



INDIAN SCHOOL AL WADI AL KABIR



CLASS: VIII	DEPARTMENT: SCIENCE 2024 - 2025	DATE: 22-04-2024
WORKSHEET NO.: 1 WITH ANSWERS	TOPIC: COMBUSTION AND FLAME	NOTE: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

I. OBJECTIVE-TYPE QUESTIONS:

1. A student burns three substances P, Q, and R, and records the observation in a table. Which option correctly categorises the given substances?

Substance	Observation
P	Burns quickly producing heat and light
Q	Burns at room temperature on its own
R	Burns with evolution of heat, light and sound

- a) All the substances are undergoing rapid combustion.
b) Substance P is undergoing rapid combustion; substance Q is undergoing spontaneous combustion whereas substance R is undergoing explosion combustion.
c) Substances P and Q are undergoing spontaneous combustion whereas substance R is undergoing rapid combustion.
d) Substance R is undergoing rapid combustion; substance Q is undergoing spontaneous combustion whereas substance P is undergoing explosion combustion.
2. The table shows the ignition temperature of four substances.

Substance	Ignition Temperature (°C)
A	80
B	39
C	110
D	25

Which substance will catch fire easily when heated at 50°C?

- a) A and C
b) B and D
c) C and D
d) A and D
3. The hottest zone of the flame is:

- a) innermost zone
 - b) middle zone
 - c) outermost zone**
 - d) none of these
4. While shaping gold into ornaments, which part of the flame is directly used by goldsmiths?
- a) Non-luminous**
 - b) Luminous
 - c) Innermost zone
 - d) Whole flame
5. The amount of heat energy produced on complete combustion of 1 kg of a fuel is called:
- a) calorific value**
 - b) significant value
 - c) heat value
 - d) internal energy
6. The burning of LPG is an example of:
- a) rapid combustion**
 - b) spontaneous combustion
 - c) slow combustion
 - d) explosion
7. The substances which give heat and light after combustion are called:
- a) flame
 - b) fuel**
 - c) combustion
 - d) none of these

For the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below

- i) Both A and R are true and R is the correct explanation of the assertion.**
- ii) Both A and R are true but R is not the correct explanation of the assertion.**
- iii) A is true but R is false.**
- iv) A is false but R is true**

8. **Assertion:** Substances that burn in the air are called combustible substances.

Reason: Different substances catch fire at different temperatures.

ii) Both A and R are true but R is not the correct explanation of the assertion.

9. **Assertion:** Water can be used to extinguish a fire caused by an electric short circuit.

Reason: Water is the most common fire extinguisher.

iv) A is false but R is true

10. **Assertion:** A non-luminous flame is accompanied by heat but very little light.

Reason: A blue flame is produced due to incomplete combustion.

iii) A is true but R is false.

11. **Assertion:** Magnesium and charcoal are combustible substances.

Reason: A substance that burns in air and produces heat and light upon burning is called combustible substance.

i) Both A and R are true and R is the correct explanation of the assertion.

II. VERY SHORT ANSWER QUESTIONS (2M):

1. a) Explain the term calorific value. [Hint: The amount of heat energy produced by the complete combustion of 1 kilogram of a fuel is known as its calorific value.]
b) How is a calorific value measured? [Hint: Calorific value is measured in kilojoule per kilogram (kJ/kg)]
2. a) Why do you have to use paper or kerosene oil to ignite a fire in wood or coal? [Hint: The ignition temperature of paper and kerosene oil is low. When paper or kerosene oil catches fire it causes the wood or coal to attain its ignition temperature so that they also catch fire.]
b) When the clothes of a person catch fire, the person is covered with a blanket to extinguish the fire. Explain why? [Hint: Blanket cuts the oxygen supply]
3. a) What do you mean by ignition temperature?
[Hint: The lowest temperature at which a substance catches fire is called its ignition temperature.]
b) You are provided with three watch glasses containing milk, petrol, and water respectively. If a burning candle is brought near these materials, which one will catch fire instantly, Why? [HINT: The watch glass containing petrol catches fire instantly as its ignition temperature is low. Petrol is an inflammable substance.]

4. a) State the importance of a fire extinguisher.

[Hint: A fire extinguisher cuts off the supply of air and also brings down the temperature of the fuel thereby helping in extinguishing the fire]

b) Why carbon dioxide fire extinguisher is considered an excellent fire extinguisher?

