The vapour mixes with air and reaches to us. In similar way we sense the good or bad smell from a distance.

(b) The particles of the aroma of hot cooked food mix with the particles of air spread from the kitchen, reach us and even farther away, in seconds. Due to high speed of particles and large space between them, gases show the property of diffusing very fast into other gases. Hence diffusion is the process which brings smell to brother's room.

42. Question

(a) What does the diffusion of gases tell us about their particles?

(b) Give one example of diffusion of gases in a liquid.

Answer

(a) Diffusion takes place most rapidly in gasses. The particles of gas have more kinetic energy due to that they move with high speed. Because of the movement of particles with high speed gas diffuses most rapidly.

(b) Carbonated drinks are prepared by the diffusion of gas in water(liquid). We notice a hiss sound when the cap of bottle of a carbonated drink is open, the hiss sound comes because of the diffused gas coming out of water. Soda, Soft drinks are the carbonated drinks and prepared mainly because of the diffusion of carbon dioxide in water(liquid).

43. Question

Give reason for the following observation:

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

Answer

The particles of the aroma of hot cooked food mix with the particles of air spread from the kitchen, reach us and even farther away, in seconds. Due to high speed of particles and large space between them, gases show the property of diffusing very fast into other gases. Hence diffusion is the process which brings smell to us and we go close to it.Temperature also increases the kinetic energy of the molecules hence increasing the rate of diffusion as a result of which smell of hot food travels faster and more further as compared to smell of cold food

44. Question

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

Answer

The particles of the aroma of hot cooked food mix with the particles of air spread from the kitchen, reach us and even farther away, in seconds. Due to high speed of particles and large space between them, gases show the property of diffusing very fast into other gases. Hence diffusion is the process which brings smell to us.

45. Question

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

Answer

Diffusion is the property of gases which is responsible for this behavior of perfume vapours. In the gaseous state, the particles move about

randomly at high speed. Hence the perfume vapours can be smelt from a considerable distance.

46. Question

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

Answer

When a crystal of **Copper Sulphate** is placed in a beaker of water, the water slowly turns blue on its own, even without stirring. Both **Copper Sulphate** crystal and water are made up of tiny particles. On dissolving, the particles of Copper Sulphate get into the spaces between the particles of water.

47. Question

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

Answer

The force of attraction between the particles of honey is more than the force of attraction between the particles of water. The particles are strongly bonded in honey than water. Hence honey is more viscous than water.

48. Question

Explain why:

(a) Air is used to inflate tyres.

(b) Steel is used to make railway lines.

Answer

(a) Air is a compressible gas and a light element that can overcome frictional forces. The availability of air everywhere also supports the fact that air is used to inflate tyres.

(b) Steel is used to make railway lines because it is very flexible and has the ability to expand. It is seen that during summers, metals expand. Steel is used because when it expands it does not change its shape. Steel does not get rust which makes it suitable for this purpose.

49. Question

Explain why, diffusion occurs more quickly in a gas than in al iquid.

Answer

The particles of a gas have maximum kinetic energy. They move with high speed in all directions. Gases thus can mix or diffuse very fast as compared to solids and liquids.

Long Answer Type Questions-Pg-20

50. Question

(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?

Answer

(a) The phenomenon of mixing of particles of different substances together is known as diffusion. Diffusion takes place because of the movement of particles (atoms and molecules) of matters. The mixing of different gases in air is a natural process that takes place continuously.

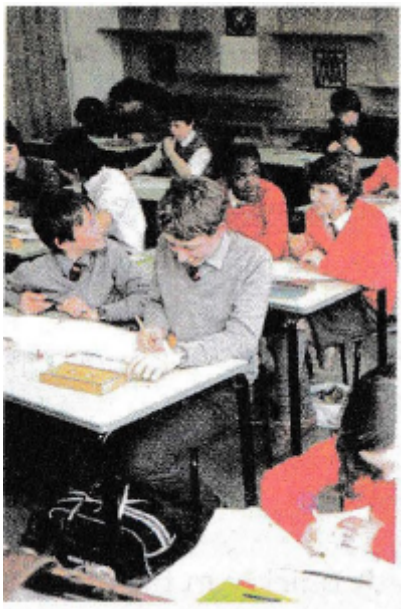
(b) The particles of a gas have maximum kinetic energy. They move with high speed in all directions. Gases thus can mix or diffuse very fast as compared to solids and liquids.

(c) Oxygen and Carbon dioxide are two gases of air which dissolve in water by diffusion. Aquatic animals take dissolved oxygen in water while breathing. Aquatic plants synthesize their food under water because of the dissolved carbon dioxide in water. This process is called respiration.

51. Question

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

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



During class, the students resemble molecules in a solid (because they are very close to one another)

While going from one classroom to another the students resemble molecules in a liquid (because they are a little more farther apart from one another)

And in the playground students resemble molecules in a gas (because they are very, very far apart from one another)

Answer

(a)

S.No.	Solids	Liquids	Gases
1.	Solids have a fixed shape and fixed volume	Liquids have fixed volume but they have no fixed shape	Gases have neither a fixed shape nor a fixed volume
2.	Solids cannot be compressed much	Liquids cannot be compressed much	Gases can be compressed easily
3.	Solids do not fill their container completely	Liquids do not fill their container completely	Gases fill their container completely
4.	Solids do not flow	Liquids generally flow easily	Gases flow easily
5.	For example: Ice, coal, wood, stone, iron, etc.	Water, milk, fruit juice, ink, petrol, etc.	Air, oxygen, hydrogen, nitrogen, steam, etc.

(b) (i) In wood, the force of attraction between the particles is strong. Thus, particles in it are closely packed making it a solid.

(ii) piece or log of wood have an orderly arrangement of the particles due to which wood have a fixed shape and volume. Hence wood is a solid.

52. Question

(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?

Answer

(a) The particles of a gas have maximum kinetic energy. They move with high speed in all directions and can exert pressure on the walls of its container.

(b) Gases neither have a definite shape nor a definite volume. They fill up the container completely.

