

Chemistry, Class 8

A. Name the following.

1. An octahedral, crystalline allotrope of carbon

Diamond

2. An allotrope of carbon used for cutting of glass

Diamond

3. An allotrope of carbon used as an electrode

Graphite

4. An allotrope of carbon used in gas masks for industrial and military purposes

Charcoal

5. The zone found at the bottom of a candle flame

Blue

6. The coolest zone of a candle flame

Innermost zone

7. An element with atomic number 6 and mass number 12

Carbon

8. A hollow cage-like crystalline form of carbon

Fullerene

9. An amorphous form of carbon used as a deodourizing agent

Charcoal

10. The coolest zone of a flame

Innermost zone

B. Choose the correct option.

1. This crystalline form of carbon is used as a superconductor.



- a. Diamond b. Graphite c. Fullerene d. Charcoal

c. Fullerene

2. It is prepared by burning hydrocarbons in the limited supply of air.

- a. Lamp black b. Bone charcoal c. Gas carbon d. Coke

a. Lamp black

3. It is a dark black solid obtained as a residue during the destructive distillation of coal.

- a. Coke b. Charcoal c. Lamp black d. Gas carbon

a. Coke

4. It is a solid primary fuel.

- a. Petrol b. Coke c. Biogas d. Wood

d. Wood

5. It is a poisonous gas.

- a. Hydrogen b. Carbon dioxide c. Carbon monoxide d. Nitrogen

c. Carbon monoxide

6. It is used for making crucibles for laboratories.

- a. Diamond b. Graphite c. Fullerene d. Coal

b. Graphite

7. Charcoal, coal, and coke are which forms of carbon?

- a. Amorphous b. Crystalline c. Element d. Mixture

a. Amorphous

8. Wood charcoal obtained after the destructive distillation of wood is used as a _____ for domestic purposes.

- a. deodorant b. fuel c. decolourant d. cutter

b. fuel

9. This gas is formed in marshy areas by the decomposition of vegetable organic matter

- a. Methane b. Ethane c. Butane d. Propane

a. Methane



10. The following gas is produced by the action of bacteria on animal and plant wastes with insufficient supply of air.

- a. Methane b. CNG c. LPG d. Biogas

d. Biogas

C. Write T for True and F for False. Correct the False statements.

1. The different physical forms of an element are known as allotropic forms.

T

2. Diamond can be found in the form of a hollow sphere, known as buckyballs.

F. Fullerene can be found in the form of a hollow sphere, known as buckyballs.

3. Peat is hard, dense black, and contains about 92% to 98% carbon.

F. Anthracite is hard, dense black, and contains about 92% to 98% carbon.

4. Gas carbon is used in the manufacturing of electrodes.

T

5. Petroleum is also referred to as "black gold".

T

6. Anthracite is used as a deodorizing agent for absorbing foul smells.

F. Charcoal is used as a deodorizing agent for absorbing foul smells.

7. There are three varieties of coal.

T

8. Lignite has the least amount of carbon amongst all coal varieties.

T

9. Anaerobic bacteria slowly decompose the animal and plant wastes into complex organic compounds and form biogas.

T

10. Petroleum is a dark-coloured, foul-smelling liquid, which is also referred to as 'black gold'.

T.

11. Petrol is used as a common household fuel for cooking food and lighting lanterns.

F. Kerosene is used as a common household fuel for cooking food and lighting lanterns.



12. The reaction between sodium bicarbonate and sulphuric acid produces carbon dioxide that is used in a soda acid fire extinguisher.

T.

D. Choose the correct option to fill in the blank.

1. Zinc oxide is reduced to _____ (zinc/oxygen) with the help of carbon.

zinc

2. Diamond and _____ (coal/graphite) are crystalline forms of carbon.

graphite

3. _____ (Diamond/Graphite) is the hardest form of carbon.

Diamond

4. _____ (Coal/Graphite) is used in nuclear reactors as a moderator.

Graphite

5. _____ (Charcoal/Coal) is used as a decolourizing agent for absorbing colours.

Charcoal

6. Vaseline, grease, and wax are the forms of _____ (paraffin/LPG).

paraffin

7. Oxygen is a _____ (combustible/non-combustible) substance.

non-combustible

8. The _____ (blue/outermost) zone is the hottest zone of a flame.

outermost

9. _____ (Carbon dioxide/Carbon monoxide) is a colourless, odourless, and highly poisonous gas.

