Gaining Apex Coaching Centre

(Where Toppers make...... Toppers) Combustion & Flame

SOME WORKED OUT ILLUSTRATIONS

Illustration 1.

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

Solution

CNG is cheap, readily available and highly combustible. It has high calorific value. It does not produce gases or residues when used in automobiles, so it reduced the pollution in our cities. The use of CNG in automobiles has reduced pollution in our cities because CNG produces the harmful product in very small amount and it is a cleaner fuel.

Illustration 2.

Compare LPG and wood as fuels.

Solution

LPG	Wood
1. No residue after burning.	1. Leaves a lot of ash on burning.
2. Can be transported through pipelines, and cylinder.	2. Cannot be transported easily like LPG.
3. Burns easily.	3. Catches fire with more difficulty.
4. Low ignition temperature.	4. High ignition temperature.
5. No smoke on burning.	5. Burns with smoke.

Illustration 3.

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

Solution

To burn a heap of green leaves is difficult, because its ignition temperature is high, but dry leaves

catch fire easily as its ignition temperature switches to low.

Illustration 4.

In an experiment, 4.5 kg of a fuel was completely burnt. The heat produced was measured to be 180,000 kJ. Calculate the calorific value of the fuel.

Solution

The calorific value of the fuel:

Calorific value = kJ/kg = 180,000/4.5 kJ/kg = 40,000 kJ/kg.

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	EXERCISE – 1			OBJECTIVE QUESTIONS				
		LEVEL - I						
1.	Which is nec (A) Water	essary for combustion ? (B) Air	(C) Both (A) & (B)	(D) None of these				
2.	Which of the (A) Heat	following are produced by (B) Light	nuclear reactions ? (C) Both (A) & (B)	(D) None of these				
3.	Thesubstance	\Rightarrow substances which have very low ignition temperature and can easily catch fire with a flame						
	called (A) Luminous (C) Inflammab	nable substances (B) Combustible substances (D) All of these						
4.	The conditior (A) Fuel (C) Oxygen	The conditions which are required for comb (A) Fuel (C) Oxygen		ustion to take place are (B) Ignition temperature (D) All of these				
5.	Statement 1 Statement 2:S flame.	 Statement 1: Wax which is a solid fuel burns with a flame. Statement 2: Solid combustible materials which vaporize at high temperature and burn with flame. (A) Statement 1 and 2 are true and statement 2 is the correct explanation of statement (B) Statement 1 and 2 are true but statement 2 does not explain statement 1 (C) Statement 1 istrue but statement 2 is false. (D) Statement 1 is false but statement 2 is true 						
	(A) Statemer (B) Statemen (C) Statemen (D) Statemen							
6.	Ignition temp (A) 35°C	berature of phosphorus is : (B) 45°C	(C) 25°C	(D) 55°C				
7.	Which of the (A) Candle	following fuel burns withou (B) Coal	ut a flame ? (C) Kerosene oil	(D) None of these				
8.	Which fuel is ((A) Charcoal	an extremely good domest (B) LPG	tic fuel ? (C) Gobargas	(D) Allof the above				
9.	Which of the fo (A) It has a hi (B) It burns w (C) It produce (D) It can easil	Which of the following statements is false regarding Natural gas? (A) It has a high calorific value of 55 KJ/gm (B) It burns with a smokeless flame (C) It produces poisonous gases on burning (D) It can easily be transported through underground pipelines						
10). Which fuel ho (A) Wood	ave more calorific value ? (B) Coal	(C) Kerosene	(D) LPG				
11	I. Unburntwaxv (A) Non - Lun (C) Inner dar	Unburnt wax vapours are present in : (A) Non - Luminous zone (C) Inner dark zone						
12	2. Which fuels c (A) Cowdung	are used for running automo (B) Petrol	bbiles ? (C) Diesel	(D) (B) and (C)				
13	3. Which of the (A) Coal	following fuel is used in indu (B) CNG	ustry ? (C) Petrol	(D) All of these				