(c) This is due to the intermolecular space in between the constituent particles is maximum in gases, little less in the liquids and the least in solids. On applying pressure, the gaseous particles come together, where as in liquids and solids, the particles are very close and hence cannot be further brought closer. Hence gases are compressible but not liquids and solids.

53. Question

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

(b) What are the characteristics of matter?

Answer

(a) Matter can be defined as anything that occupies space and has a volume. It possesses mass.

Examples - Air, Water, Soil and plastic.

(b) Characterstics of Particles of Matter

(i) Particles in matter are in a state of continuous motion-

The particles present in matter are not stationary, but have a tendency to acquire motion. In fact they are in a state of continuous motion.

(ii) Particles in matter attract one another-

The particles in matter attract one another. This attraction is inversely proportional to the distance between the particles.

(iii) Particles in matter have spaces between them -

Empty spaces called voids separate the particles from one another. Due to these voids matter is able to disperse into one another bringing about diffusion.

54. Question

(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?

Answer

(a) The zig-zag or random path travelled by the particles of matter is called Brownian motion.

(b) The continous zig zag movement of tiny dust particles suspended in air results from their collision by the fast moving particles of air. This haphazard or random portion of particles is known as Brownian motion.

Multiple Choice Questions (MCQs)-Pg-20

55. Question

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

Answer

When a crystal of potassium permanganate is placed in a beaker of water, the water slowly turns blue on its own, even without stirring. Both potassium permanganate crystal and water are made up of tiny particles. On dissolving, the particles of potassium permanganate get into the spaces between the particles of water. This process is called diffusion.

56. Question

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

C. gases and liquids behave as fluids

D. only liquids are fluids

Answer

(c)

57. Question

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, wind

B. air, sugar, oil

C. oxygen, water, sugar

D. salt, juice, air

Answer

oxygen(gas) < water(liquid) < sugar(solid).

58. Question

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 (ii)

B. (i) and (iv)

C. (ii) and (iii)

D. (ii) and (iv)

Answer

The distance between the molecules of hydrogen gas would increase in two conditions-

(i) Increasing the volume of the container of hydrogen gas.

(ii) Some hydrogen gas leaking out of the container.

59. Question

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

A. Carbon

B. sulphur

C. oxygen

D. phosphorus

Answer

Gases can be termed as fluids.

60. Question

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

Answer

Robert brown studied about the movement of particles in pollen grains and termed it as Brownian motion.

61. Question

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

Answer

Kerosene is a liquid.

62. Question

Which of the following statement is incorrect?

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

Answer

The particles present in matter are not stationary, but have a tendency to acquire motion. In fact they are in a state of continuous motion.

63. Question

When a gas jar full of air is placed upside down on a gas jar full of bromine vapours, the red-brown vapours 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 upwards against gravity

Answer

Bromine is heavier than air.

64. Question

When a gas jar containing colourless air is kept upside down over a gas jar full of brown-coloured bromine vapour, then after sometime, the brown colour of bromine vapour spreads into the upper gas jar making both the gas jars appear 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

Answer

Bromine is a liquid. Hence it is heavier than air.

65. Question

Which one of the following statements is not true?

A. The molecules in a solid vibrate about a fixed position

B. The molecules in a 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

Answer

The particles of liquids are relatively loosely packed. This type of packing leads to a greater mobility of the molecules.

Questions Based on High Order Thinking Skills (HOTS)-Pg-21

66. Question

Look at the diagram on the right side. Jar A contains are d-brown gas whereas Jar B contains a colourless gas. The two gas jars are separated by a glass plate placed between them

(a) What will happen when the glass plate between the two jars is pulled away?

(b) What name is given to the phenomenon which takes place?

(c) Name the brown gas which could be in jar A.

(d) Which is the colorless gas most likely to be present in jar B?

(e) Name one coloured solid and one colourless liquid which can show the same phenomenon.

Answer

(a) when the glass plate is pulled away between the two jars, the brown gas from jar A mix up with colourless gas in jar B. Red-brown gas is seen to slowly diffuse through the colourless gas in jar B. After sometime, Jar B becomes completely red brown in colour.

(b) The mixing of two gases in the above experiment is called Diffusion.

(c) The brown gas present in jar A could be Bromine vapours.

(d) The colourless gas in jar B could be air.

(e) Potassium permanganate (coloured solid) and Water (colourless liquid).

67. Question

Bromine and air take about 15 minutes to diffuse completely but bromine diffuses into a vacuum very rapidly. Why is this so?

Answer

If bromine gas is allowed to enter a gas jar containing a vacuum,

the red-brown colour instantly fills the jar

because there are no air molecules to collide with.

This shows that the bromine molecules are moving very fast. When bromine is added to a gas jar filled with air, the red-brown gas is seen to slowly diffuse through the air.

The many collisions between the bromine molecules

and the air molecules slow down the rate

at which the red-brown bromine gas fills the jar.

68. Question

Bromine particles are almost twice as heavy as chlorine particles. Which gas will diffuse faster; bromine(vapour) or chorine? Explain your answer.

Answer

Since bromine is more massive than chlorine, than it makes sense that chlorine will move faster than bromine. Since chlorine moves faster, it diffuses faster.

69. Question

Why is a liquid (the hydraulic fluid) used to operate the brakes in a car?

Answer

The particles in a liquid (the brake oil) can move freely without being compressed much and hence transmit the pressure applied on brake pedal to the brake drum (on moving wheel) efficiently.

70. Question

Explain why, a small volume of water in a kettle can fill a kitchen with steam.

Answer

When water is heated, it gets converted into vapours. In gaseous state, intermolecular spaces are very large and so it occupies large volume. So, when a small volume of water in kettle is converted to steam, it can fill the kitchen.