Carbon monoxide

10. Carbon monoxide acts as a good _____ (oxidizing/reducing) agent.

reducing

11. Carbon reacts with _____ (oxygen/hydrogen) to form carbon dioxide or carbon monoxide gas with the release of energy.

oxygen

12. The different physical forms of an element are known as _____ (allotropic/crystalline) forms.



allotropic

13. _____ (Crystalline/Amorphous) forms have definite geometrical forms, sharp edges, and plane surfaces.

Crystalline

14. In _____ (diamond/graphite), each carbon atom is linked with four other carbon atoms in a tetrahedral shape.

diamond

15. In _____ (graphite/fullerene), each carbon atom is linked with three other carbon atoms to form a trigonal shape structure.

graphite**E. Circle the odd one.**

1. Diamond, Graphite, Fullerene, Charcoal (Hint: Crystalline forms of carbon; circle the one which is not a crystalline form of carbon.)

Charcoal

2. Coal, Coke, Lamp black, Diamond (Hint: Amorphous forms of carbon)

Diamond

3. Charcoal, Kerosene, Diesel, Gasoline (Hint: Products of the fractional distillation of petroleum)

Charcoal

4. Glass, Paper, Stone, Iron (Hint: Non-combustible substances)

Paper

5. Carbon monoxide, Carbon dioxide, Gas carbon, Methane (Hint: Gases)

Gas carbon

6. Limestone, Starch, Washing soda, Baking soda (Hint: Inorganic forms of carbon)

Starch

7. Peat, Lignite, Charcoal, Anthracite (Hint: Varieties of coal)

Charcoal.

8. Wood, Natural gas, Petroleum, Kerosene (Hint: Primary fuels)

Kerosene

F. Give two examples of the following.

1. Primary or natural fuels

Petroleum, Wood

2. Amorphous forms of carbon

Coke, Charcoal

3. Crystalline forms of carbon

Diamond, Fullerene

4. Secondary or derived fuels

Biogas, Kerosene

G. Give reasons for the following.

1. Diamond and graphite are crystalline forms of carbon.

Diamond and graphite are crystalline forms of carbon because they have regular shape and size. They have definite geometrical forms, sharp edges, and plane surfaces (these forms are referred to as crystals..)

2. Graphite is used as the pencil lead.

Graphite is used as pencil lead as it is soft, flaky, and greyish-black.

3. Charcoal is used as an adsorbent to absorb gases and colours.

As charcoal is porous and has large surface area with less volume, so it is used as an adsorbent to absorb gases and colours.

4. Sand and water are used for extinguishing fire.

Sand and water are used for extinguishing fire because both are non-combustible substances and can cut off the supply of air or oxygen.

5. Soda-acid and foam-based fire extinguishers are not safe to extinguish electrical fires.

Soda-acid and foam-based fire extinguishers contain water. As water conducts electricity, these fire extinguishers are not safe to extinguish electrical fires.

6. Petrol and kerosene are secondary fuels.

Petrol and kerosene are secondary fuels as they are derived from the natural fuel, petroleum, which is a primary fuel.

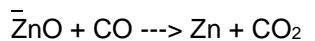
7. Fullerene is the crystalline form of carbon.

Fullerene is crystalline form of carbon as it has a fixed structure, is anisotropic in nature, and has sharp melting and boiling point.



8. Carbon monoxide acts as a reducing agent.

Carbon monoxide is reducing agent as it absorbs oxygen and forms carbon dioxide. For example,



Carbon monoxide reduces zinc oxide to zinc and itself gets oxidized to carbon dioxide.

9. Carbon monoxide is a poisonous gas.

Carbon monoxide has more affinity for haemoglobin than oxygen. When inhaled, carbon monoxide combines with haemoglobin to form a stable complex called carboxyhaemoglobin, and reduces the oxygen level in blood. Headache, nausea, and fatigue are the signs of the presence of carbon monoxide in blood in a little amount. Large contents of carbon monoxide may lead to suffocation followed by brain damage and then finally death. Hence carbon monoxide is a poisonous gas.

H. Explain the following terms.

1. Allotropy:

Allotropy is the existence of a chemical element in different physical forms. All these physical forms have same chemical properties.

2. Fuel:

A substance that produces large amount of heat and light energy on burning is known as fuel.

3. Ignition temperature:

The temperature at which a fuel begins to burn is known as ignition temperature.

