CHEMISTRY

BOOKS - MTG IIT JEE FOUNDATION

COMBUSTION AND FLAME

Illustrations

1. What does a soda-acid type of ire extinguisher contain? How does it work? Explain the working of a soda-acid fire

extinguisher with the help of a labelled diagram.

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2. What are the conditions necessary for combustion to take place ?

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3. Give three conditions which can be used to put off fire.

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4. When a person's clothes catch fire, you should quickly wrap him in a thick blanket and roll him on the ground. Why?

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5. What are explosives? How do they work?

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6. Give an example of a very slow combustion.

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7. What is spontaneous combustion? Explain with an example.

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8. How will you show that carbon dioxide is produced during combustion?

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9. How will you show that water vapours are formed during combustion?

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10. What is the blue zone in a candle flame?

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11. How does a candle flame work? Explain the phenomena.

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12. Which is a better fuel, biogas or wood? Give reasons to support your answer.

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13. What do you understand by fuel efficiency? What role does it play in selecting a fuel?

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14. Write short note on Greenhouse effect.

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15. What would have happened if the greenhouse gases were totally missing in the

earth's atmosphere? Discuss.

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Solved Example

1. Why does kerosene burn with a blue flame in wick stove but produces a yellow flame when burnt in a lamp?

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2. Define incomplete and complete combustion.

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3. Why is it dangerous to sleep in a closed room where coal is burning or stand in a garage keeping the engine of a car running?

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4. Name few pollutants produced by combustion of fuels and mention their harmful effects.

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5. Why should soda-acid and foam-type extinguishers not be used in fighting electrical fires?

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6. Give reasons : Liquid carbon dioxide fire extinguishers can be used for both electrical and oil fires.

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7. What is the job of a fire extinguisher? How does the fire brigade work to extinguish fire?

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8. Name any three gaseous fuels used either as domestic or as industrial fuel.

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9. How do you get the flame in the candle?

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10. Give two examples of each : Natural fuel

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11. Give two examples of each : Secondary fuel

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12. Give two examples of each : Primary fuel

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13. Give two examples of each : Processed fuel

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14. Give two examples of each : Fossil fuel

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15. What are the useful applications of greenhouse effect?

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Ncert Section

1. List conditions under which combustion can take place.

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2. Burning of wood and coal causes _____ of air.

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3. An important liquid fuel, used in homes is _____.

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4. Fill in the following blanks with suitable words :

A fuel must be heated to its ..... before it starts burning.

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5. Fire produced by oil cannot be controlled by _____ _.

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

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7. Compare LPG and wood as fuels.

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8. Give reasons.

Water is not used to control fires involving electrical equipment.

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9. Give reasons.

LPG is a better domestic fuel than wood

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10. Give reasons.

Paper by itself catches fire easily whereas a piece of paper wrapped around an aluminium pipe does not.

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11. Make a labelled diagram of a candle flame.

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12. Name the unit in which the calorific value of a fuel is expressed.

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13. Explain how is CO_2 able to control fire?

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

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15. Which zone of a flame does a goldsmith use for melting gold and silver and why?

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16. 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.

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17. Can the process of rusting be called combustion? Discuss.

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18. Abida and Ramesh were doing an experiment in which water was to be heated in a beaker. Abida kept the beaker near the wick in the yellow part of the candle flame. Ramesh kept the beaker in the outermost part of the

flame. Whose water will get heated in a shorter time?

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Exercise Multiple Choice Questions Level 1

1. While cooking, if the bottom of the vessel is getting blackened on the outside, it means that

A. the food is not cooked completely

B. the fuel is not burning completely

C. the fuel has high calorific value

D. the fuel is burning completely.

Answer: B

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2. The hottest zone in the candle flame is the

A. non-luminous zone

B. luminous zone

C. invisible zone

D. all zones are equally hot.

Answer: A

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3. The zone that produces yellow light in the candle flame is

A. non-luminous zone

B. luminous zone

C. invisible zone

D. all zones give light.

Answer: B

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4. LPG burns with a

A. non-luminous flame

B. luminous flame

C. yellow flame

D. both (a) and (b).

Answer: A

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5. The salt used in soda acid type extinguisher is

A. potassium carbonate

B. sodium nitrate

C. sodium bicarbonate

D. potassium nitrate.

Answer: C

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6. Burning of charcoal in a closed room will produce

A. carbon dioxide

B. nitrogen dioxide

C. carbon monoxide

D. sulphur dioxide.

Answer: C

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7. Coal burns with

A. flame

B. only glow

C. both flame and glow

D. does not burn.

Answer: B

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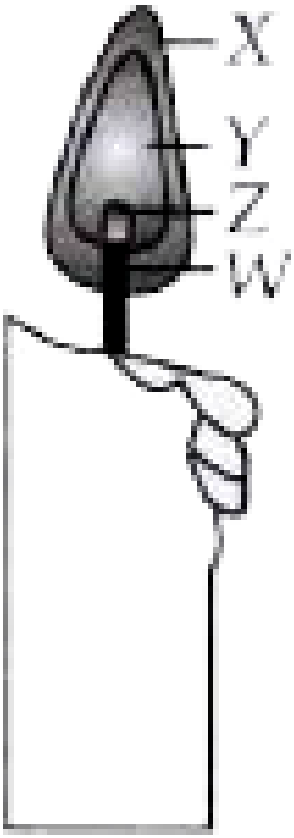
8. Which part of the flame is hottest?



A. X

B. Y

C. Z

D. W

Answer: A

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9. Combustion is a

A. physical process

B. chemical process

C. both (a) and (b)

D. none of these.

Answer: B

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10. In presence of water, ignition temperature of paper

A. decreases

B. increases

C. remains constant

D. can decrease or increase.

Answer: B

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11. Use of which fuel in the vehicles has reduced pollution?

