



## INDIAN SCHOOL AL WADI AL KABIR



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| <b>Class: VIII</b>                        | <b>DEPARTMENT: SCIENCE<br/>2021-2022</b> | <b>DATE: 14-11-2021</b>         |
| <b>WORKSHEET NO.: 10<br/>WITH ANSWERS</b> | <b>TOPIC: COMBUSTION AND FLAME</b>       | <b>NOTE: A4 FILE<br/>FORMAT</b> |
| <b>NAME OF THE<br/>STUDENT</b>            | <b>CLASS &amp; SEC:</b>                  | <b>ROLL NO.</b>                 |

### I.VERY SHORT ANSWER (1M)

1.What is combustion?

(Hint: Combustion is a chemical process in which a substance reacts with oxygen to liberate heat and light)

2.What do you mean by ignition temperature?

(Hint: The lowest temperature at which a substance catches fire is called its ignition temperature)

3.State the importance of a fire extinguisher.

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

4.Which substances produce a flame?

(Hint: Substance which vapourise during burning gives out flame)

5. How is calorific value measured?

(Hint: Calorific value is measured in **Kilo joule per Kilogram**)

6. Burning of wood and coal causes -----

- a) Air purification                      **b) Air pollution**  
c) Precipitation                          d) Soil conservation

7. The suspended particles released by combustion of coal in air may lead to a health disease.

Select the correct option:

- a). Goitre      b) Arthritis      **c) Asthma**      d). Bone cancer

8.When the clothes of a person catch fire, the person is covered with a blanket to extinguish fire. Explain why?

(Hint- Blanket cuts the oxygen supply)

9. What is flame?

(Hint- Region where combustion takes place)

10. Kerosene oil produces flame whereas coal does not produce flame. Comment on the statement.

(Hint- Kerosene oil-vapourises, Coal- Does not vapourise)

## II. ASSERTION AND REASON

For question numbers 1-3, 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 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

1. Assertion: Substances that burn in air are called combustible substances

Reason: Substances that do not burn in air are called non-combustible substances

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

2. Assertion: A non-luminous flame is accompanied with heat but very little light.

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

**iii) A is true but R is false.**

3. Assertion: The inner zone of candle flame is black in colour.

Reason: The inner zone lacks oxygen, hence no combustion occurs here.

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

## III. PASSAGE BASED

Read the passage carefully and attempt the questions given below.

A chemical process in which a substance reacts with oxygen to give off heat is called combustion. The substance that undergoes combustion is said to be combustible. It is also called a fuel. The fuel may be solid, liquid or gas. Sometimes, light is also given off during combustion, either as a flame or as a glow.

The lowest temperature at which a substance catches fire is called its ignition temperature. The substances which have very low ignition temperature and can easily catch fire

with a flame are called inflammable substances. Examples of inflammable substances are petrol, alcohol, Liquefied Petroleum Gas (LPG)

i)What are combustible substance?

- a) **Substance that undergoes combustion**
- b) Substance reacts with ozone
- c) Substance that glows
- d) All of these

ii)Fuels can be :

- a) Solids only
- b) Liquids only
- c) Gases only
- d) **All of these**

iii)What is ignition temperature?

- a) **Lowest temperature at which a substance catches fire.**
- b) Temperature when water boils
- c) Temperature at which ice is formed
- d) Temperature of LPG.

iv)Identify the inflammable substance from the following.

- a) Soil
- b) Water
- c) **Alcohol**
- d) Vinegar

v)What are inflammable substances?

- a) Substances with low ignition temperature
- b) Substances which catches fire easily with a flame
- c) Only option a
- d) **Both a and b**

#### **IV.CASE STUDY BASED 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?

| <b>Substance</b> | <b>Observation</b>                            |
|------------------|---|
| 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) Substances P and Q are undergoing spontaneous combustion whereas substance R is undergoing rapid combustion.
- (c) **Substance P is undergoing rapid combustion; substance Q is undergoing spontaneous combustion whereas substance R is undergoing explosion combustion.**
- (d) Substance R is undergoing rapid combustion; substance Q is undergoing spontaneous combustion whereas substance P is undergoing explosion combustion.