4. Calorific value:

The amount of heat liberated when one gram of a fuel is burnt in a sufficient supply of oxygen is called the calorific value of that fuel.

5. Combustion:

It is a slow chemical process during which the substance burns in air to liberate heat and light.

6. Coalification

Coalification: The slow process of conversion of dead vegetation into coal is called coalification.

7. Combustion

Combustion: Combustion is the slow chemical process during which a substance burns in air to liberate heat and light energy.

8. Fire

Fire: Fire is a rapid chemical reaction of a combustible material combines with oxygen releasing heat, light, and



smoke.

9. Flame

Flame: The part of the fire where burning of gases or vapour takes place with the production of heat and light.

10. Destructive distillation

Destructive distillation: The process of heating organic substances strongly in the absence of air is called destructive distillation.

I. Distinguish between the following.

1. Crystalline and amorphous forms of carbon

Crystalline form	Amorphous form
They have regular shape and size.	They do not have regular shape and size.
They have definite geometrical forms, sharp edges and plane surfaces (these forms are referred as crystals).	They do not have definite geometrical forms, plane surface, and sharp edges.
They are anisotropic, which means that they exhibit different properties, such as refractive index, in different directions (planes and angles).	These are isotropic, which means that they exhibit the same properties in all the directions (planes and angles).
They have fixed melting and boiling points.	They do not have fixed melting and boiling points.
The melting and boiling temperatures are high.	The melting and boiling temperatures are low.
Diamond, graphite, and fullerene are crystalline forms of carbon.	Coal, charcoal, and coke are amorphous forms of carbon.

2. Diamond and graphite



Diamond	Graphite
In diamond, each carbon atom is linked with four other carbon atoms in a tetrahedral shape. This forms the basic unit of the crystal structure of diamond. This basic unit repeats and extends in all directions to form an octahedral shape.	In diamond, each carbon atom is linked with four other carbon atoms in a tetrahedral shape. This forms the basic unit of the crystal structure of diamond. This basic unit repeats and extends in all directions to form an octahedral shape.
It is rare in occurrence.	It is common in occurrence.
It is colourless.	It is greyish-black in colour.
It is the hardest form of carbon.	It is soft and flaky.
Its density is 3.5 g/cm^3 .	Its density varies from 2.09 to 2.3 g/cm^3 .
It is a bad conductor of heat and electricity.	It is a good conductor of heat and electricity.
It is used as a precious gem in jewellery, cutting glass, for drilling rocks, etc.	It is used for making electrodes, crucibles, as moderator in nuclear reactor, as lubricant, lead of pencil etc.

3. Combustion and respiration

Combustion	Respiration
Oxygen is used to burn the fuel.	Oxygen is used in burning the food.
It is a fast oxidation process.	It is a slow oxidation process.
It is a man-made process.	It is a natural process.
It takes place at a high temperature.	It takes place at a low temperature.
A large amount of heat and light is produced.	A little amount of energy is produced.
It is initiated.	It is spontaneous.
It takes place on non-living things.	It takes place in living thing.

4. Lamp black and charcoal

Lamp black	Charcoal
Lamp black (or carbon black or soot) is a black fine powder. It is prepared by burning hydrocarbons such as kerosene, oil, wax, petrol, or naphthalene in the limited supply of air.	Charcoal is a black, soft, and porous solid. When organic substances such as wood, bone, or sugar are heated strongly in the absence of air in a closed container, then charcoal is formed.
Lamp black is used as a pigment in the manufacturing of shoe polishes, black paints, and colours. It is used in the manufacturing of printing cartridges.	It is used in gas masks for industrial and military purposes, and as a decolourizing agent for absorbing colours. Charcoal is also used as an adsorbent in household water filters. It is used as a deodorizing agent for absorbing foul smells.

5. Coke and charcoal

Coke	Charcoal
Coke is a dark black solid obtained as a residue during the destructive distillation of coal.	Charcoal is a black, soft, and porous solid. When organic substances such as wood, bone, or sugar are heated strongly in the absence of air in a closed container, then charcoal is formed.
It is used for house hold and industrial fuel as it does not produce smoke on burning. It acts as good reducing agent. It is used in the manufacturing of fuel gases like water gas, producer gas and carbon monoxide.	Coke is used as a household fuel and an industrial fuel as it does not produce smoke on burning. It acts as a good reducing agent. It is used in the manufacturing of gaseous fuels such as water gas and producer gas.