A. Petrol

B. Diesel

C. CNG

D. Kerosene.

Answer: C

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12. Ideal fuel has ---------- calorific value.

A. low

B. high

C. moderate

D. zero

Answer: B

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13. Which element shows spontaneous combustion?

A. Calcium

B. Phosphorus

C. Copper

D. Iron

Answer: B

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14. In the sun, heat and light are produced by

A. chemical reaction

B. nuclear reaction

C. ionic reaction

D. reduction reaction.

Answer: B

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15. Which of the following can be used to generate electricity?

A. Glass

B. Soil

C. Wind

D. Stone

Answer: C

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16. Mark the correct statement.

A. Biogas is obtained from plant and animal wastes.

B. Biogas pollutes the air while wood does not.

C. Using biogas is more expensive than wood.

D. Water should be used for oil or petrol fires.

Answer: A

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17. Place a piece of burning charcoal on an iron plate and cover it with a plastic jar. The charcoal stops burning because

A. its ignition temperature is lowered

B. supply of oxygen is cut off

C. it becomes cold after some time

D. none of the above.

Answer: B

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18. The central zone of the candle flame is luminous due to

A. incomplete combustion of wax vapours

B. complete combustion of wax vapours

C. no combustion of wax vapours

D. formation of carbon dioxide.

Answer: A

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19. Respiration is a reaction which can be called

A. combustion

B. substitution

C. polymerisation

D. carbonisation

Answer: A

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20. Digestion of food is in an example of

A. incomplete combustion

B. complete combustion

C. slow combustion

D. rapid combustion.

Answer: C

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21. Which of the following oxides are present in acid rain?

A. Phosphorus oxides

B. Sulphur oxides

C. Nitrogen oxides

D. Both (b) and (c)

Answer: D

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22. Which of the following phenomenon is responsible for global warming?

A. Acid rain

B. Greenhouse effect

C. Ozone formation

D. None of these

Answer: B

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23. We can prevent energy crisis if we

A. use non-renewable sources of energy

B. slow down the use of fuels like coal and petroleum

C. start using sources like wind, sunlight, hydro energy, etc.

D. both (b) and (c).

Answer: D

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24. A good fuel

A. should have low calorific value

B. should cause pollution

C. should have high ignition temperature

D. should be easy to transport.

Answer: D

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25. Which of the following is fuel for our body?

A. Petrol

B. Diesel

C. Food

D. Water

Answer: C

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26. Which of the following has lower ignition temperature?

A. Wood

B. Paper

C. Vegetable oil

D. Kerosene oil

Answer: D

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27. Fire extinguishers extinguish the fire by

A. cutting off the supply of air

B. bringing down the temperature of fuel

C. supplying air to the fuel

D. both (a) and (b).

Answer: D

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28. Unburnt carbon particles of the fuel cause

A. stomach infections

B. respiratory problems

C. brain infections

D. skin problems

Answer: B

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29. Why do we use paper or kerosene oil to start fire in wood or coal?

A. To reach the ignition temperature of wood or coal by burning of paper or kerosene.

B. To supply more oxygen through kerosene.

C. To give blue flame to the wood or coal.

D. For spreading the fire.

Answer: A

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30. Why do fire brigades pour water on the fire?

A. Water cools the combustible material so that its temperature is brought below its ignition temperature.

B. This prevents the fire from spreading.

C. Water vapours help in cutting off the supply of air.

D. All of the above.

Answer: D

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31. Hydrogen satisfies the conditions of an ideal fuel but cannot be used freely because

(i) it has high calorific value.

(ii) it is difficult to store and transport.

(iii) it is soluble in water.

(iv) it is highly inflammable.

Select the correct statements.

A. (i) and (iii)

B. (i) and (ii)

C. (ii) and (iv)

D. (iii) and (iv)

Answer: C

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32. The hottest part of the Bunsen burner is

A. blue zone

B. zone of complete combustion

C. zone of partial combustion

D. all parts of the flame are equally.

Answer: A,B

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33. Read the following statements.

1. Water is the best extinguisher for fires involving inflammable materials

2. Carbon dioxide is used to extinguish fires involving oil and petrol

3. Water is not suitable for fires involving electrical equipments.

4. Fires caused by short-circuit should be immediately put off by sprinkling water on it.

Which alternative has the correct statements

A. 2 and 3

B. 3 and 4

C. 1 and 2

D. 2 and 4

Answer: A

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34. Flames of the mixture ..... are used for welding.

A. oxyhydrogen

B. oxynitrogen

C. oxycarbon

D. oxymethane

Answer: A

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35. The formation of soot occurs when

A. there is not enough oxygen for burning and few carbon particles are left

unburnt

B. there is enough oxygen for burning carbon particles

C. there is not enough oxygen for burning hydrogen

D. none of these.

Answer: A

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36. The necessary conditions for combustion process to occur are

1. availability of air/oxygen only

2. availability of air/oxygen and fuel

3. temperature of fuel below ignition temperature

4. temperature of fuel above ignition temperature

Select the correct alternative.