71. Question

Explain why, osmosis can be considered to be a special kind of diffusion. Classify the following into

(i) osmosis, and (ii) diffusion:

(a) swelling up of a raisin on keeping in water

(b) spreading of virus on sneezing

(c) earthworm dying on coming in contact with common salt

(d) shrinking of grapes kept in thick sugar syrup

(e) preserving of pickles in salt

(f) spreading of smell of cake being baked in the kitchen

(g) aquatic animals using oxygen dissolved in water during respiration

Answer

In diffusion as well as osmosis, there is movement of particles from a region of higher concentration to a region of lower concentration. Diffusion can take place without having a membrane or through a permeable membrane. But, Osmosis can only take place through a semi-permeable membrane.

(a) Osmosis

(b) Diffusion

(c) Osmosis

(d) Osmosis

(e) Osmosis

(f) Diffusion

(f) Diffusion

72. Question

A student placed a gas jar containing air in the upside down position over a gas jar full of red-brown bromine vapours. He observed that the red brown colour spread upwards into the jar containing air. Based on this observation, the student concluded that it is only the bromine vapour which moves up and diffuses into air in the upper jar, the air from the upper jar does not move down by diffusion into the lower jar containing bromine vapours. Do you agree with this conclusion of the student? Give reason for your answer.

Answer

The conclusion is wrong. Air present in the upper jar also diffuses downwards into bromine vapours in the lower gas jar. But since air is a colourless gas, the student could not notice its presence in lower gas jar.

73. Question

An inflated balloon full of air goes down slowly (becomes smaller and smallers lowly) even though the knot at the mouth of the balloon is air tight. And after a week all the air has escaped from the balloon. Explain how the air particles got out of the balloon.

Answer

Air molecules can slowly diffuse through the surface, or leak through the knot. The fast moving molecules of air trapped in the inflated balloon exert continuous pressure on the thin, stretched rubber sheet of balloon and keep on diffusing out gradually through it.

74. Question

When extremely small particles X derived from the another of a flower were suspended in a liquid Y and observed through a microscope, it was found that the particles X were moving throughout the liquid Y in a very zig zag way. It was also observed that warmer the liquid Y, faster the particles X moved in its surface.

(a) What could particles X be?

(b) What do you think liquid Y is?

(c) What is the zig-zag movement of particles X?

(d) What is causing the zig-zag movement of particles X?

(e) Name the scientist who discovered this phenomenon.

(f) What does this experiment tell us about the nature of liquid Y?

Answer

(a) Pollen grains are the extremely small particles observed under a microscope.

(b) Water, pollen grains are suspended in water.

(c) Brownian motion, it relates to movement of particles discovered by Robert Brown.

(d) The fast moving water molecules are constantly hitting particles X (pollen grains) causing them to move in a zig-zag path.

(e) Robert Brown

(g) The liquid Y is made up of extremely small particles which are constantly moving.

75. Question

When a beam of sunlight enters a room through a window, we can see tiny particles X suspended in a gas (or rather a mixture of gases) Y which are moving rapidly in a very haphazard manner.

(a) What could particles X be?

(b) Name the gas (or mixture of gases) Y.

(c) What is the phenomenon exhibited by particles X known as?

(d) What is causing the movement of particles X?

(e) What conclusion does the existence of this phenomenon give us about the nature of matter?

Answer

(a) Dust particles are moving in a haphazard manner.

(b) Air

(c) Brownian motion, it relates to movement of particles discovered by Robert Brown.

(d) The fast moving air molecules are constantly hitting the tiny dust particles causing them to move rapidly in a very haphazard manner

(f) The gaseous matter 'air' is made up of very tiny particles which are constantly moving.

Very Short Answer Type Questions-Pg-36

1. Question

The boiling point of water is 100°C. Express this in SI units (Kelvinscale).

Answer

BP of water is 100C. In S.I. units it becomes, 273 + 100 = 373K.

2. Question

The Kelvin temperature is 270K. What is the corresponding Celsius scale temperature?

Answer

Kelvin temperature is 270K. Celsius scale temperature is 270 - 273 = -3C.

3. Question

Convert the temperature of 573K to the Celsius scale.

Answer

Kelvin temperature is 573K. Celsius scale temperature is 573 - 273 = 300C.

4. Question

Convert the temperature of 373°C to the Kelvin scale.

Answer

Celsius temperature is 373°C. Kelvin scale temperature is 373 + 273 = 646K.

5. Question

The boiling point of alcohol is 78°C. What is this temperature on Kelvin scale?

Answer

BP of alcohol is 78°C. Kelvin temperature will be 78 + 273 = 351K.

6. Question

The Kelvin scale temperature is 0 K. What is the corresponding Celsius scale temperature?

Answer

Kelvin scale temperature is 0 K. Celsius scale temperature is 0 - 273 = -273°C.

7. Question

Give the usual mane of the following:

Heat required to change the state of a substance without changing the temperature.

Answer

Latent heat does not raise (or increase) the temperature. But latent heat has always to be supplied to change the state of a substance.

8. Question

What is the (a) common unit of temperature, and (b) SI unit of temperature?

Answer

(a) The common unit of measuring temperatures like melting points, boiling points etc., is 'degrees Celsius' which is written in short form as °C.

(b) The SI unit of measuring temperature is Kelvin, which is denoted by the symbol K.

9. Question

Write the relation between Kelvin scale and Celsius scale of temperature.

Answer

The relation between Kelvin scale and Celsius scale of temperature can be written as:

Temp. on Kelvin scale = Temp. on Celsius scale + 273

10. Question

What should be added to a Celsius scale reading so as to obtain the corresponding Kelvin scale reading?

Answer

To convert a temperature on Celsius scale to Kelvin scale, we have to add 273 to the Celsius temperature and to convert a temperature on Kelvin scale to the Celsius scale, and we have to subtract 273 from the Kelvin temperature.

11. Question

What is meant by saying that the latent heat of fusion of ice is 3.34 × 105J/kg?

Answer

The heat which is going into ice but not increasing its temperature, is the energy required to change the state of ice from solid to liquid (water). This is known as the latent heat of fusion of ice (or latent heat of melting of ice). The latent heat of fusion of ice is 3.34 × 105 J/ kg (or 3.34 × 105 j/kg). Hence 3.34 x 10 5 J of heat has to be supplied to change 1 Kg of ice (at its melting point, 0 C) into water at the same temperature of 0C.