6. Primary and secondary fuel



Primary fuel	Secondary fuel
Fuels that occur naturally are known as primary or natural fuels.	Fuels that are derived from natural fuels are known as secondary or derived fuels.
For example, wood and coal are solid primary fuels. Petroleum is a liquid primary fuel. Natural gas is a gaseous primary fuel.	For example, coke and lamp black are solid secondary fuels. Petrol and kerosene are liquid secondary fuels. Biogas and water gas (a mixture of carbon monoxide and hydrogen) are gaseous secondary fuels.

7. Methane and biogas

Methane	Biogas
It is the simplest hydrocarbon with formula CH_4 .	It is a mixture of natural hydrocarbons, mainly methane and ethane.
It is formed in marshy areas by the decomposition of organic matter.	It is produced by bacterial action on animal and plant waste in limited supply of air.

8. Peat and anthracite

Peat	Anthracite
It is formed in the first stage of coal formation.	It is the purest variety of coal.
It is light brown in colour and contains 50-60% carbon.	It is hard, dense black, and contains 92-98% carbon.

9. Fullerene and diamond



Fullerene	Diamond
A molecule entirely composed of carbon in the form of a hollow, cage-like structure is called fullerene. The number of carbon atoms that make up a fullerene can vary from 30 to 900. Fullerene can be found in the form of a hollow sphere, known as buckyballs. It can also be cylindrical, known as carbon nanotubes.	In diamond, each carbon atom is linked with four other carbon atoms in a tetrahedral shape. This forms the basic unit of the crystal structure of diamond. This basic unit repeats and extends in all directions to form an octahedral shape.
Fullerene is soluble in many solvents.	Diamond is insoluble in any solvent.

10. Liquefied petroleum gas and kerosene

Liquefied petroleum gas	Kerosene
It is a colourless, odourless gas containing ethane, propane, and butane.	It is a transparent liquid containing hydrocarbons made up of 10 to 12 carbon atoms
LPG is used as a domestic fuel for cooking food.	Kerosene is used as a common household fuel for cooking food and lighting lanterns

J. Short answer questions.

1. Name any three inorganic compounds that contain carbon.

Carbon dioxide, carbon monoxide, and sodium carbonate are three inorganic compounds that contain carbon.

2. Name any three organic compounds that contain carbon.

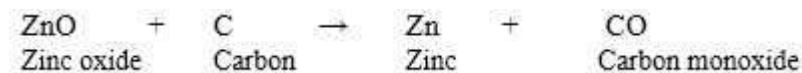
Methane, ethane, and methyl alcohol are three organic compounds that contain carbon.

3. Write down the chemical properties of carbon.

Carbon has the following chemical properties:

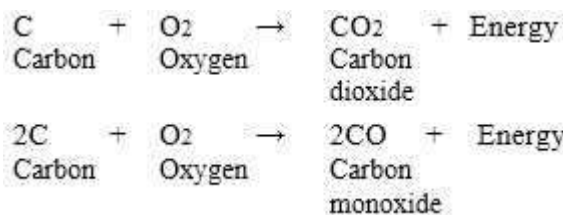
• Carbon has a very good affinity for oxygen. Hence, carbon is used to reduce compounds containing oxygen.

Carbon can reduce metal oxides to metals.



In this reaction, zinc oxide is reduced to zinc with the help of carbon. Also, carbon is oxidized to carbon monoxide.

• Carbon reacts with oxygen to form carbon dioxide or carbon monoxide gas with the release of energy.



4. Give any two examples of each crystalline and amorphous forms of carbon.

Diamond and graphite are crystalline forms of carbon. Coal and charcoal are amorphous forms of carbon.

5. Give any two physical properties of diamond and graphite.

Diamond is the purest form of carbon. It is also the hardest substance known on earth. Its crystals are octahedral in structure. Graphite is soft and flaky. Its crystals form a hexagonal, layered network.

6. Name the different varieties of coal.

Peat, lignite, bituminous, and anthracite are the four varieties of coal.

7. Name the main products formed by the destructive distillation of wood.

The products formed by the destructive distillation of wood are wood charcoal, carbon dioxide, carbon monoxide, methane, and hydrogen gas.

8. Give any two features of a good fuel.

Two features of a good fuel are:

- It should have a low ignition temperature and a high calorific value.
- It should burn completely and should not leave residue after burning.

9. Why are fossil fuels also called non-renewable resources?

Fossil fuels are called non-renewable resources because they cannot be regenerated and take millions of years to be formed.