A. 1 and 2

B. 2 and 4

C. 3 and 1

D. 4 and 1

Answer: B

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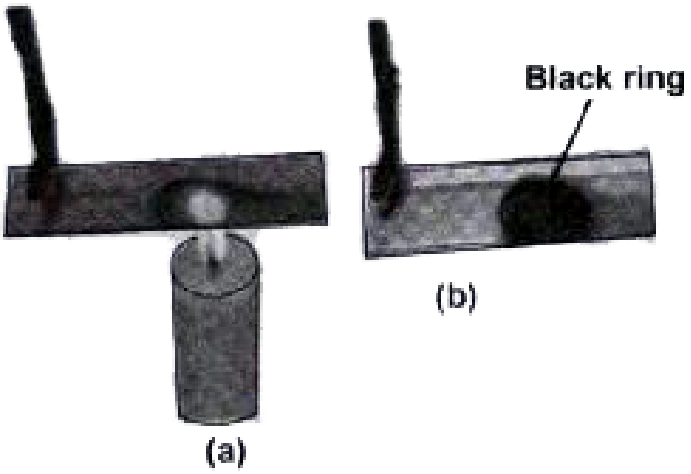
37. When you introduce a glass plate into the luminous zone of a candle flame for a few seconds, the observation is as shown in figure

(b). What does the observation indicate?



A. Deposition of burnt CO_2 particles present in the air around the flame.

B. Deposition of unburnt carbon particles in the luminous zone of the flame.

C. Deposition of molten wax.

D. All of these.

Answer: B

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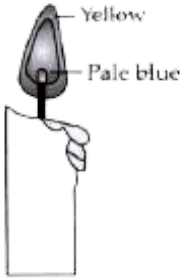
38. Which of the following diagrams shows a non-luminous flame?

A. 

B.



C.

D.

Answer: A

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39. Students were carrying out an experiment in the laboratory, in which one of the steps involved heating the alcohol. However, the teacher strictly instructed the students not to heat alcohol directly on flame. Why do you think the teacher gave such an instruction?

A. The temperature of the flame is not high enough to heat alcohol.

B. Alcohol is highly inflammable.

C. The heat of the flame is sufficient enough to overcome the ignition temperature of alcohol and it can easily catch fire.

D. Both (b) and (c)

Answer: D

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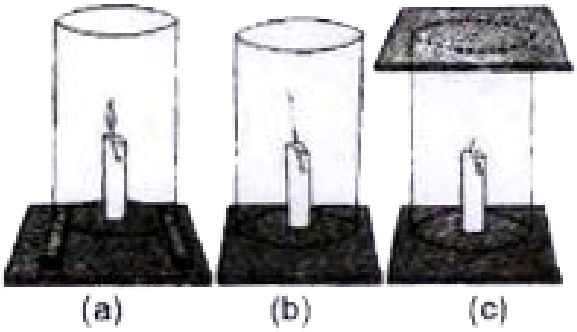
40. What does this experiment show?



A. Candle can burn in a glass chimney.

B. Candle cannot burn in a glass chimney.

C. Wood is essential for combustion.

D. Oxygen is essential for combustion.

Answer: D

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41. Which of the following is highly inflammable?

A. Wood

B. Glass

C. Melamine plastic

D. Kerosene oil

Answer: D

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42. A spoon was kept in contact with ice cubes for some time. Later, the same spoon was held over the flame of a small candle. The figure shows the observation. What do you infer from the given figure?

A. Spoon is an inflammable substance.

B. Burning of candle is a spontaneous process.

C. CO_2 is a product of combustion.

D. Water vapour is a product of combustion.

Answer: D

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43. When the matchstick strikes against the rubbing surface, what happens to the red phosphorus?

A. It converts into white phosphorus.

B. It reacts with potassium chlorate.

C. It ignites antimony trisulphide.

D. No reaction takes place.

Answer: A

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44. Which statement best explains the spontaneous combustion?

A. It is the ability of materials to burn with the help of some source of heat like flame or spark.

B. It is the ability of certain materials to start burning without any flame, spark, heat or ignition source.

C. It is the ability of certain materials to remain unburnt.

D. It is the ability of certain materials to burn without oxygen.

Answer: B

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45. State which of the following statements is false.

A. The matter contained in the body of plants and animals is called biomass.

B. Biogas is produced by decay of biomass.

C. Petroleum is formed from the remains of dead animals in the sea.

D. Fossil fuels should be conserved because they give lot of energy.

Answer: D

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46. Identify the correct statements.

(i) Carbon dioxide is used to extinguish fires involving oil and petrol.

(ii) Carbon dioxide used for extinguishing fires caused by oil.

(iii) Fires caused by short-circuit should not be put off by sprinkling water on it.

(iv) Water is not the best extinguisher for fires involving petrol and kerosene.

A. (i), (ii) and (iii)

B. (ii) and (iii)

C. (ii) and (iv)

D. All of these

Answer: D

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47. Which of the following statements is/are correct?

I. The flame of a Bunsen burner is blue when the air hole is open and yellow when the air hole is closed.

II. The liquid or solid wax never catches fire.

III. A substance cannot catch fire if its temperature is higher than its ignition temperature.

IV. Water should be poured over burning petrol, kerosene or diesel.

V. The middle zone of a candle emits the least light

A. I and II only

B. III and IV only

C. II,III and IV only

D. V only

Answer: A

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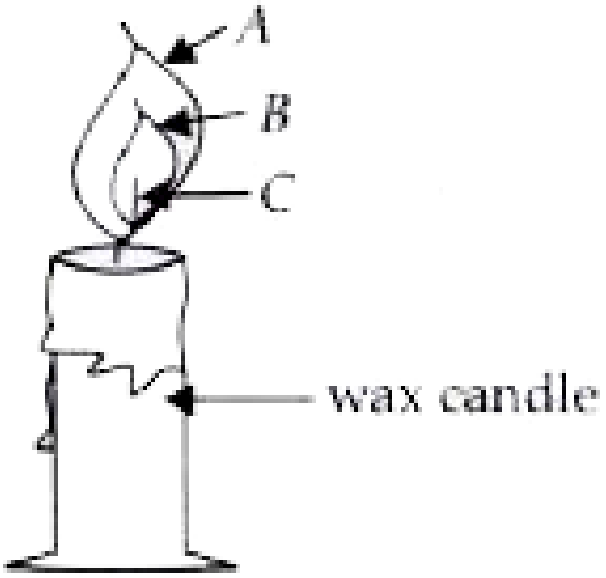
48. The different zones of a candle flame are marked by the letters A, B and C.