12. Question

What is meant by saying that the latent heat of vaporization of water is 22.5×10^5J/kg?

Answer

The latent heat of vaporisation of a water is the quantity of heat in joules required to convert 1 kilogram of the water (at its boiling point) to vapour or gas, without any change in temperature. The latent heat of vaporization of water is 22.5×10^5 joules per kilogram (or 22.5×10^5 j/kg). Hence it means that 22.5 × 10 5 J of heat is required to change 1 Kg of water (at its boiling point, 100°C) into steam at the same temperature of 100°C.

13. Question

Name the temperature at which:

(a) A liquid changes into a gas

(b) A solid changes into a liquid.

Answer

(a) The temperature, at which a liquid boils and changes rapidly into a gas at atmospheric pressure, is called boiling point of the liquid.

(b) The temperature at which a solid substance melts and changes into a liquid at atmospheric pressure, is called melting point of substance.

14. Question

Name one common substance which can be easily changed from one state to another by heating or cooling.

Answer

Water is a common substance which can be easily changed from one state to another by heating or cooling.

15. Question

What is the mane of the process in which:

(a) A solid turns directly into a gas?

(b) A gas turns directly into a solid?

Answer

(a) The changing of a solid directly into vapor (or gas) is called sublimation.

(b) The changing of vapor (or gas) directly into solid is called sublimation.

16. Question

Name one property which is shown by ammonium chloride but not by sodium chloride.

Answer

Ammonium chloride shows property of sublimation whereas sodium chloride cannot show sublimation.

17. Question

What is the name of the process due to which dry ice changes into carbon dioxide gas?

Answer

Sublimation is the process by which dry ice changes into carbondioxide gas.

18. Question

What is the common name of solid carbon dioxide?

Answer

Dry ice is the common name of solid carbon dioxide.

19. Question

Why is solid carbon dioxide known as dry ice?

Answer

Since solid carbon dioxide directly changes into carbon dioxide gas (or sublimes), and does not melt to produce a liquid (like ordinary ice), it is called dry ice.

20. Question

State one condition necessary to liquefy gases (other than applying high pressure).

Answer

When a gas is cooled enough, then its particles lose so much kinetic energy that they slow down, move closer together until they start being attracted to each other, and form a liquid.

21. Question

State whether the following statement is true or false:

Solid carbon dioxide is stored under low pressure.

Answer

It is true that solid carbon dioxide is stored under low pressure. When a slab of solid carbon dioxide is kept exposed to air, then the pressure on it is reduced to normal atmospheric pressure (1 atmosphere), its temperature rises, and its starts changing into carbon dioxide gas.

22. Question

What is the chemical name of dry ice?

Answer

Chemical name of dry ice is Carbon dioxide.

23. Question

Fill in the following blanks with suitable words:

(a) Gases can be liquefied by applying ___ and lowering ___

(b) When steam condenses to form water, heat is ___

(c) Temp on Kelvin scale = Temp on Celsius scale + ___

(d) Scientists say that there are actually five states of matter: Solid, liquid, gas, ___ and ___

(e) The state of matter called ___ makes a fluorescent tube (or neon sign bulb) to glow.

Answer

(a) Pressure; temperature.

(b) Released.

(c) 273

(d) Plasma; Bose-Einstein Condensate (BEC).

(e) Plasma

Short Answer Type Questions-Pg-36

24. Question

What do you understand by the term 'latent heat'? What are the two types of latent heat?

Answer

The heat energy which has to be supplied to change the state of a substance is called its latent heat. The latent heat which we supply is used up in overcoming the forces of attraction between the particles of substance during the change of state. Latent heat does not increase the kinetic energy of the particles of the substance, so the temperature of a substance does not rise during the change of state.

Latent heat is of two types: Latent heat of fusion and Latent heat of vaporization.

25. Question

Why is heat energy needed to melt a solid? What is this heat energy called?

Answer

The heat energy which we supply is used in overcoming the forces of attraction between the particles of substance during the change of state. It does not increase the kinetic energy of the particles of the substance, so the temperature of a substance does not rise during the change of state. This type of heat energy is called Latent heat.

26. Question

Under what conditions heat can be given to a substance without raising its temperature?

Answer

When a change of state of a substance has to take place the heat given would not raise the temperature.

27. Question

Why does the temperature remain constant during the melting of ice even though heat is supplied continuously?

Answer

The latent heat which we supply is used up in overcoming the forces of attraction between the particles of ice during the melting of ice. Latent heat does not increase the kinetic energy of the particles of ice, so the temperature of ice does not rise during the change of state.

28. Question

Why does the temperature remain constant during the boiling of water even though heat is supplied continuously?

Answer

The latent heat which we supply is used up in overcoming the forces of attraction between the particles of water during the boiling of water. Latent heat does not increase the kinetic energy of the particles of water, so the temperature of ice does not rise during the change of state.

29. Question

Explain why, ice at 0°C is more effective in cooling than water at the same temperature.

Answer

At 273K or 0°C the ice will give more cooling than water because it can absorb more heat than water due to its latent heat of fusion.

30. Question

Would you cool a bucket of water more quickly by placing it on ice or by placing ice in it? Give reasons for your answer.

Answer

We would place ice in the water to cool it more quickly because the ice takes its latent heat from the water and hence cools it more effectively. On the other hand, if we keep the water on ice then the latent heat would be taken from the surrounding air hence releasing its coolness to the surrounding and not the water.

31. Question

Why does steam cause more severe burns than boiling water?

Answer

Steam will produce more severe burns than boiling water because steam has more heat energy than water due to its latent heat of vaporisation. Steam and boiling water can exist at varying temperatures but it is only correct to assume here that both are at the same temperature.

32. Question

Which contains more heat,1kg of ice at 0°C or 1 kg of water at 0°C? Give reason for your answer.