10. Name any four products formed by the fractional distillation of petroleum.

Petroleum on fractional distillation produces various products such as fuel oil, diesel, kerosene, gasoline, petroleum gas, and residue. The residue on further distillation gives asphalt, paraffin wax, and lubricating oil.

11. Why is carbon monoxide known as the silent killer?

Carbon monoxide is a colourless, odourless, and highly poisonous gas. It is known as the silent killer as its presence cannot be noticed till the harmful effects are experienced. Carbon monoxide has more affinity for haemoglobin than oxygen. When inhaled carbon monoxide combines with haemoglobin to form a stable complex called carboxyhaemoglobin, and reduces the oxygen level in blood. Large contents of carbon monoxide in blood



may lead to suffocation followed by brain damage and then finally death.

12. With help of a chemical equation, prove that carbon monoxide acts as a reducing agent.



In this reaction, zinc oxide is reduced to zinc with the help of carbon. Also, carbon is oxidized to carbon monoxide.

13. What is Kerosene? Mention one of its uses.

Kerosene is a transparent liquid containing hydrocarbons that are made up of 10 to 12 carbon atoms (C₁₀H₂₂ to C₁₂H₂₆). Kerosene is used as a common household fuel for cooking food and lighting lanterns.

14. What is LPG?

LPG is liquefied petroleum gas, which is a colourless and odourless gas containing butane (C₄H₁₀), propane (C₃H₈), and ethane (C₂H₆). LPG is used as a domestic fuel for cooking food.

15. What is a fuel?

A substance that produces a large amount of heat and light energy on burning is known as a fuel. For example, petroleum and biogas are fuels.

16. Give any two features of a good fuel.

A good fuel has the following features:

- It should be cheap and readily available.
- It should have a low ignition temperature and high calorific value.

17. Name any two organic and inorganic compounds of carbon.

Starch and sucrose are organic compounds of carbon. Carbon monoxide and carbon dioxide are inorganic compounds of carbon.

18. What is paraffin wax? Give its use.

Paraffin wax is a mixture of hydrocarbons that are made up of 20 to 30 carbon atoms (C₂₀H₄₂ to C₃₀H₆₂). Vaseline, grease, and wax are the forms of paraffins.

- Vaseline is used for making face creams and ointments.
- Grease is used as a lubricant.
- Wax is used for making candles and wax paper.

19. What are the steps that are necessary to control fire?

To control fire:

- decrease the temperature of the combustible substance below its ignition temperature and
- cut off the supply of air or oxygen.

20. Name the device used to extinguish fires caused by oil and electricity. How does it work?



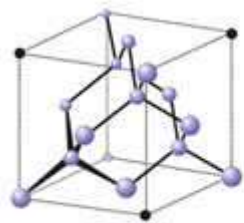
In liquid carbon dioxide fire extinguishers, liquid carbon dioxide is stored in a cylinder under pressure. As soon as the liquid carbon dioxide comes out of the extinguisher, the temperature decreases and the carbon dioxide changes into the white dry powder of solid ice. This cuts off the supply of oxygen and controls the fire. This type of fire extinguishers are used for extinguishing fires caused by oil and electricity.

21. What is the calorific value of a fuel?

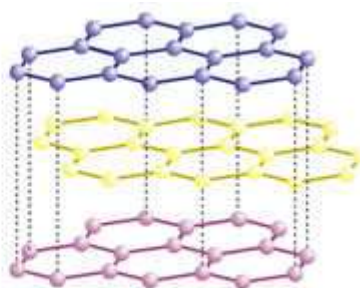
The amount of heat liberated when a gram of a fuel is burnt in a sufficient supply of oxygen is called the calorific value of that fuel. The SI unit of calorific value of fuel is joule per kilogram (J/Kg).

K. Long answer questions.

1. Draw the structures of diamond and graphite.



Diagrammatic representation of a very small part of a diamond crystal (the purple dots represent carbon atoms)



Diagrammatic representation of a very small part of graphite structure

2. Discuss the formation of coal. Explain the four varieties of coal.

Coal is a black, hard solid. It is formed by the process of carbonization in which wood or decayed vegetable matter is converted into coal under high pressure, high temperature, and in absence of air in millions of years' time. The following are the four varieties of coal.