Which of the following is correct?

A. B is the hottest part of the flame.

B. C is moderately hot.

C. A is the hottest part of the flame.

D. A is moderately hot whereas C is the coldest part.

Answer: C

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49. The upper most part of match stick is made up of

A. antimony trisulphide and potassium chlorate

B. antimony trisulphide and potassium perchlorate

C. red phosphorus and white phosphorus

D. antimony trisulphite and potassium perchlorate

Answer: A

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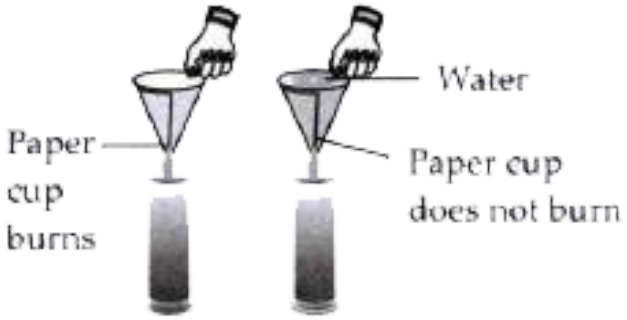
50. Cheenu sets up an experiment as shown in the figure.



What do you think would Cheenu's observation and conclusion be?

A. Paper cup with water does not burn.

B. Temperature of water rises.

C. Paper cup loses the heat to the water by conduction.

D. All of these.

Answer: D

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Exercise Match The Following Level 1

1. Choices for the correct combination of elements from List-I and List-II are given as

options (a), (b), (c) and (d) out of which one is correct.

List-I	List-II
(P) Carbonised fossil fuel	1. Dark zone
(Q) Ideal fuel	2. Non-luminous zone
(R) Invisible zone of candle flame	3. LPG
(S) The coolest zone of candle flame	4. Coal

A. P-2,Q-4,R-1,S-3

B. P-3,Q-2,R-4,S-1

C. P-4,Q-3,R-2,S-1

D. P-4,Q-2,R-1,S-3

Answer: C

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2. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c) and (d) out of which one is correct.

List-I	List-II
(P) Natural gas	1. Foul smell
(Q) Slow combustion	2. Methane
(R) Thermal power	3. Rusting
(S) Ethyl mercaptan	4. Coal

A. P-4,Q-2,R-1,S-3

B. P-2,Q-3,R-4,S-1

C. P-2,Q-1,R-4,S-3

D. P-4,Q-3,R-2,S-1

Answer: B

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3. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c) and (d) out of which one is

correct.

List-I		List-II
(P) Materials which burn readily	1.	Thermal power
(Q) Heat produced by burning unit mass of fuel	2.	Ignition temperature
(R) Point of catching fire	3.	Calorific value
(S) Power generated by burning fuel	4.	Combustible

A. P-3,Q-1,R-4,S-2

B. P-2,Q-3,R-4,S-1

C. P-4,Q-2,R-1,S-3

D. P-4,Q-3,R-2,S-1

Answer: D

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4. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c) and (d) out of which one is correct.

List-I	List-II
(P) Carbon dioxide	1. Carboxy haemoglobin
(Q) Carbon monoxide	2. Processed fuel
(R) Fossil fuel	3. Global warming
(S) Biogas	4. Natural gas

A. P-3,Q-2,R-4,S-1

B. P-3,Q-1,R-4,S-2

C. P-4,Q-3,R-2,S-1

D. P-2,Q-3,R-4,S-1

Answer: B

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5. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c) and (d) out of which one is

correct.

List-I	List-II
(P) Wax	1. No combustion
(Q) Dark zone	2. Yellow flame
(R) Paper	3. No flame
(S) Charcoal	4. Hydrocarbon

A. P-4,Q-1,R-2,S-3

B. P-4,Q-3,R-2,S-1

C. P-3,Q-2,R-4,S-1

D. P-1,Q-4,R-3,S-2

Answer: A

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Exercise Assertion Reason Level 1

1. Assertion : Carbon dioxide produced by burning of fuels causes global warming.

Reason : It leads to melting of polar ice.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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2. Assertion : Carbon dioxide is used as a fire extinguisher.

Reason : Fire can be extinguished by cutting off the supply of oxygen.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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3. Assertion : Candle burns with a flame whereas coal does not.

Reason : Coal is converted to vapours on combustion.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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4. Assertion : Ignition temperature is the minimum temperature at which a substance catches fire.

Reason : All substances catch fire at same temperature.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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5. Assertion : Alcohol and petrol can be used as household fuels for cooking.

Reason : They are not highly inflammable substances.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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6. Assertion : The colour of LPG flame is blue while a candle flame is yellow.

Reason : LPG undergoes complete combustion while wax undergoes incomplete combustion.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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7. Assertion : Charcoal does not produce a flame.

Reason : Charcoal does not vaporise.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion : A piece of wood cannot be burnt by a lighter or a matchstick.

Reason : We use paper or kerosene oil to initiate fire in wood pieces.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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9. Assertion : We can boil water in a paper cup.

Reason : Ignition temperature of paper is too high

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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10. Assertion : CNG and LPG are not ecofriendly fuels.

Reason : They produce many harmful pollution.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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Exercise Comprehension Level 1

1. When a combustible substance is burnt, it produces both light and heat, when heat energy that is produced by it is used, called fuel. Usually, fuels are compounds of carbon and hydrogen, thus they combine with oxygen on burning and liberate carbon dioxide and water vapour. Substances such as wood, coal, kerosene, diesel, petrol, LPG, etc., are commonly used as fuels. Fuels may be used at

home, in industries and for transportation.