Answer

The latent heat of fusion of ice is 3.34 x 10 5 J/Kg. It means that 3.34 x 10 5 joules of heat is required to change 1 Kg of ice at its melting point of 0°C into water at the same temperature (of 0°C). This means that 1 Kg of ice at 0°C has 3.34 x 10 5 joules of less heat than 1 kg of water at the same temperature of 0°C.

33. Question

Which contains more heat, 1 kg of water at 100°C or 1 kg of steam at 100°C? Give reason for your answer.

Answer

1 Kg of steam at 100°C has more heat than water at the same temperature because when water changes into steam, it absorbs latent heat, but when steam condenses to form water, an equal amount of latent heat is given out.

34. Question

Explain why, steam at 100°C is better for heating purposes than boiling water at 100 °C.

Answer

Steam has more energy than boiling water. It possesses the additional latent heat of vaporization. Therefore, steam at 1000 C is better for heating purposes as it steam would give out 22.5 x 10 5 joules per kilogram more heat than boiling water.

35. Question

Which produces more severe burns: boiling water or steam? Why?

Answer

Steam will produce more severe burns than boiling water because steam has more heat energy than water due to its latent heat of vaporisation. Steam and boiling water can exist at varying temperatures but it is only correct to assume here that both are at the same temperature.

36. Question

Why does the temperature of a substance remain constant during the change of state?

Answer

The latent heat which we supply is used up in overcoming the forces of attraction between the particles of substance during the change of state. Latent heat does not increase the kinetic energy of the particles of the substance, so the temperature of a substance does not rise during the change of state.

37. Question

What is the physical state of water:

(a) at 0°C? (b) at 25°C

(c) at 100°C (d) at 250°C

Answer

(a) As 0°C is melting point of ice and freezing point of water, hence at this temperature, the physical state can be ice or water.

(b) In liquid state.

(c) As 100°C is the boiling point of water and condensing temperature of steam, hence physical state at this temperature can be Steam or

water.

(d) In gas state.

38. Question

Explain why, there is no rise in temperature of a substance when it undergoes a change of state though heat is supplied continuously.

Answer

The latent heat which we supply is used up in overcoming the forces of attraction between the particles of substance during the change of state. Latent heat does not increase the kinetic energy of the particles of the substance, so the temperature of a substance does not rise during the change of state.

39. Question

Define 'melting point' of a substance? What is the melting point of ice?

Answer

The temperature at which a solid melts to become a liquid at the atmospheric pressure is called its melting point. The melting point of ice is 273.16 K.

40. Question

Define 'boiling point' of a substance? What is the boiling point of water?

Answer

The temperature at which a liquid starts boiling at the atmospheric pressure is known as its boiling point. The boiling point of water is 373 K.

41. Question

Define the following terms:

(a) Melting (b) Boiling

Answer

(a) Melting- The process of melting is change of solid state into liquid state. It is also called fusion.

(b) Boiling- The process of boiling is change of liquid state into vapour state.

42. Question

Define the following terms:

(a) Condensation (b) Freezing

Answer

(a) Condensation- The process of changing a gas (or vapour) to a liquid by cooling is called condensation. When steam (or water vapour) changes into water on cooling, it is called condensation of steam.

(b) Freezing- The process of changing a liquid into a solid by cooling is called freezing. When water is cooled, it gets converted into a solid called 'ice'. This is called freezing of water. Freezing means solidification.

43. Question

Explain why, naphthalene balls kept in stored clothes in our homes disappear over a period of time.

Answer

This happens because naphthalene balls undergo sublimation. The naphthalene balls keep on forming naphthalene vapours slowly which disappear into the air.

44. Question

Explain briefly, how gases can be liquefied.

Answer

Gases can be liquefied by applying pressure and lowering temperature. When a high pressure is applied to a gas, it gets compressed (into a small volume), and when we also lower its temperature, it gets liquefied. So, we can say that gases can be liquefied (turned into liquids) by compression and cooling.

45. Question

How is ammonia gas liquefied?

Answer

Ammonia gas can be liquefied by applying high pressure and lowering the temperature. When a high pressure is applied to ammonia gas, it gets compressed (into a small volume), and when we also lower its

temperature, it gets liquefied. So, we can say that ammonia gas can be liquefied (turned into liquids) by compression and cooling.

46. Question

How does applying pressure (or compression) help in the liquefaction of a gas?

Answer

Gases can be liquefied by applying pressure and lowering temperature. When a high pressure is applied to a gas, it gets compressed (into a small volume), and when we also lower its temperature, it gets liquefied. So, we can say that gases can be liquefied (turned into liquids) by compression and cooling.

47. Question

How does perspiration or sweating help keep our body cool on a hot day?

Answer

During summer, we perspire more because of the mechanism of our body which keeps us cool. We know that during evaporation, the particles at the surface of the liquid gain energy from the surroundings or body surface and change into vapour. The heat energy equal to the latent heat of vaporization is absorbed from the body leaving the body cool.

48. Question

Why does all the water of the earth not get evaporated during hot summer days?

Answer

All water on earth does not get evaporated on hot summer days because of the high value of latent heat of vaporization of water.

49. Question

If the back of your hand is moistened with alcohol, you will find that it rapidly becomes dry. Why is it that while it is drying, your hand feels cool?

Answer

Liquids like alcohol, petrol and perfume are volatile (which can change into vapours easily). When we apply alcohol to the back of our hand, we find that it dries up quickly and while it is drying, the hands feel cold. This happens due to the fact that to change from liquid to the vapour state, alcohol requires latent heat of vaporization. The alcohol takes this latent heat of vaporization from the hand due to which the hand loses heat and we feel cold.

50. Question

Why does a desert cooler cool better on a hot, dry day?

Answer

The cooling in a desert room cooler is caused by the evaporation of water. The higher temperature on a hot day increases the rate of evaporation of water, and the dryness of air also increases the rate of evaporation of water. And due to this increased rate of evaporation of water, a desert room cooler works better on a hot and dry day.

51. Question

How does the water kept in an earthen pot (matka) become cold during summer?

