Lakhmir Singh Science Class 8 Solutions For Chapter 6 Combustion and Flame

1. Define the ignition temperature of a substance.

Answer

The lowest temperature at which a combustible substance catches fire when heated in the air is called its ignition temperature of a substance.

2. Which of the two has a lower ignition temperature: petrol or kerosene?

Answer

Petrol has a lower ignition temperature.

3. Name the most common fire extinguisher.

Answer

The most common fire extinguisher is water.

4. Which is the best fire extinguisher for fires involving electrical equipment and inflammable materials like petrol?

Answer

The best fire extinguisher for fires involving electrical equipment and inflammable materials like petrol is carbon dioxide.

5. Name one substance which undergoes spontaneous combustion (or burns in air at room temperature).

Answer

White phosphorous undergoes spontaneous combustion (or burns in air at room temperature).

6. Name the unit in which the calorific value is expressed.

Answer

Calorific value is expressed in energy per unit mass of the substance. Example KJ/Kg

7. Which of the following fuels has the lowest calorific value?

Diesel, Methane, Coal, CNG, Petrol

Answer

Coal has the lowest calorific value.

8. Which of the following fuels has the highest calorific value?

Diesel, Methane, CNG, Coal, Petrol

Answer

CNG and Methane have the highest calorific value.

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9. Name the term which is used to express the efficiency of a fuel.

Answer

Calorific value is used to express the efficiency of a fuel.

10. Name one solid, one liquid and one gas which burn by producing a flame.

Answer

Solid: Molten wax

Liquid: Kerosene

Gas: Liquified Petroleum Gas

11. Which of the following does not produces a flame on burning?

Camphor, Charcoal, Kerosene

Answer

Charcoal does not produce flame on burning.

12. Name one fuel which burns without producing a flame.

Answer

Charcoal burns without producing flame.

13. How many zones are there in a flame?

Answer

There are three zones in a flame. Namely, innermost, middle and outer zone.

14. Which zone of a candle flame is the hottest?

Answer

The outermost zone of the candle is the hottest.

15. In a candle flame, what is the colour of: (a) innermost zone (b) middle zone and (c) outer zone?

Answer

(a) Dark or black

(b) Yellow

(c) Blue

16. Name any harmful product released by the burning of fuels.

Answer

Carbon monoxide is one of the most harmful products released by the burning of fuels.

17. Name the very poisonous gas produced by the incomplete combustion of fuels.

Answer

Incomplete combustion of fuels produces poisonous gas called carbon monoxide.

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18. Name the fuel which is gradually replacing petrol and diesel in automobiles.

Answer

CNG is gradually replacing petrol and diesel in automobiles.

19. Name two substance having low ignition temperature and two having high ignition temperatures.

Answer

Substances having low ignition temperature: LPG and Petrol

Substances having high ignition temperature: Coal and wood

20. Fill in the blanks with suitable words

(a) A fuel must be heated to its_____ before it starts burning.

(b)The most common supporter of combustion around us is _____

(c)Fire produced by burning oil cannot be controlled by_____

(d)A liquid fuel used in homes is_____

(e)The amount of heat evolved when 1kg of a fuel is burnt completely is called its_____

(f)The substance which vaporize during, give_____

(g)Burning of wood and coal causes_____ of air.

Answer

(a) A fuel must be heated to its ignition temperature before it starts burning.

(b)The most common supporter of combustion around us is air.

(c)Fire produced by burning oil cannot be controlled by water.

(d)A liquid fuel used in homes is kerosene.

(e)The amount of heat evolved when 1kg of a fuel is burnt completely is called its calorific value.

(f)The substance which vaporizes during, give flames.

(g)Burning of wood and coal causes pollution of air.

Short Answer Type Questions

21. (a) What are fuels? Name any two common fuel.

(b) State any four characteristics of an ideal fuel (or good fuel).

Answer

(a) Any substance which upon combustion produces a usable amount of energy is known as fuel. For example, fossil fuels, biogas, nuclear energy etc.

(b) Characteristics of an ideal fuel (or good fuel) are:

- Fuel is easily available and cheaper
- Burns easily in the air at a moderate rate

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- Releases a large amount of energy
- No harmful substances must be emitted from fuel
- Eco friendly

22. (a) Define the calorific value of a fuel.

(b) "The calorific value of LPG is 55000KJ/kg". What does it mean?

Answer

(a) The amount of heat energy produced on complete combustion of 1 kg of a fuel is called its calorific value. The calorific value of a fuel is expressed in a unit called kilojoule per kg (kJ/kg).

(b) The calorific value of LPG is 55000KJ/kg means 1 kilogram of LPG is burned completely and 55000KJ/kg of heat energy is produced.