A fuel can exist in which of the following states?

A. Solid only

B. Liquid only

C. Solid and liquid

D. Solid, liquid and gas.

Answer: D

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2. When a combustible substance is burnt, it produces both light and heat, when heat energy that is produced by it is used, called fuel. Usually, fuels are compounds of carbon and hydrogen, thus they combine with oxygen on burning and liberate carbon dioxide and water vapour. Substances such as wood, coal, kerosene, diesel, petrol, LPG, etc., are commonly used as fuels. Fuels may be used at home, in industries and for transportation.

Which of the following fuels is used for running automobiles?

A. Wood

B. Charcoal

C. Diesel

D. Coal

Answer: C

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Any substance may be regarded as a fuel which liberates carbon dioxide, water vapours and heat energy on reaction with

A. oxygen

B. water

C. carbon monoxide

D. hydrogen

Answer: A

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4. Burning fuels such as diesel and coal release sulphur dioxide. It has corrosive effects and is also suffocative in nature. Acid rain is another serious problem which damages old monuments such as the Taj Mahal.

Oxides of nitrogen and sulphur are present in smoke emitted by vehicles. These combine with water vapour present in the atmosphere to form acids which are responsible for damaging soil, crops and buildings. This is the reason why the eco-friendly fuel CNG, is now being widely used in commercial vehicles, in India. The by-product of combustion of CNG is not harmful to the environment.

An ideal fuel is one which

A. does not leave behind undesirable substances

B. burns immediately on coming in contact with air

C. provides both heat and light on combustion

D. has a very high ignition temperature.

Answer: A

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5. Burning fuels such as diesel and coal release sulphur dioxide. It has corrosive effects and is also suffocative in nature. Acid rain is another serious problem which damages old monuments such as the Taj Mahal.

Oxides of nitrogen and sulphur are present in smoke emitted by vehicles. These combine with water vapour present in the atmosphere to form acids which are responsible for damaging soil, crops and buildings. This is the reason why the eco-friendly fuel CNG, is now being widely used in commercial vehicles, in

India. The by-product of combustion of CNG is not harmful to the environment.

How the pollution in the cities can be reduced by the use of CNG in automobiles?

A. It produces less amount of sulphur dioxide and chlorine.

B. It does not leave any residue or smoke after burning in the engine.

C. It produces large amount of carbon dioxide.

D. It is used in compressed form.

Answer: B

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6. Burning fuels such as diesel and coal release sulphur dioxide. It has corrosive effects and is also suffocative in nature. Acid rain is another serious problem which damages old monuments such as the Taj Mahal.

Oxides of nitrogen and sulphur are present in smoke emitted by vehicles. These combine with water vapour present in the atmosphere

to form acids which are responsible for damaging soil, crops and buildings. This is the reason why the eco-friendly fuel CNG, is now being widely used in commercial vehicles, in India. The by-product of combustion of CNG is not harmful to the environment.

Acid rain which is very harmful for crops, buildings and soils is formed by dissolving

A. sulphur and nitrogen oxides released during the combustion of fuels

B. hydrogen and water released during combustion of fuels

C. metal oxides present in the soil

D. unburnt carbon particles released during combustion of fuels.

Answer: A

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7. Given below are the comparative data of certain fuels.

Fuel	Calorific value	Storage	Residue	Pollutants	Transport
Hydrogen	Highest	Difficult	No residue	No pollutants	Pipeline
CNG	Very high	Difficult	No residue	No pollutants	Pipeline
LPG	High	Easy	No residue	No pollutants	Cylinders
Kerosene	Moderate	Easy	No residue	CO_2	Tankers
Petrol	Moderate	Difficult	No residue	CO_2	Tankers/Pipeline
Diesel	Moderate	Easy	No residue	SO_2, CO_2, etc.	Tankers/Pipeline
Coal	Low	Difficult	Ash	SO_2, CO_2, etc.	Difficult

Why is LPG used as the most successful household fuel?

A. It has high calorific value, no residue and is very difficult to store.

B. It has high calorific value, no pollution and is easy to store and transport.

C. It has low calorific value, no pollutants and is easy to store.

D. It has moderate calorific value, no residue and difficult to transport.

Answer: B

Watch Video Solution

8. Given below are the comparative data of certain fuels.

Fuel	Calorific value	Storage	Residue	Pollutants	Transport
Hydrogen	Highest	Difficult	No residue	No pollutants	Pipeline
CNG	Very high	Difficult	No residue	No pollutants	Pipeline
LPG	High	Easy	No residue	No pollutants	Cylinders
Kerosene	Moderate	Easy	No residue	CO_2	Tankers
Petrol	Moderate	Difficult	No residue	CO_2	Tankers/Pipeline
Diesel	Moderate	Easy	No residue	SO_2, CO_2, etc.	Tankers/Pipeline
Coal	Low	Difficult	Ash	SO_2, CO_2, etc.	Difficult

Coal is not considered to be an ideal household fuel because

A. lot of fuel is wasted in the form of ash and its ignition temperature is high

B. it has low calorific value

C. it produces smoke, sulphur dioxide and unburnt carbon particles

D. all of these.

Answer: D

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9. Given below are the comparative data of certain fuels.

Fuel	Calorific value	Storage	Residue	Pollutants	Transport
Hydrogen	Highest	Difficult	No residue	No pollutants	Pipeline
CNG	Very high	Difficult	No residue	No pollutants	Pipeline
LPG	High	Easy	No residue	No pollutants	Cylinders
Kerosene	Moderate	Easy	No residue	CO_2	Tankers
Petrol	Moderate	Difficult	No residue	CO_2	Tankers/Pipeline
Diesel	Moderate	Easy	No residue	SO_2, CO_2, etc.	Tankers/Pipeline
Coal	Low	Difficult	Ash	SO_2, CO_2, etc.	Difficult

Which property of hydrogen prevents it from becoming an ideal fuel?