Answer

During hot summer days, water is usually kept in an earthen pot (called pitcher or matka) to keep it cool. The earthen pot has large number of extremely small pores (or holes) in its walls. Some of the water continuously keeps seeping through these pores to the outside of the pot. This water evaporates (changes into vapor) continuously and takes the latent heat required for vaporization from the earthen pot and the remaining water. In this way, the remaining water loses heat and gets cooled.

52. Question

What type of clothes should we wear in summer? Why?

Answer

During summer, we perspire more because of the mechanism of our body which keeps us cool. We know that during evaporation, the particles at the surface of the liquid gain energy from the surroundings or body surface and change into vapour. The heat energy equal to the latent heat of vaporization is absorbed from the body, leaving the body

cool. Cotton, being a good absorber of water helps in absorbing the sweat and exposing it to the atmosphere for easy evaporation.

53. Question

Why are we able to sip hot tea or milk faster from a saucer rather than from a cup?

Answer

If the hot tea or milk is taken in a cup, then due to the narrow shape of the cup, the surface area of hot tea in the cup is comparatively small. Due to this, the evaporation of hot tea is slow; cooling caused by evaporation is less and hence the hot tea remains appreciably hot for a much longer time. On the other hand, the saucer has a large surface area due to which the tea taken in the saucer evaporates much faster, thus cooling it quickly and making it convenient to sip or drink.

54. Question

Why does our palm feel cold when we put some acetone (or perfume) on it?

Answer

The particles gain energy from your palm or surroundings and evaporate causing the palm to feel cool. The heat energy equal to the latent heat of vaporization is absorbed from the body, leaving the body cool.

55. Question

How will you demonstrate that water vapour is present in air?

Answer

The presence of water vapor in air can be shown by the following experiment:

Let us take some ice-cold water in a tumbler. Soon we will see water droplets on the outer surface of tumbler. The water vapor present in air, on coming in contact with the cold glass of water, loses energy and gets converted to liquid state, which we see as water droplets.

Long Answer Type Questions-Pg-37

56. Question

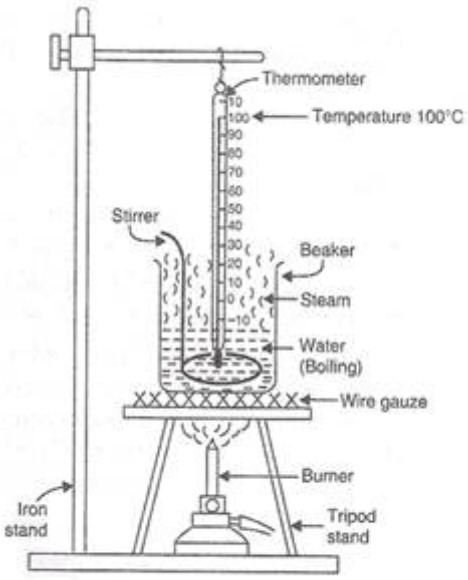
(a) Define the term 'latent heat of fusion' of a solid. How much is the latent heat of fusion of ice?

(b) Draw a labeled diagram of the experimental set-up to study the latent heat of fusion of ice.

Answer

(a) The latent heat of fusion (or melting) of a solid is the quantity of heat in joules required to convert 1 kilogram of the solid (at its melting point) to liquid, without any change in temperature. The latent heat of fusion of ice is 3.34×10^5 joules per kilogram (or 3.34×10^5 j/kg).

(b) Experimental set up to demonstrate the latent heat of fusion-



Boiling of water to form steam
(liquid to gas change)

57. Question

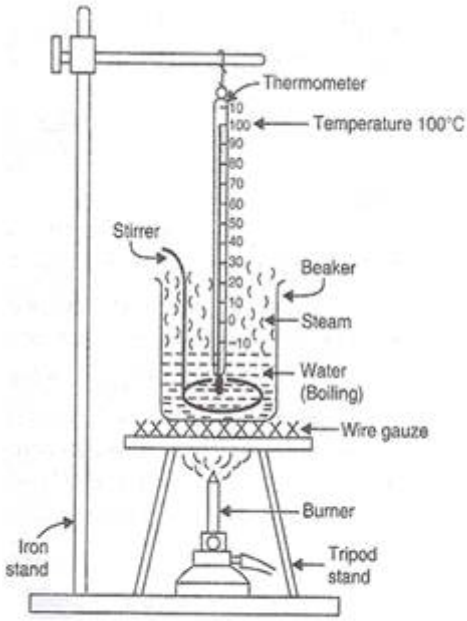
(a) Define the term 'latent heat of vaporization' of liquid. What is the value of the of the latent heat of vaporization of water?

(b) Draw a labeled diagram of the experimental set-up to study the latent heat of vaporization of water.

Answer

(a) The latent heat of vaporisation of a liquid is the quantity of heat in joules required to convert 1 kilogram of the liquid (at its boiling point) to vapour or gas, without any change in temperature. The latent heat of vaporization of water is 22.5×10^5 joules per kilogram (or 22.5×10^5 j/kg).

(b)



Boiling of water to form steam
(liquid to gas change)

58. Question

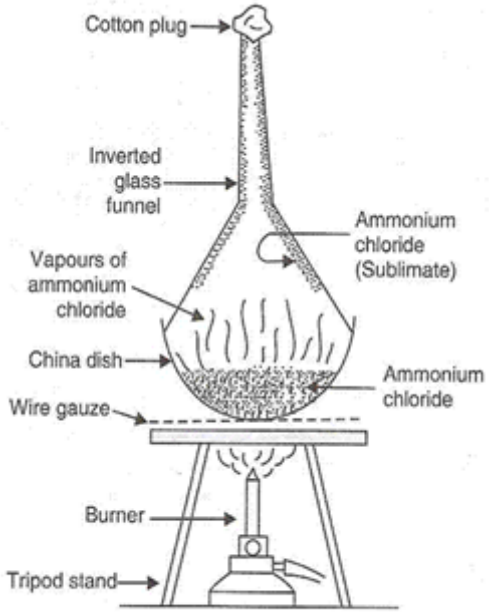
(a) What is sublimation? Name two substances (other than ammonium chloride) which undergo sublimation.