#### **V. a) SHORT ANSWER TYPE QUESTIONS (2 M):**

1.What are the characteristics of good fuel? (**Hint: It should have high calorific value, Proper ignition temperature, Moderate rate of combustion, Cheap and easily available, Safe to handle, store and easy to transport, should not cause pollution on burning**)

2. Crackers on ignition produces sound. Why? (Hint- Cracker on ignition produces sound due to the sudden formation of large amount of gas due to chemical reactions. The gases expand and explode. Such a combustion is called explosion.)

3.State the difference between rapid and spontaneous combustion.

(Hint: **Rapid combustion**- Substance burns in a short span of time. 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)

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

(Hint- Burning of wood produces a lot of smoke which causes respiratory diseases, to use wood as a fuel, we would have to cut trees. Trees are very essential for any living being. These are provided with many natural substances which help human life.)

5. In an experiment 4 kg of fuel was completely burnt. The heat produced was measured to be 160,000kJ. Calculate the calorific value of the fuel (Hint- Calorific value of the fuel =Amount of heat energy produced / Weight of the fuel burnt- 40,000kJ/kg)

6. What is explosion? (Hint: The sudden reaction occurring with evolution of large amount of gases heat, light and sound. Eg when a cracker ignited )

7. What do understand from the statement – 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)

8. Explain the term calorific value.

(Hint: The amount of heat produced by the complete combustion of 1 kilogram of a fuel is known as its calorific value.)

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

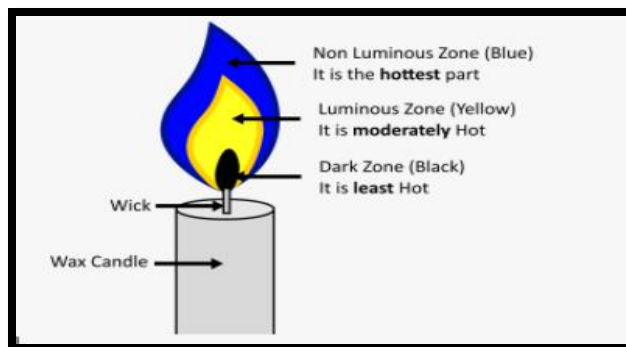
(Hint- Blackish ring, due to the deposition of unburnt carbon particles)

10. Ravi observed that a goldsmith was trying to melt a gold ring using the candle flame. Which part of the candle flame will the goldsmith use. Why?

(Hint: Outermost part as it is the hottest zone where complete combustion occurs)

#### **VI. b) SHORT ANSWER TYPE QUESTIONS (3 M):**

- Why do you have to use paper or kerosene oil to ignite 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.)
  - You are provided with three watch glasses containing milk, petrol and mustard oil 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.)
- Draw a neat labelled diagram showing the different zones of a candle flame.



3. The calorific values of petrol and CNG are 45,000 and 50,000 kJ/kg respectively. If you have a vehicle which 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 large amount of heat energy than petrol. It produces the least air pollutants.)

4. Manu was heating oil to fry potato chips. The vessel with oil all of a sudden caught fire. He poured water to extinguish 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.)

5. Why carbon dioxide fire extinguisher is considered as an excellent fire extinguisher? (Hint- Carbon dioxide being heavier than oxygen forms a blanket and cuts off oxygen supply, it brings down the temperature of the fuel, it does not harm the electrical equipment)

6. Write a short note on the phenomenon of Global Warming. (Global warming is the rise in temperature of the atmosphere of the earth. This results, among other things, 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.)

### **VII. LONG ANSWER TYPE QUESTIONS (5 M):**

1.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) How does throwing sand on fire help to put it off?

(Hint- sand cuts off the oxygen supply and thus the fire goes off)

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

2.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.

Amount of fuel burnt = 60 kg

Amount of heat produced = 1,80,000 kJ

Calorific value of the fuel = Heat produced / Amount of fuel

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

∴ Calorific value of the fuel is 3,000 kJ/kg.

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