A. Its highest calorific value.

B. Its very low ignition temperature.

C. Its solubility in water.

D. Its pollution free nature, since the by-product of its combustion is only water.

Answer: B

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10. Wax is a hydrocarbon. When the wick is lit, the solid wax melts and becomes a liquid. This liquid soaks into the wick and in the heat it is

vaporized. The flame is a zone of combustion of these vapours of wax. When a candle burns, the carbon from the wax combines with oxygen in the air. Carbon undergoes oxidation, and gets changed into carbon dioxide. At the same time hydrogen combines with air to form water vapours. Some of the carbon does not burn and is deposited as soot.

The formation of soot occurs when

A. there is not enough oxygen for burning and few carbon particles are left unburnt

B. there is enough oxygen for burning carbon particles

C. there is not enough oxygen for burning hydrogen

D. hydrocarbon is converted to soot on heating.

Answer: A

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11. Wax is a hydrocarbon. When the wick is lit, the solid wax melts and becomes a liquid. This liquid soaks into the wick and in the heat it is vaporized. The flame is a zone of combustion of these vapours of wax. When a candle burns, the carbon from the wax combines with oxygen in the air. Carbon undergoes oxidation, and gets changed into carbon dioxide. At the same time hydrogen combines with air to form water vapours. Some of the carbon does not burn and is deposited as soot.

Why does wax burn with a flame?

A. Liquid wax is vaporized and the vapours of wax burn.

B. Carbon from the wax vaporizes to burn.

C. Carbon from the wax combines with oxygen to form carbon dioxide which burns

D. Hydrogen of the wax burns to form water.

Answer: A

12. Wax is a hydrocarbon. When the wick is lit, the solid wax melts and becomes a liquid. This liquid soaks into the wick and in the heat it is vaporized. The flame is a zone of combustion of these vapours of wax. When a candle burns, the carbon from the wax combines with oxygen in the air. Carbon undergoes oxidation, and gets changed into carbon dioxide. At the same time hydrogen combines with air to form water vapours. Some of the carbon does

not burn and is deposited as soot.

The flame of the candle is

A. zone of non-combustion

B. zone of combustion

C. dark zone

D. zone of molten wax.

Answer: B

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Exercise Very Short Answer Level 1

1. How does pouring water extinguish a fire ?

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2. How does a fire start?

Watch Video Solution

3. What is the colour of LPG flame?

Watch Video Solution

4. What are processed or secondary fuels?

Watch Video Solution

5. Why does charcoal not produce flame?

Watch Video Solution

6. What is a fuel? Give some examples of fuel.

Watch Video Solution

7. Name three substances used to extinguish fire.

Watch Video Solution

8. Coal is used in power generation. What is the power generated in such a way known as?

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9. What is a primary fuel?

Watch Video Solution

10. Why is sand used for extinguishing fire?

Watch Video Solution

11. What is the ultimate source of energy?

Watch Video Solution

12. On what bars is a fuel considered to be efficient?

Watch Video Solution

13. How is carbon monoxide harmful to us?

Watch Video Solution

14. Do all the substances catch fire at the same temperature?

Watch Video Solution

15. Candle wax and kerosene both produce same products on combustion. Why is kerosene a better fuel than candle wax?

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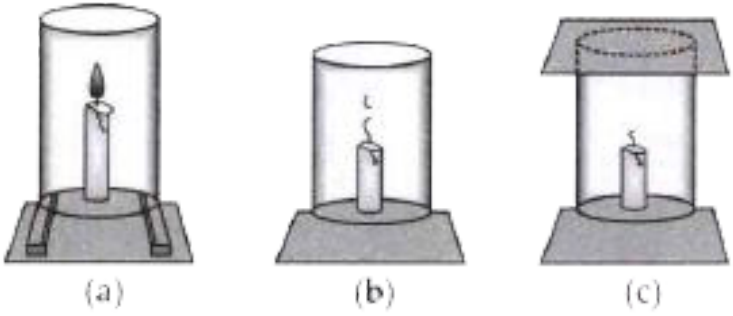
Exercise Short Answer Level 1

1. What are the disadvantages of incomplete combustion?

2. What are the harmful effects of increasing consumption of fuels?

3. Observe the given figures and write down the conclusions and the reason for the same.



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4. Write the colours of the flame produced by Kerosene lamp

Watch Video Solution

5. Write the colours of the flame produced by Candle

Watch Video Solution

6. Write the colours of the flame produced by Bunsen burner

Watch Video Solution

7. What are the products of combustion of any fuel?

Watch Video Solution

8. What happens when a magnesium ribbon is heated in presence of air?

Watch Video Solution

9. Give few examples of solid, liquid and gaseous fuels

Watch Video Solution

10. Why is a matchstick rubbed against the rough surface of match box to light it?

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11. What are the disadvantages of burning wood as fuel ?

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12. Why is sun regarded as the ultimate source of energy?

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13. What is global warming? How does combustion of fuels cause global warming?

Watch Video Solution

14. Why does the flame of candle rise up to a good height on burning?

Watch Video Solution

15. What is the source of liquid fuels? Give some examples of liquid fuels.

Watch Video Solution

16. Hydrogen has the highest calorific value, but it is not used as a fuel. Why?

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17. What is energy crisis?