[Hint: Carbon dioxide being heavier than oxygen forms a blanket and cuts off the oxygen supply, it brings down the temperature of the fuel, and it does not harm the electrical equipment, It can be stored at high pressure as a liquid in cylinders and when released from cylinders it expands enormously in volume and cools down.)

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. a) What is a flame? [Hint: A flame is a region where the combustion of gaseous substances takes place]

b) Which substances produce a flame? [Hint: Substance which vapourises during burning gives out the flame.]

c) Kerosene oil produces flame whereas coal does not produce a flame. Comment on the statement. [Hint: Kerosene oil - Vapourises, Coal - Does not vapourise]

2. a) Why do forest fires occur during hot summers?

[Hint: During hot summers, the temperature is high, the air has less water vapour, and there is lots of dry vegetation in the forest. All these conditions are favorable for a fire, started by friction between trees, becoming a major forest fire.]

b) State the difference between rapid, spontaneous combustion and explosion.

[Hint: **Rapid combustion**- The type of combustion in which a large amount of heat and light are produced in a short time is called rapid combustion. Rapid Combustion requires external heat energy to start. This reaction results in enormous amounts of light and heat energy.

Spontaneous combustion- Type of combustion in which a material suddenly bursts into flames, without the application of any apparent cause. Less amount of heat and light energy is released]

Explosion [Hint: The sudden reaction occurring with the evolution of large amounts of gases heat, light, and sound. A large amount of gas formed in the reaction is liberated.

Eg. when a cracker ignited]

3. a) Mandar was heating oil to fry potato chips. The vessel with oil all of a sudden caught fire.

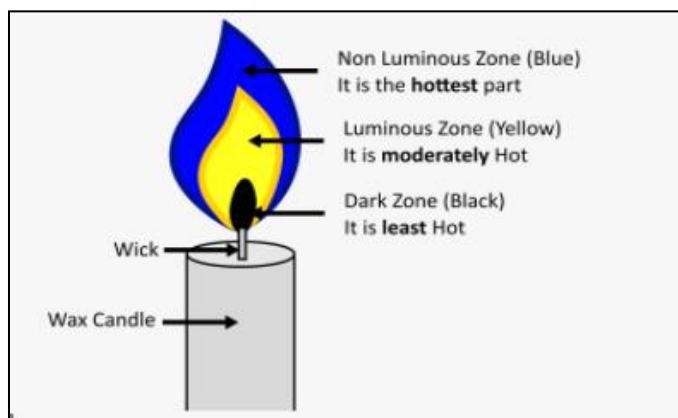
He poured water to extinguish the fire. Do you think this activity was suitable? Why?

[Hint: Pouring water to extinguish fire caused due to oil is not correct. Oil is lighter than water, hence it floats on water. To cut off the supply of air, a lid can be placed on the pan.]

- b) The calorific values of petrol and CNG are 45,000 and 50,000kJ/kg respectively. If you have a vehicle that can run on both petrol as well as CNG, which will you prefer and why?

[Hint: The calorific value of CNG is higher than that of petrol. Produces a larger amount of heat energy than petrol. It produces the least air pollutants.]

4. a) Draw a neat labelled diagram showing the different zones of a candle flame.



- b) Introduce a glass plate into the luminous zone of the steady candle flame and hold it for a few seconds, then remove it. What did you observe on the glass plate?

[Hint: Blackish ring, due to the deposition of unburnt carbon particles]

5. a) What is global warming?

[Hint: Global warming is the rise in temperature of the atmosphere of the earth.]

- b) What are the effects of global warming?

[Hint: It results, in the melting of polar glaciers, which leads to a rise in the sea level, causing floods in the coastal areas. Low-lying coastal areas may even be permanently submerged under water, unseasonal rains, etc.]

IV. LONG ANSWER TYPE QUESTIONS (5 M):

1. a) What is fuel? [Hint: The substance that undergoes combustion is said to be combustible. It is also called fuel.]
- b) Why is food called fuel for our body? [Hint: Food is called fuel for our body because in our body food is broken down by reaction with oxygen and heat is produced.]
- c) What are the characteristics of a good fuel? [Hint: It should have a high calorific value, Moderate ignition temperature, Moderate rate of combustion, Cheap and easily

available, Safe to handle, store, and easy to transport, and Should not cause pollution on burning]

2. a) Name the outermost zone of a candle flame. What colour is it? Why?