23. Can you burn a piece of wood by bringing a lighted matchstick near it? Explain.

Answer

No we cannot burn a piece of wood by bringing a lighted matchstick near it. When a lighted matchstick is brought near a piece of wood it does not start burning because the ignition temperature of wood is higher than a piece of paper. A matchstick can light a tiny splinter of wood but not a big log of wood. A burning matchstick can produce sufficient heat to reach the ignition temperature of the splinter of wood therefore a matchstick can light a splinter of wood directly.

24. Why do you have to use paper or kerosene oil to start fire in wood or coal?

Answer

The ignition temperature of wood or coal is higher and it requires more heat to start burning. This is the cause that to start a fire in wood or coal paper or kerosene oil is used as the ignition temperature of paper or kerosene oil is lower than that of wood or coal.

25. What is meant by rapid combustion? Give one example of rapid combustion.

Answer

When a substance burns rapidly, with the aid of an external source and produces heat within a short period of time is called rapid combustion. Example: Burning of LPG

26. What is meant by spontaneous combustion? Give one example of spontaneous combustion.

Answer

The types of combustion in which material suddenly bursts into flames, without the application of any apparent cause is called spontaneous combustion. Eg., Burning of phosphorus.

27. What is meant by explosive combustion (or explosion)? Give one example of explosive combustion (or explosion).

Answer

A sudden reaction takes place with the release of heat and light and the evolution of a large amount of gas takes place it is called an explosion. Eg., firecrackers.

28. How will you show that air is necessary for combustion?

Answer

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Air helps in combustion. Air contains about twenty-one percent of oxygen and this oxygen present in the air helps in the process of combustion. Without oxygen, combustion will not take place.

29. Can the process of rusting be called combustion? Give a reason for your answer.

Answer

No, because rusting is an exothermic process as heat is liberated during rusting. On the other hand, combustion is a chemical process in which a substance reacts with oxygen to release energy in the form of heat or light.

30. Why are fires produced by burning oil not extinguished by pouring water?

Answer

Water is heavier than oil. So when it is poured on an oil fire, it sinks to the bottom where it evaporates due to heat of the fire and thus expands rapidly due to which it may push and splatter fire in all directions. Fire due to oil can be extinguished by using dry chemical fire extinguisher.

31. Explain why, fire caused by electricity should not be extinguished by pouring water.

Answer

The most common fire extinguisher is water. But waterworks only when things like wood and paper are on fire. If electrical equipment is on fire, water may conduct electricity and harm those trying to douse the fire. For fires involving electrical equipment and inflammable materials like petrol, carbon dioxide (CO_2) is the best extinguisher. CO_2, being heavier than oxygen, covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled. The added advantage of CO_2 is that in most cases it does not harm the electrical equipment.

32. How is the fire caused by electricity extinguished?

Answer

The fire caused by electricity extinguished by petrol or by carbon dioxide. For fires involving electrical equipment and inflammable materials like petrol, carbon dioxide (CO_2) is the best extinguisher. CO_2, being heavier than oxygen, covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled. The added advantage of CO_2 is that in most cases it does not harm the electrical equipment.

33. How is the fire produced by burning oil (or petrol) extinguished?

Answer

The fires caused by the burning of inflammable materials like oil or petrol are also extinguished by using carbon dioxide fire extinguishers. Carbon dioxide used for extinguishing fire can be stored as a liquid at high pressure in cylinders.

34. A drum full of kerosene catches fire. What is the simplest way to put off this fire?

Answer

A small fire like a drum of kerosene on fire can be extinguished by throwing sand or soil over it. When sand is thrown over burning kerosene oil, the sand covers it like a blanket. The sand cuts off the air supply to the burning kerosene oil due to which the fire gets extinguished.

35. What is the first thing you should do if a fire caused by burning wood or paper?

Answer

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Water extinguishes heat by cooling down the burning substance such as wood and paper. When water is thrown on these substances, it gets cooled below its ignition temperature and also stops burning.

36. (a) What does a Fire Brigade do when it arrives at a place where a building is on fire.

(b) Describe one method of putting out a fire caused by burning wood or paper.

Answer

(a) When fire brigade arrives to the rescue, the fireman throws a strong stream of water on the building on fire, the burning material gets cooled down to below their ignition temperature and the fire is extinguished.

(b) Water extinguishes heat by cooling down the burning substance such as wood and paper. When water is thrown on these substances, it gets cooled below its ignition temperature and also stops burning.