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Exercise Long Answer Level 1

1. What are the various problems caused by combustion of fuels?

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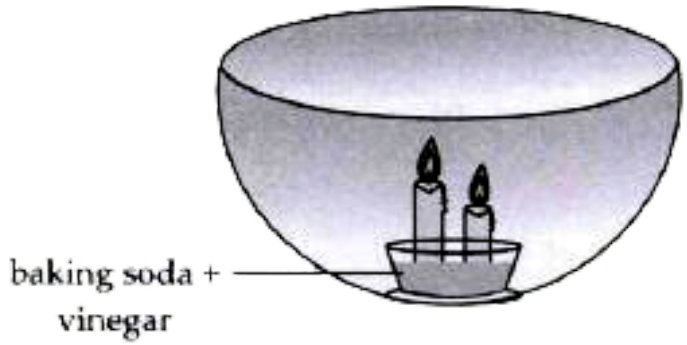
2. Make a model of a fire extinguisher. Place a short candle and a slightly taller candle in a

small dish filled with baking soda. Place the dish at the bottom of a large bowl. Light both the candles. Then pour vinegar into the dish of baking soda. Take care. Do not pour vinegar on the candles. Observe the foaming reaction. What happens to the candles? Why? In what order?



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3. A combustible substance cannot catch fire or burn as long as its temperature is lower than its ignition temperature. Explain with examples.

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4. What are the main disadvantages of deforestation?

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5. Explain the phenomenon of explosion with suitable examples.

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6. Why do we sweat and feel hot after running or exercising?

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7. Why do we require a judicious use of fuels?

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8. Why is CNG called an ecofriendly fuel?

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9. Water should not be used to put off electrical fires or burning oil and petrol. Instead sand or soil should be used. Why?

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10. Describe the history of a matchstick.

Watch Video Solution

11. Explain how LPG and CNG work as household and commercial vehicle fuels?

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Exercise Integer Numerical Value Level 1

1. What are the conditions necessary for combustion to take place ?

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2. The number of materials among the following which do not produce flame is coal, candle, camphor, magnesium and petrol

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3. In an experiment 50 kg of a fuel was completely burned. The heat produced measured to be 150,000 kJ. The calorific value of the fuel is $x \times 1000$. Then x is

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4. The number of liquid fuels among the following is Petrol, LPG, CNG, coal, diesel, spirit, biogas

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5. Types of fuel on the basis of source are

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Olympiad Hots Corner

1. Which of the following statements are true?

I. In the luminous zone of candle flame, vaporised wax gets oxidised to carbon dioxide which burns with a blue flame.

II. There is no burning in the dark inner zone

of the flame.

III. Non luminous zone is the hottest part of the flame.

IV. Luminous zone of a flame is mainly due to incomplete burning of carbon.

A. I and III only

B. II and III only

C. II, III and IV only

D. All of these

Answer: C

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2. Rahul, a class 8 student conducted the following experiment and recorded the observations in the given table.

Figure 1

Figure 2

Obser-vation	Does balloon explode?		Is ignition temperature of balloon reached?	
	Fig. 1	Fig. 2	Fig. 1	Fig. 2
I.	Yes	Yes	No	Yes
II.	Yes	No	Yes	No
III.	No	Yes	Yes	Yes

The correct observation and inference drawn are

A. I, balloon has a higher ignition temperature than water hence, it explodes

B. II, water increases the melting point of balloon

C. III, water in the balloon absorbs the heat

D. II, water conducts the heat away from the balloon.

Answer: D

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3. Match the column I with column II and select the correct option from the given codes.

	Column I		Column II
P.	Dark zone of flame	(i)	Rapid combustion
Q.	Source of heat and light in sun	(ii)	Incomplete combustion
R.	Burning of LPG gas	(iii)	Spontaneous combustion
S.	Luminous zone	(iv)	Nuclear reactions
T.	Burning of phosphorus in air at room temperature	(v)	No combustion

A. P-(v) , Q-(iv), R-(i) , S-(ii) ,T-(iii)

B. P-(ii) , Q-(iv) , R-(i) , S-(v) , T-(iii)

C. P-(v) , Q-(iv) , R-(iii), S-(ii) , T-(i)

D. P-(ii) , Q-(iii) , R-(iv) , S-(v) , T-(i)

Answer: A

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4. Water is not a suitable fire extinguisher to the fires involving oil and petrol because

A. water may conduct electricity

B. water is heavier than oil

C. water cannot be stored at high pressure in cylinders

D. water is lighter than oil.

Answer: B

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5. Sakshi performed two experiments as shown in figure 1 and 2, and recorded her observations in the table.

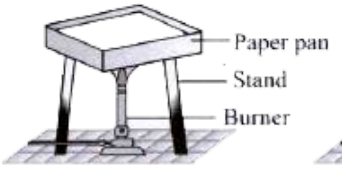

Figure 1

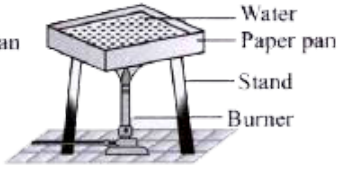

Figure 2

Observation	Does paper pan burn?		Is ignition temperature of paper reached?	
	Figure 1	Figure 2	Figure 1	Figure 2
I	Yes	Yes	No	Yes
II	Yes	No	Yes	No
III	No	Yes	Yes	Yes

Find out the correct observation and the reason behind it from the options given below.

A. I, paper has a higher ignition temperature than water.

B. II, fireproof paper pan is used in figure 2.

C. III, paper is non-inflammable.

D. II, heat supplied to the paper pan is transferred to water by conduction, so ignition temperature of paper is not reached in figure 2.