[Hint: Non-luminous zone, blue, complete combustion takes place due to availability of oxygen]

b) Why is the moderately hot zone yellow in colour? [Hint: Unburnt carbon particles glow]

c) Why is the zone that is closest to the wick black? [Hint: Due to accumulation of wax vapours as it is an area of no combustion]

d) State the conditions necessary for combustion to take place. [Hint: Substance must be combustible, medium like oxygen should be available, and a substance must attain its ignition temperature]

3. a) Give Reason-Water is not used to control fires involving electrical equipment.

[Hint: Water is a good conductor of electricity. If added to an electrical fire, the water would just spread the electricity further. The person dousing the fire might get an electric shock]

b) A matchstick catches fire on rubbing against a rough surface. Why?

[Hint: By rubbing a matchstick against a rough surface (friction), it attains its ignition temperature and thus catches fire.]

c) Why is sodium kept immersed in kerosene?

[Hint: Sodium has very low ignition temperature, i.e., it catches fire on coming in contact with air and moisture, hence it is kept in kerosene.]

d) 60 kg of fuel was completely burnt for an experiment. The amount of heat energy was found to be 1,80,000 kJ. Calculate the calorific value of the fuel.

[Hint: Amount of fuel burnt = 60 kg

Amount of heat produced = 1,80,000 kJ

The calorific value of the fuel = Heat produced / Amount of fuel

$$= 1,80,000 / 60 = \underline{\underline{3,000 \text{ kJ/kg}}}$$

\therefore The calorific value of the fuel is 3,000 kJ/kg.

4. a) What are the harmful effects of burning fuels?

[Hint: The increasing fuel consumption has harmful effects on the environment.

- Carbon fuels like wood, coal, and petroleum release unburnt carbon particles. These fine particles are dangerous pollutants causing respiratory diseases, such as asthma.

- Incomplete combustion of these fuels gives carbon monoxide gas. It is a very poisonous gas.
- Combustion of most fuels releases carbon dioxide in the environment. Increased concentration of carbon dioxide in the air is believed to cause global warming.]

5. a) What do you understand from the statement – the calorific value of candle wax is 5000 kJ/kg?

[Hint: The amount of heat liberated when 1 kg of wax is completely burnt in the presence of air is 5000kJ]

b) In an experiment 3 kg of fuel was completely burnt. The heat produced was measured to be 150,000 kJ. Calculate the calorific value of the fuel.

[Hint: The calorific value of the fuel = Amount of heat energy produced / Weight of the fuel burnt

$$= 150,000 / 3 = \mathbf{50,000 \text{ kJ/kg}}$$

c) Although wood has a very high calorific value, we still discourage it as a fuel. Why?

[Hint: Because of the following reasons, wood is not a fuel of choice:

- (i) It has a high ignition temperature, so starting a fire in wood is a little tough.
- (ii) Burning wood produces many harmful gases such as carbon monoxide and carbon dioxide. These gases are toxic and also cause air pollution.
- (iii) To use wood as a fuel, we would have to cut trees. Trees are very essential for living beings, they provide many natural substances that help human life. and so, cutting them is not encouraged.
- (iv) Burning of wood produces a lot of smoke which causes respiratory diseases, such as asthma.

V. SOURCE-BASED/CASE-BASED QUESTIONS:

The picture shows four types of fire extinguishers. Each extinguisher is suited for specific sources of fire.



i) A tailor has money for any two of the fire extinguishers. Which pair of fire extinguishers does he buy it for his tailoring shop?

[Hint: The tailor will buy fire extinguishers P and R.]

ii) Fire extinguisher K is suitable for kitchen fires. Which fire extinguisher from P, Q, R, and S can perform most of the work of K.

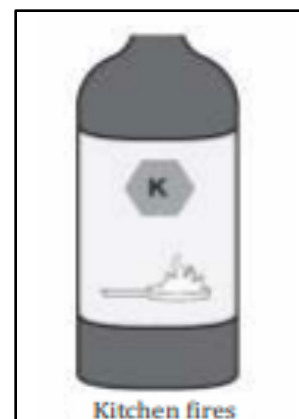
[Hint- Q can perform like K.]

iii) How does dumping sand on a fire extinguish the flame?

[Hint: Sand is used to extinguish fires caused by oil. The sand particles cut off oxygen contact with burning oil.]

iv) What are inflammable substances? Give examples.

[Hint: The substances that have very low ignition temperatures and can easily catch fire with a flame are called inflammable substances. Examples of inflammable substances are petrol, alcohol, Liquefied Petroleum Gas (LPG), etc.]



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