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14.	. When magnesium burns with oxygen it forms ?							
	(A) Mg(OH) ₂	(B) MgCO ₃	(C) MgO	(D) All of these				
15.	Which of the followir (A) Carbon monoxide	ng pollutant causes re (B) Carbon dioxide	espiratory problems : (C) Smoke	(D) Both (A) & (C)				
	LEVEL - II							
1.	The heat and light that (A) Fire	come from burning mc (B) Fuel	iterials is known as (C) Flame	(D) All of these				
2.	How fire can be put ((A) By throwing wat (C) By throwing sand	off ? er on it d or soil over it	(B) By using fire extinguishers(D) Any of these methods					
3.	 Which of the following conditions is/are necessary for combustion : (A) Presence of a combustible substance (B) There must be continuous supply of supporter of combustion (C) Ignition temperature. (D) All of these 							
4.	A colourless gas is denser than air. It neither burns nor supports the burning of splint. What could be							
	the gas (A) Helium	(B) Hydrogen	(C) Oxygen	(D) Carbon-dioxide				
5.	Consider the following statements : (I) Complete combustion needs sufficient quantity of air. (II) Incomplete combustion releases carbon monoxide. (A) Only (I) is correct. (B) Only (II) is correct (C) Both (I) & (II) are correct (D) None of these							
6.	Which of the following (A) Low calorific valu (C) Fairly cheap and e	g is not the attribute of e asily available	a good fuel ? (B) Moderate rate of combustion (D) Safe to handle, store, and transport					
7.	A yellow sooty flame with lots of smoke is p (A) Kerosene burnt in gas stove. (C) LPG in gas stove		oduced by : (B) Paper burns in insufficient amount of oxygen (D) Both (A) and (B)					
8.	Which gas is the bes (A) CO ₂	st extinguisher ? (B) CO	(C) Watervapour	(D) O ₂				
9.	Incomplete combus (A) CO ₂ gas	tion of fuels gives (B) CO gas	(C) CO + H ₂	(D) None of these				
10.	Which statement is a (A) Gaseous fuels pro (B) Combustion of fu	correct - duced least amount o Jel produce CO ₂	f harmful gases as com	pared to solid and liquid				

- (C) Acid rain is also caused by combustion of heavy fuels
- (D) All correct

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EXERCISE - 2

SUBJECTIVE QUESTIONS

Very short answer type questions

- 1. What is a combustible substance?
- 2. What is an inflammable substance?
- 3. What will happen if air supply is stopped to a burning substance?
- 4. What is a fire extinguisher?
- 5. What is a primary fuel?
- 6. What happens to natural gas when it is burnt?
- 7. When a substance is burnt in the presence of oxygen, what is the phenomenon known as?
- 8. What type of combustion takes place when the food you've eaten is used to provide energy for your body?
- 9. What kind of substances are paper, wood and kerosene?
- 10. Who described in detail the chemical history of a candle?
- 11. Which fuel are you using at home?
- 12. When a substance catches fire, what is that temperature known as?
- 13. What is that value on which the efficiency of a fuel is determined?
- 14. What is that substance known as which is burnt to use its heat energy?
- 15. What is power generated by the heat produced by burning fuel?

Short answer type questions

- 1. Why doesn't wet wood burn easily?
- 2. Differentiate between solid and liquid fuels.
- 3. Why do some substances produce flame?
- 4. What happens to the wax when a candle is burnt? Is it possible to get this wax back?
- 5. State any two reasons why you consider a particular fuelbest.
- 6. What really is an explosion?
- 7. What is the middle zone of a burning candle known as? Why?
- 8. What holds the flame of the candle?
- 9. Why is domestic fuel known as LPG? What do the letters stand for?
- 10. Mention any two cost effective ways of cooking.

Long answer type questions

- 1. What are the characteristic of a 'good' fuel?
- 2. Discuss the various type of gaseous fuels.
- 3. Petrol does not catch fire on its own at room temperature. Why?
- 4. Wet paper do not burns while a dry paper catches fire easily. Why?
- 5. Describe the different types of combustion, giving suitable examples.

EXERCISE - 3

MISCELLANEOUS QUESTIONS

True or false

- 1. Substances burn in air and form carbon dioxide.
- 2. Burnt fuel should always leave some residue.
- 3. Water gas is a mixture of carbon monoxide and nitrogen.
- 4. Calorific value of coke is more than that of coal.
- 5. Natural gas mainly contains methane and traces of ethane and propane.
- 6. Wood burns with a flame.
- 7. There is a blue colour zone at the base of the wick.
- 8. Presence of a combustible substance is not essential for a substances to burn.
- 9. Red phosphorus can be stored in a bottle.
- 10. Coal gas is obtained from destructive distillation of coal.

Fill in the blanks

- 1. On burning, solid fuels leave _____ and ____.
- 2. Fuels are compounds of _____and _____
- **3.** $4P + 5O_2 \longrightarrow$
- 4. ____and___are non-combustible substances.
- 5. Substances that burn easily are called ______substances.
- 6. A candle flame consists of _____ important zones.
- 7. A liquid fuel used in home is_____
- 8. Combustion is of _____types.
- 9. The innermost zone of flame is known as_____
- 10. Burning of wood and coal causes _____ of air.

Match the column

1. Column-l

- (1) Combustible
- (2) Non-combustible
- (3) Ignition
- (4) Flame
- (5) Water

Column–II

- (i) Kindling temperature
- (ii) Zone of combustion
- (iii) Fire extinguisher temperature
- (iv) Petrol
- (v) Diamond