- Peat: This is formed in the first stage of coal formation. Peat is light brown in colour and contains about 50 to 60% carbon.
- Lignite: This is formed in the second stage of coal formation. Lignite is light brown in colour and contains about 60 to 65% carbon, but it is harder than peat.
- Bituminous: This is formed in the third stage of coal formation which is black in colour and contains about 70 to 90 %Carbon. The bituminous coal is further classified into high, medium, and low percentage coal. This coal is also known as household coal.
- Anthracite: This is the purest variety of coal. It is hard and dense black and contains 92 to 98% carbon. It takes time to ignite but once ignited it burns for a long time and gives out a lot of energy.

3. What is biogas? How is it produced?

Biogas is a gaseous and an eco-friendly fuel. It contains methane and ethane as hydrocarbons. Biogas is produced by the action of bacteria on animal and plant wastes with insufficient supply of air. In this process, animal dung and plant waste are mixed with water and allowed to ferment in the absence of air for a day or two. The anaerobic bacteria slowly decompose the waste into complex organic compounds and form biogas. The residue formed during this process is used as manure as it contains all the necessary nutrients for the plant growth.

4. Discuss any three products that are formed by the fractional distillation of petroleum.



a. Paraffin wax is a mixture of hydrocarbons that are made up of 20 to 30 carbon atoms (C₂₀H₄₂ to C₃₀H₆₂). Vaseline, grease, and wax are the forms of paraffins.

- Vaseline is used for making face creams and ointments.
- Grease is used as lubricant.
- Wax is used in making candles and wax paper.

b. Kerosene is a transparent liquid containing hydrocarbons that are made up of 10 to 12 carbon atoms (C₁₀H₂₂ to C₁₂H₂₆). It is used as common household fuel for cooking food and lighting lanterns.

c. Liquefied petroleum gas (LPG) or petroleum gas is colourless and odourless gas containing butane (C₄H₁₀), propane (C₃H₈) and ethane (C₂H₆). It is stored in steel cylinders and is used as domestic fuel for cooking food. It has very high calorific value and very low ignition temperature.

5. What is combustion? What happens during combustion? Name the types of combustions along with one example of each.

Combustion is a slow chemical process during which a substance burns in air to liberate heat and light. During combustion, the burning substance changes into its oxide form with the release of heat, sound, and light energy.

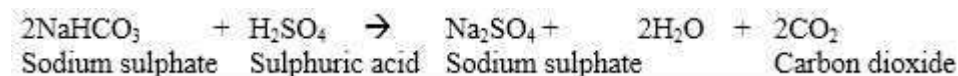
There are four types of combustion:

1. Rapid or fast combustion, e.g., burning of a matchstick
2. Spontaneous combustion, e.g., burning of hay
3. Slow combustion, e.g., burning of wood
4. Explosion, e.g., burning of cracker

6. What are fire extinguishers? Discuss the working of the soda-acid fire extinguisher.

Fire extinguishers are the devices that are used to put off accidental fires. In these devices, carbon dioxide is produced in different forms to extinguish fire.

Soda acid fire extinguisher: It is the most common domestic fire extinguisher. This device consists of a steel cylinder filled with sodium bicarbonate solution. In the upper part of the container, a small bottle of concentrated sulphuric acid is placed. The reaction between sodium bicarbonate and sulphuric acid produces carbon dioxide which comes out from the nozzle with great force when the knob is pressed. This helps to extinguish the fire produced by wood and paper.

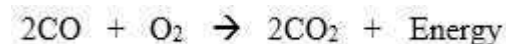


7. With the help of a diagram, explain the four zones of a candle flame.

A flame is a part of fire where the burning of gases or vapour takes place with the production of heat and light.

A candle flame has four zones- blue, innermost, middle, and outermost zone.

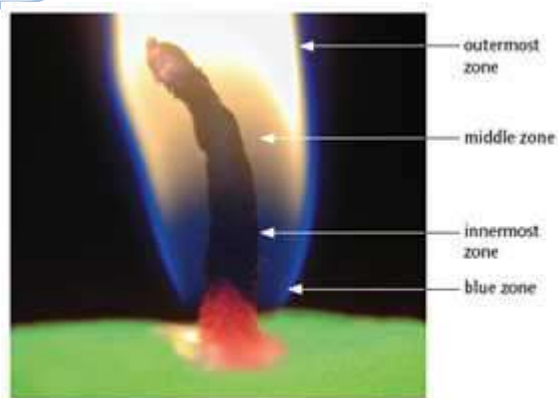
a. **Blue zone:** It is found at the bottom of the flame and is blue in colour due to the burning of carbon monoxide.



b. **Innermost zone:** It is the zone of non-combustion as it lacks oxygen. It is the coolest zone of the flame and does not emit light. Hence it is completely dark.