37. Explain why, we are advised not to sleep in a room having closed doors and windows, with a coal fire burning inside.

Answer

Due to the burning of coal, the available oxygen gets depleted and it leads to incomplete burning of coal. Incomplete combustion of coal gives carbon monoxide gas. It is a very poisonous gas. It is dangerous to burn coal in a closed room. The carbon monoxide gas produced can kill persons sleeping in that closed room

38. (a) What is a flame? What type of substance, on burning, gives a flame?

(b) What is the difference between the burning of a candle and the burning of a fuel like coal?

Answer

(a) A hot glowing body of ignited gas that is generated by something on fire is called Flame. Kerosene oil and molten wax are substances that give a flame while burning.

(b) Substances which vapourize during burning produce flames, such as wax in the candle, Kerosene.

Substances which do not vapourize during burning do not produce flames. Example – coal and charcoal.

39. How does pouring water extinguished a fire?

Answer

Water lowers the temperature of the burning substance. When the temperature goes down below the ignition temperature of the burning substance the fire extinguishes. The water here acts as a cooling agent.

40. Explain how carbon dioxide is able to control fires?

Answer

Carbon dioxide is heavier than oxygen, covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled. The added advantage of CO_2 is that in most cases it does not harm the electrical equipment.

41. If you see a person whose clothes are on fire, how will you extinguish the fire? Give a reason for your answer.

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Answer

The person whose clothes are on fire should be immediately covered with a blanket. When the burning clothes of a person are covered with a blanket, the supply of air to the burning clothes is cut off, and hence the burning stops.

42. Give two examples each of: (a) solid fuels (b) liquid fuels (c) gaseous fuels

Answer

Solid Fuels

1. Coal- Is used to produce electricity through steam engines.
2. Coke- Coke is used as a reducing agent in the extraction of metals.

Liquid Fuels

1. Petrol: Used to run small automobiles like bike and car.
2. Kerosene- Used for domestic heating purposes and jet engines as fuel.

Gaseous fuel

1. CNG – CNG is used to run automobiles.
2. Natural Gas – It is used for industrial purpose

43. Name the various zones of a candle flame. Which zone(or part) of a candle flame is the least hot(or coldest)?

Answer

A candle flame consists of three different zones. Each zone has different temperatures. Every zone has a different color and this will help us in understanding the temperatures of each zone.

1. The first zone is called the Outer zone
2. The second zone is called the Middle zone
3. The third zone is called as Inner zone

The least hot region of the flame is present innermost. This inner zone is black in color due to the presence of unburnt wax vapors.

44. Why does a goldsmith blow air into the kerosene lamp flame with a blow-pipe?

Answer

A goldsmith blows air into the kerosene lamp flame with a blow-pipe to ensure that the combustion of fuel takes place and the temperature of the flame increases. The goldsmith mainly uses a non-luminous flame which is termed to be the outermost part of the flame. This part of the flame is used because the outermost flame undergoes complete combustion and is considered as the hottest part of the flame.

45. In which zone of a candle flame: (a) partial combustion of fuel takes place, and (b) complete combustion of fuel takes place?

Answer

(a) Middle zone

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(b) Outer zone

46. Explain how the use of CNG in automobiles has reduced pollution in cities.

Answer

CNG played an important role in reducing pollution among automobiles for the following reasons

- CNG is comparatively a cleaner fuel.
- The CNG can be an alternative for diesel, petrol and propane/LPG.
- It usually contains a few undesirable gases than the other fuels mentioned above.
- The combustion of fuels like petroleum causes many unburnt carbon particles along with carbon monoxide which leads to respiratory diseases.

47. What are the disadvantage of burning wood as fuel?

Answer

The burning of fuels like wood as fuel releases unburnt carbon particles in the air which causes respiratory problems. Incomplete combustion of fuels produces a very poisonous gas called carbon monoxide.

48. Give reason for the following: LPG is a better domestic fuel than wood.

Answer

LPG is a better domestic fuel than wood due to the following reasons:

- It doesn’t release smoke and other pollutants
- It is a cleaner fuel
- The fuel efficiency of LPG is more than that of wood.
- The calorific value of LPG is 55000 kJ/kg

49. Explain why, when a burning candle is covered with an inverted gas jar, the candle gets extinguished after some time.

Answer

A burning candle is covered with an inverted gas jar, the candle gets extinguished after some time because it does not get sufficient oxygen. Oxygen is one of the necessary conditions for combustion.

50. It is difficult to burn a heap of green leaves but dry leaves catch fire easily. Explain.

Answer

A heap of green leaves contains a lot of moisture in it, hence its ignition temperature is high. Therefore it does not catch fire easily. But dry leaves have no moisture content in it, hence its ignition temperature is low. Therefore it catches fire easily.

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