Combustion

A. Fill in the Blanks

Complete the sentences with the correct term from the word bank.

1. The lowest temperature at which a substance catches fire is called its _____.

2. A substance that undergoes combustion is said to be _____.

3. The amount of heat energy produced on complete combustion of 1 kg of a fuel is called its _____.

4. Burning of wood and coal causes _____ of the air.

5. The most common fire extinguisher works by cutting off the supply of _____.

B. Match the Following;

Match the items in Column A with the correct description in Column B.

Column A	Column B
1. LPG	A. Product of complete combustion
2. Ignition Temperature	B. Cuts off oxygen supply to a fire
3. Fire Extinguisher	C. A highly inflammable fuel
4. Carbon Dioxide (CO_2)	D. The unit is kilojoules per kilogram (kJ/kg)
5. Calorific Value	E. The minimum temperature for a substance to burn3

C. Practice Problems

These questions require a bit more detail.

1. Define "ignition temperature."

2. Why does a matchstick not catch fire on its own at room temperature?

3. What are the main products formed during the complete combustion of a fuel like natural gas (methane)?

4. What is an "inflammable substance"? Give an example.

5. How does wrapping a person whose clothes are on fire in a thick blanket help?

6. What is the "calorific value" of a fuel?

7. Name the three distinct zones of a candle flame.

8. Which zone of a candle flame is the hottest, and why?

9. Explain why carbon dioxide (CO_2) is effective in extinguishing fires.

10. What is the difference between rapid combustion and spontaneous combustion?

D. Warm-up Questions

Answer these quick questions to refresh your memory.

1. What is combustion?
2. List the three essential things needed for combustion to occur (the "Fire Triangle").
   - _____
   - _____
   - _____
3. Give one example of a combustible substance.
4. Give one example of a non-combustible substance.
5. Which gas in the air is necessary for combustion?

E. Challenge Questions

Think critically to answer these questions.

1. Explain what happens during incomplete combustion and name the dangerous gas it produces. Why is this gas so harmful to humans?

2. A goldsmith uses the outermost zone of a flame to melt gold. Why is this specific zone chosen?

3. Burning fossil fuels like coal and diesel can release oxides of sulfur and nitrogen into the atmosphere. What major environmental problem does this cause?

4. Water is a common fire extinguisher. On which two types of fires should water never be used? Explain why for each.

5. Explain how a forest fire can sometimes start on its own on a very hot day without any human activity.

F. Word Problems & Application

Apply your knowledge to these real-world scenarios.

1. A camper is trying to start a campfire with damp logs on a cold evening. Which element of the fire triangle is making it difficult to start the fire, and why?
2. Why is it extremely dangerous to sleep in a sealed room with a burning charcoal or coal fire?

3. Fuel A has a calorific value of 45,000 kJ/kg. Fuel B has a calorific value of 55,000 kJ/kg. Which fuel is more efficient? Explain your reasoning.
4. When you gently blow on a smoldering piece of wood, it glows brighter. However, when you blow hard on a lit matchstick, it goes out. Explain both phenomena using the fire triangle.
5. A factory that uses flammable chemicals has "NO SMOKING" signs and ensures the area is well-ventilated. How do these two rules help prevent fires?

G. True or False

1. Carbon dioxide is a combustible gas. _____
2. Water is a good extinguisher for fires involving electrical equipment. _____
3. The middle zone of a candle flame is yellow and is the hottest part. _____
4. A substance must be heated to its melting point to start burning. _____
5. Global warming is partly caused by an excess of carbon monoxide in the atmosphere. _____