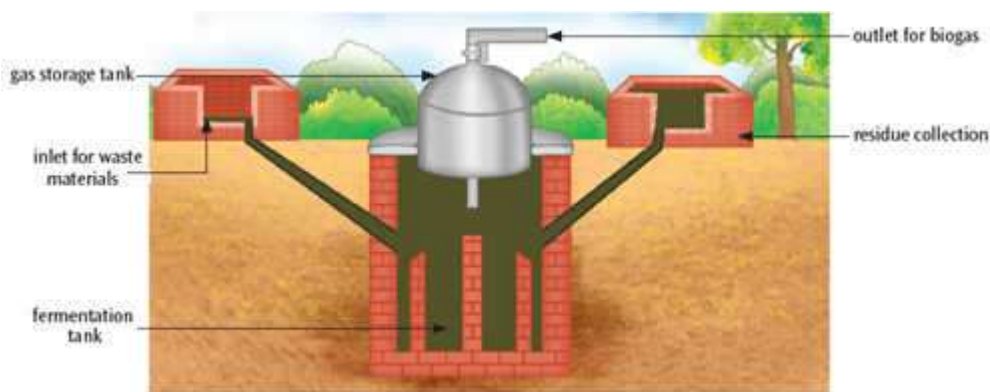
c. **Middle zone:** It is the zone of partial combustion as wax particles in this zone burn incompletely to form carbon particles. Hence it gives soot and smoke. It is the largest zone of the flame. It is yellow in colour.

d. **Outermost zone:** It is the zone of complete combustion as it has enough oxygen to burn wax particles completely. This zone has the highest temperature of 1800°C. It is the hottest zone of the flame. This zone is thin and blue in colour.



Zones of a candle flame

8. Draw a labelled diagram of a biogas plant. Write a short note on the formation of biogas.



Diagrammatic representation of a biogas plant

Biogas is produced by the action of bacteria on animal and plant wastes with insufficient supply of air. In this process, animal dung and plant waste are mixed with water and allowed to ferment in the absence of air for a day or two. The anaerobic bacteria slowly decompose the waste into complex organic compounds and form biogas. The residue formed during this process is used as manure as it contains all the necessary nutrients for the plant growth.

9. Explain the various parts of a flame.

A candle flame has four zones – blue, innermost, middle and outermost zone.

Blue zone: It is found at the bottom of the flame and is blue in colour due to the burning of carbon monoxide.



Innermost zone: It is the zone of non-combustion as it lacks oxygen. It is the coolest part and does not emit light.

Hence it is completely dark.

Middle zone: It is the zone of partial combustion. It is the largest zone of the flame. It is yellow in colour. The wax particles in this zone emit light and burn incompletely to form carbon particles. Hence it gives soot and smoke.

Outermost zone: It is the zone of complete combustion as it has enough oxygen to burn wax particles completely. It is thin and blue in colour. This zone is the zone with highest temperature of 1800°C.

10. Discuss the uses of coal.

The uses of coal are listed below.

- Coal is used as a fuel for industry and domestic purposes.
- It is used to prepare coke, coal gas, and coal tar.
- It is the source for organic compounds such as benzene and naphthalene.
- It is used in the manufacturing of synthetic coal, perfumes, drugs, textile, and fertilizers.

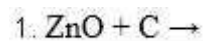
11. What are the different types of fuels? Describe them.

Fuels are classified into primary or natural fuels and secondary or derived fuels. These two types of fuels are further classified into solid, liquid, and gaseous fuels depending upon the physical state of the fuel.

Primary or natural fuels: Fuels that occur naturally are known as primary or natural fuels. These fuels are further classified into solid, liquid, and gaseous fuels. For example, wood and coal are solid primary fuels. Petroleum is a liquid primary fuel. Natural gas is a gaseous primary fuel.

Secondary or derived fuels: Fuels that are derived from natural fuels are known as secondary or derived fuels. These fuels are further classified into solid, liquid, and gaseous fuels. For example, coke and lamp black are solid secondary fuels. Petrol and kerosene are liquid secondary fuels. Biogas and water gas (a mixture of carbon monoxide and hydrogen) are gaseous secondary fuels.

L. Complete and balance the equations given below.



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