Answer: D

View Text Solution

6. The calorific values of some fuels are given.

Fuel	Calorific value (kJ/kg)
Coal	25000 – 33000
Diesel	45000
LPG	55000
CNG	50000

On the basis of given data, the correct order of efficiency of different fuels is

A. LPG > CNG > Diesel > Coal

B. Coal > Diesel > LPG > CNG

C. Diesel > CNG > Coal > LPG

D. CNG > LPG > Diesel > Coal

Answer: A

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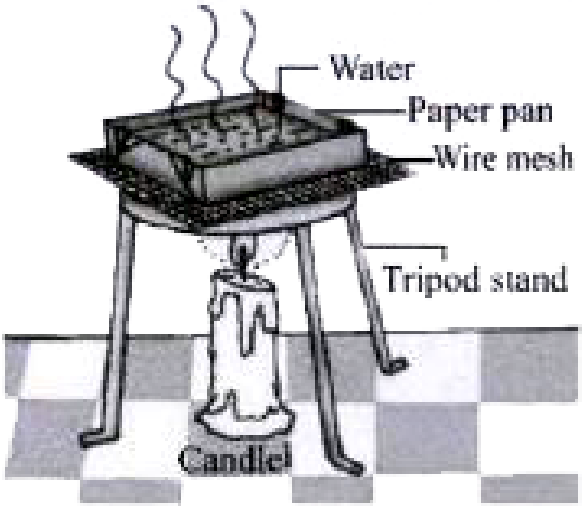
7. Mr. Goyal, a science teacher showed the following experimental set up to the students. Which of the following is the correct

observation and its explanation?



A. The paper pan catches fire and the water spills all over the wire mesh because paper is inflammable.

B. The paper pan has a very high ignition temperature so it does not catch fire.

C. The water in the pan absorbs heat from the candle flame and thus prevents the paper to reach the ignition temperature.

D. The paper pan helps the water vapours to condense back to water.

Answer: C

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8. Liquid and gaseous fuels have more advantages over solid fuels. Some of the advantages are :

(i) Calorific value of liquid and gaseous fuels is higher than the solid fuels.

(ii) Liquid and gaseous fuels have higher ignition temperatures than the solid fuels.

(iii) Liquid and gaseous fuels are easier to store since solid fuels occupy lot of space.

(iv) Liquid and gaseous fuels burn completely not leaving any residue.

Choose the correct advantages.

A. (i), (ii) and (iii)

B. (i), (iii) and (iv)

C. (ii), (iii) and (iv)

D. (i), (ii) and (iv)

Answer: B

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9. If Raman opened the air-hole of a bunsen burner fully and lighted the burner, he will get

_____

A. A luminous flame which is orange-yellow in colour.

B. A non-luminous flame which is pale blue in colour.

C. A flame that strikes back which is thin blue or green-yellow in colour.

D. A smoky flame which gives off a lot of soot.

Answer: B

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10. Wax burns with a flame because

A. liquid wax is vaporised and the vapours of wax burn

B. carbon from the wax vaporises to burn

C. carbon from the wax combines with oxygen to form carbon dioxide which burns

D. hydrogen of the wax burns to form water.

Answer: A

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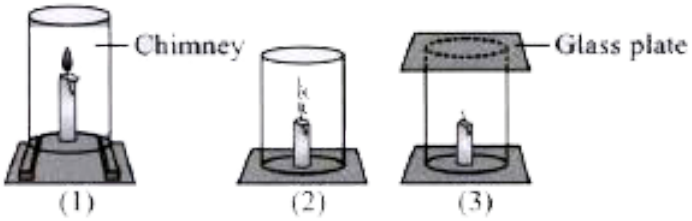
11. Observe the given figures carefully :



Which of the following statements is/are incorrect?

I. Candle 1 burns freely due to presence of air.

II. Smoke is produced in candle 2 due to less supply of air.

III. Flame finally goes off in candle 3 as air is not available.

A. II only

B. I and II only

C. I and III only

D. None of these

Answer: D

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12. Calorific values of some fuels are given :

Fuel	Calorific value (kJ/kg)
Biogas	35,000 – 40,000
Petrol	45,000
Hydrogen	1,50,000
CNG	50,000

On the basis of this data, find out the correct order of efficiency of fuels.

A. Biogas > Petrol > CNG > Hydrogen

B. CNG > Hydrogen > Biogas > Petrol

C. Hydrogen > CNG > Petrol > Biogas

D. Petrol > CNG > Biogas > Hydrogen

Answer: C

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13. Read the given statements carefully.

P: I am the most common fire extinguisher but not suitable for oil, petrol and electrical fires. I am heavier than oil and also, conduct electricity

Q : I am an excellent fire extinguisher and

most suitable for oil, petrol and electrical fires.

I also, form a blanket around the fire and bring down the temperature of the fuel.

Identify P and Q.

A. $P - CO_2, Q - H_2O$

B. $P - H_2O, Q - CO$

C. $P - O_2, Q - CO_2$

D. $P - H_2O, Q - CO_2$

Answer: D

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14. Mr. Verma while watching TV suddenly came across an accident as shown below.

In the above situation, what should Mr. Verma do?

A. He should pour water on the fire.

B. He should use oil to cut off the supply of air.

C. He should use CO_2 extinguisher on fire.

D. He should use LPG to control fire.

Answer: C

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15. Match the column I with column II and select the correct option from the codes given

below.

Column I	Column II
(a) Hottest zone of candle flame	(i) Zone of unburnt wax vapours
(b) Yellow zone of candle flame	(ii) Non-luminous zone
(c) Black innermost zone of the candle flame	(iii) Incomplete combustion zone

A. (a)-(i),(b)-(ii),(c)-(iii)

B. (a)-(ii),(b)-(i) , (c)-(iii)

C. (a)-(i), (b)-(iii),(c)-(ii)

D. (a)-(ii), (b)-(iii), (c)-(i)

Answer: D

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