(b) Draw a labeled diagram of the experimental set-up to demonstrate the sublimation of ammonium chloride.

Answer

(a) The changing of a solid directly into vapours on heating and of vapours into solid on cooling, is known as sublimation. The changing of a solid directly into vapor (or gas) is called sublimation. The changing of vapor (or gas) directly into solid is called sublimation. The common substances which undergo sublimation are Iodine, Camphor, Naphthalene and Anthracene.

(b)



Sublimation of ammonium chloride.

59. Question

(a) What are the two ways in which the physical states of matter can be changed?

(b) Draw the 'states of matter triangle' to show the interconversion of states of matter.

(c) How can the evaporation of a liquid be made faster?

Answer

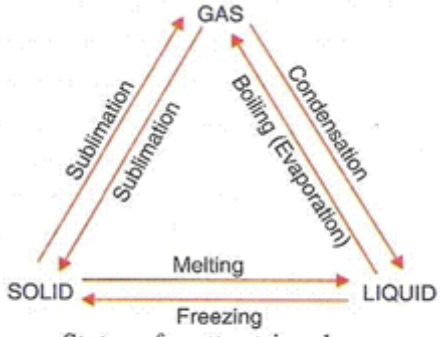
(a) We can change the physical state of matter in two ways:

(i) By changing the temperature (heating or cooling).

(ii) By changing the pressure (increasing or decreasing the pressure).

These two factors decide whether a given substance would be in a solid, liquid or gaseous state.

(b)



States of matter triangle.
It shows the interconversion of the three states of matter.

(c) The rate of evaporation of a liquid can be made faster by

(i) Increasing the temperature

(ii) Increasing the surface area of the liquid

(iii) Lowering humidity and

(iv) increasing wind speed.

60. Question

(a) What is evaporation? State the various factors which affect evaporation.

(d) Why does evaporation cool a liquid?

Answer

(a) The process of a liquid changing into vapour (or gas) even its boiling point is called **evaporation.**

Factors affecting Evaporation:

1). Temperature

2). Surface area

3). Humidity

4). Wind speed

(c) The cooling caused by evaporation is based on the fact that when a liquid evaporates, it takes the latent heat of vaporization from surroundings which it touches. By losing heat, the surroundings get cooled.

Multiple Choice Questions (MCQs)-Pg-38

61. Question

Which of the following are also considered to be the states of matter?

(i) Plasma (ii) Platelets

(iii) BFC (iv) BHC

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (ii) and (iv)

Answer

Plasma is the state which consists of super energetic and super excited particles. These particles are in the form of ionised gases.

62. Question

One of the following does not undergo sublimation. This one is:

A. iodine

B. sodium chloride

C. ammonium chloride

D. camphor

Answer

The common substances which undergo sublimation are: Ammonium chloride, Iodine, Camphor. When these solids are heated, their particles move so quickly that they separate completely to form vapor (or gas).

63. Question

Which of the following process/processes release heat?

(i) condensation

(ii) vaporization

(iii) freezing

(iv) melting

A. only (i)

B. only (iv)

C. (i) and (iii)

D. (ii) and (iv)

Answer

Condensation and freezing release heat.

64. Question

If the temperature of an object is 268K, it will be equivalent to:

A. -5°C

B. +5°C

C. 368°C

D. -25°C

Answer

Temp. on Celsius scale = Temp. on Kelvin scale - 273

268 – 273 = -5 °C

65. Question

The boiling point of ethane is, -88°C. This temperature will be equivalent to:

A. 285K

B. 288K

C. 185K

D. 361K

Answer

BP of ethane is -88°C, -88 + 273 = 185K.

66. Question

When heat is constantly supplied by a gas burner with small flame to melt ice, then the temperature of ice during melting:

A. Increases very slowly

B. Does not increase at all

C. First remains constant and then increases

D. Increases to form liquid water

Answer

Latent heat does not increase the kinetic energy of the particles of the substance, so the temperature of a substance does not rise during the change of state.

67. Question

When water at 0°C freezes to form ice at the same temperature of 0°C, then it:

A. Absorbs some heat

B. Releases some heat

C. Neither absorbs nor releases heat

D. Absorbs exactly $3.34 \times 10^5 J/kg$ of heat

Answer

water at 0°C freezes to form ice and release heat.

68. Question

When heat is constantly supplied by a burner to boiling water, then the temperature of water during vaporisation:

A. Rises very slowly

B. Rises rapidly until steam is produced

C. First rises and then becomes constant

D. Does not rise at all

Answer

D

69. Question

The latent heat of fusion of ice is:

A. $3.34 \times 10^5 J/kg$

B. $22.5 \times 10^5 J/kg$

C. $3.34 \times 10^4 J/kg$

D. $22.5 \times 10^4 J/kg$

Answer

The latent heat of fusion of ice is 3.34×10^5 joules per kilogram (or 3.34×10^5 j/kg).

70. Question

The latent heat of vaporization of water is:

A. 22.5×10^6 J/kg

B. 3.34×10^6 J/kg

C. 22.5×10^4 J/kg

D. 3.34×10^5 J/kg

Answer

The latent heat of vaporization of water is 22.5×10^5 joules per kilogram (or 22.5×10^5 j/kg).

71. Question

Which one of the following set of phenomena would increase on raising the temperature?

A. diffusion, evaporation, compression of gases

B. evaporation, compression of gases, solubility

C. evaporation, diffusion, expansion of gases

D. evaporation, solubility, diffusion, compression of gases.

Answer

Temperature will raise in the following phenomenon-evaporation, diffusion and expansion of gases.

72. Question

Which of the following represent the suitable condition for the liquefaction of gases?

A. Low temperature, low pressure

B. High temperature, low pressure

C. Low temperature, high pressure

D. High temperature, high pressure

Answer

Gases can be liquefied by applying pressure and lowering temperature.

73. Question

During summer days, water kept in an earthen pot(pitcher) becomes cool because of the phenomenon of:

A. diffusion

B. transpiration

C. osmosis

D. evaporation

Answer

Evaporation is the phenomenon which is responsible for cooling of pitcher.

74. Question

On converting 25°C, 38°C and 66°C to Kelvin scale, the correct sequence of temperatures will be:

A. 298K, 311K and 339K

B. 298K, 300K and 338K

C. 273K, 278K and 543K

D. 298K, 310K and 338K

Answer

(a)

75. Question

The conversion of a solid into vapours without passing through the liquid state is called:

A. vaporization

B. fusion

C. sublimation

D. freezing

Answer

sublimation refers to conversion of a solid into vapours without passing through the liquid state.

76. Question

The evaporation of water increases under the following conditions:

A. Increase in temperature, decrease in surface area

B. Increase in surface area, decrease in temperature

C. Increase in surface area, rise in temperature

D. Increase in temperature, increase in surface area, addition of common salt

Answer

evaporation of water increases with increase in surface area and rise in temperature.

77. Question

On converting 308K, 329K and 391K to Celsius scale, the correct sequence of temperatures will be:

A. 33°C, 56°C and 118°C

B. 35°C, 56°C and 119°C

C. 35°C, 56°C and 118°C

D. 56°C, 119°C and 35°C

Answer

(c)

78. Question

Which of the following energy is absorbed during the change of state of a substance?

A. Specific heat

B. latent heat

C. heat capacity

D. heat of solution

Answer

latent heat is absorbed during the change of state of a substance.

79. Question

Which of the following factors are responsible for the change in state of solid carbon dioxide when kept exposed to air?

(i) increase in pressure

(ii) increase in temperature

(iii) decrease in pressure

(iv) decrease in temperature

A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iii)

D. (ii) and (iv)

Answer

Increase in temperature and decrease in pressure are responsible for the change in state of solid carbon dioxide when kept exposed to air.

80. Question

During respiration, glucose and oxygen enter our body cells and waste products carbon dioxide and water leave the body cells by the process of:

A. effusion

B. osmosis

C. diffusion

D. plasmolysis

Answer

diffusion.

Questions Based on High Order Thinking Skills (HOTS)-Pg-39

81. Question

There are four substances W, X, Y and Z. The substance W is a dark violet solid having diatomic molecules. A solution of W in alcohol is used as a common antiseptic C. The substance X is a white solid which is usually recovered from sea water on a large scale. The substance Y is a white solid which is insoluble in water and used in the form of small balls for the safe storage of woollen clothes. The substance Z is a yet another white solid which is used in making commonly used dry cells.

(a) Name (i) W (ii) X (iii) Y and (iv) Z.

(b) Out of W, X, Y and Z, which substance/substances can undergo sublimation?

(c) Which substances organic in nature?

(d) What is the name of substance C?

(e) Which substance belongs to the halogen family?

Answer

(a)

(i) Iodine

(ii) Sodium chloride (Common salt)

(iii) Naphthalene

(iv) Ammonium chloride

(b) W(iodine), Y(naphthalene) and Z(ammonium chloride)

(c) Y(naphthalene)

(d) Tinctureiodine

(e) W(iodine)

82. Question

The substance X normally exists in a physical state which can flow easily but does not fill its vessel completely. It also turns anhydrous copper sulphate blue. When substance X is cooled excessively, it changes into a substance Y which has a fixed shape as well as a fixed volume. If, however, the substance X is heated strongly, it changes into a substance Z which has neither a fixed shape nor a fixed volume.

(a) Name the substances (i) X (ii) Y and (iii) Z.

(b) What is the process of conversion of X into Y known as?

(c) At which temperature X gets converted into Y?

(d) What is the process of conversion of X into Z known as?

(e) At which temperature X gets converted into Z?

Answer

(a) (i) Water

(ii) Ice

(iii) Steam

(b) Freezing

(c) 0°C

(d) Boiling (or Vaporisation)

(e) 100°C

83. Question

The scientists now say that there are actually five states of matter A, B, C, D and E. The state A has a fixed volume but no fixed shape. The state B can be compressed very easily by applying pressure and state C has a fixed shape as well as a fixed volume. The state D is mixture of free electrons and ions whereas state E is named after an Indian scientist and a famous physicist.

(a) Name the physical states (i) A (ii) B (iii) C (iv) D, and (v) E.

(b) Name one substance belonging to state C which can directly change into vapours on heating. What is this process known as?

(c) Name one substance which normally belongs to state B but whose solid form changes directly into gaseous state.

(d) Name the most common substance belonging to state A.

(e) Which state of matter makes the sum and other stars to glow.

Answer

(a) (i) Liquid

(ii) Gas

(iii) Solid

(iv) Plasma

(v) Bose-Einstein Condensate(BEC)

(b) Ammonium chloride; Sublimation

(c) Carbon dioxide

(d) Water

(e) D(plasma)

84. Question

When water is cooled to a temperature x, it gets converted into ice at temperature x by a process called P. And when ice at temperature x is warmed, it gets reconverted into water at the same temperature x in a process called Q.

(a) What is the value of temperature x in Kelvin?

(b) What is the process P known as?

(c) What is the name of energy released during process P?

(d) What is the process Q known as?

(e) What is the name of energy absorbed during process Q?

Answer

(a) 273K

(b) Freezing

(c) Latent heat of freezing

(d) Melting

(e) Latent Heat of fusion

85. Question

When water is heated to a temperature x, it gets converted into steam at temperature x by a process called R. And when steam at temperature x is cooled, it gets reconverted in to water at the same temperature x by a process called S.

(a) How much is the value of x in Kelvin?

(b) What is the process R called?

(c) What is the name of the energy absorbed during the process R?

(d) What is process S known as?

(e) What is the name of energy released during the process S known as?

Answer

(a) 373K

(b) Boiling (or Vaporisation)

(c) Latent heat of vaporisation

(d) Condensation

(e) Latent heat of condensation