

## 2 Matter

### 2.1 (a) Properties of matter

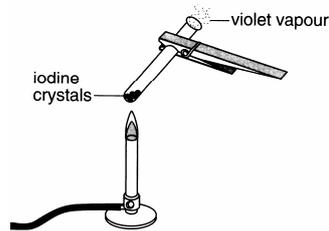
1 Which state of matter has a definite volume but no definite shape ?

- A Solid    **B Liquid**    C Gas    D Solid and liquid

2 Choose the correct statement:

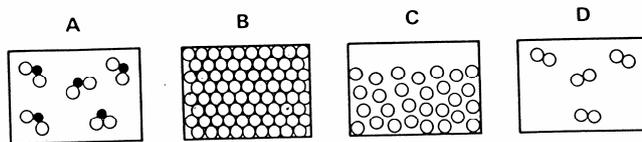
- A A solid has a definite shape but no definite volume.  
 B A liquid has a definite shape and definite volume.  
**C Matter has weight and occupies space.**  
 D A gas has a definite volume but no definite shape.

3 The process shown in the following diagram is called



- A combination    B decomposition    C combustion    **D sublimation**

4 The diagram below represents the arrangement of particles in solids, liquids and gases.



Which diagram represents a gaseous compound? **Ans: A**

5 Solids are denser than liquids because their particles are

- A heavier    B bigger    C only vibrating    **D very closely packed**

6 When water freezes into ice, the water molecules in ice

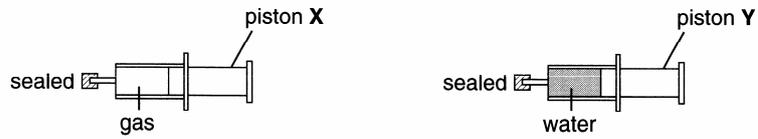
- A move faster    B move slower    C collide with each other    **D can only vibrate**

7 Which one of the following statements is true of an atom in a gold coin at room temperature?

- A Each atom is constantly moving at random  
 B Each atom is far apart from another atom  
**C Each atom is vibrating about its fixed position**  
 D Each atom is constantly colliding with other atoms

2.1 (a) Properties of matter

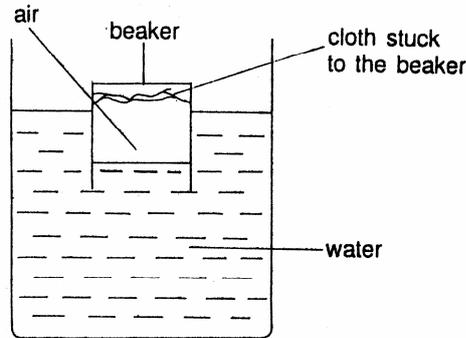
8 Figure shows two identical syringes which are sealed. Initially the volume of gas and water is the same



The pistons are pushed and it is found that piston X moves into the hollow tube more than piston Y. This is because (98)

- A gas molecules are bigger than water molecules
- B gas molecules are further apart than water molecules
- C water molecules are bigger than gas molecules
- D water molecules are further apart than gas molecules

9 Figure shows a beaker being pushed slowly with its mouth downwards into a basin of water until the whole beaker is completely immersed under water.



When the beaker is removed from the basin, the piece of cloth is found to remain dry. This experiment shows that air (95)

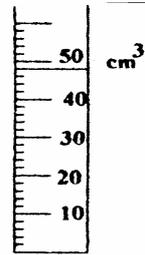
- A can be expanded
- B molecules cannot be destroyed
- C molecules change shape
- D occupies space

10 A

11 A

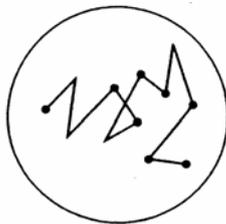
2.1 (b) Space between particles & Brownian motion

1 Ahmad mixed 25 cm<sup>3</sup> of alcohol with 25 cm<sup>3</sup> of water. The total of the mixture is as shown:



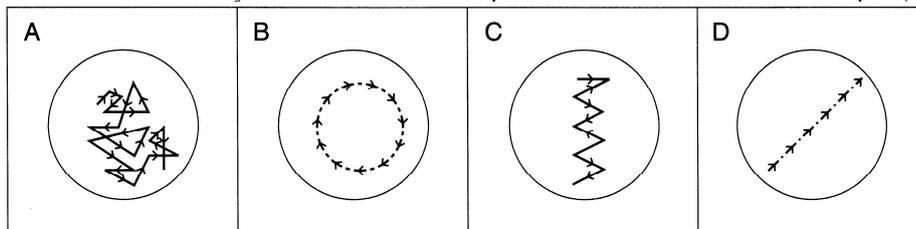
This is because

- A water and alcohol particles are of the same size
  - B there are no particles between the alcohol particles
  - C water particles when mixed with alcohol particles become smaller
  - D particles of one go into the spaces between the particles of the other**
- 2 Cooking gas is easily compressible because gas molecules are
- A light
  - B small
  - C far apart**
  - D moving randomly and freely
- 3 When a liquid boils, its particles move
- A further apart**
  - B closer together
  - C more uniformly
  - D more slowly
- 4 The movement of smoke particles as seen under the microscope is due to
- A smoke particles breaking up into smaller particles
  - B smoke particles being attracted by the air particles
  - C smoke particles colliding with the air particles**
  - D smoke particles grouping together to form bigger particles
- 5 Figure shows the direction of movement of one of the smoke particles seen under a microscope.



Which of the following **best** describes the observation? (97PMB)

- A Each smoke particle has a few molecules
  - B The smoke particle is larger than air particle
  - C The smoke particle has random movement
  - D The smoke particle collides with the air particles**
- 6 Amir did an experiment on the movement of air particles using a smoke cell. Which of the following diagrams shows the most likely movement of a smoke particle as seen under the microscope? (2000S)



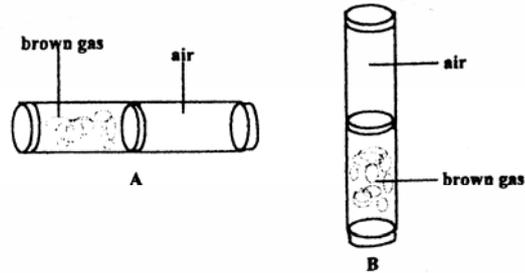
Ans: A

## 2.1 (c) Diffusion

1 There is a leak in the petrol tank of a car and you know by the smell of it. The smell reaches you by

- A convection    B evaporation    **C diffusion**    D osmosis

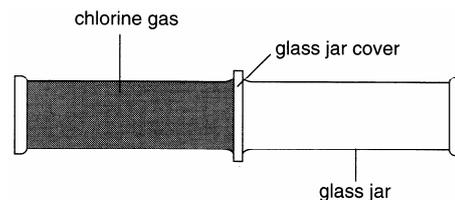
2 Each of the two pairs of gas jars were filled with brown gas as shown in the figure



After some time a uniform colour was seen throughout both pairs of gas jars. What process has occurred?

- A evaporation    B decomposition    C osmosis    **D diffusion**

3 The following diagram shows two glass jars separated by a glass jar cover. When the glass jar cover is removed, the chlorine will fill both jars. This occurs because the chlorine molecules



- A move horizontally  
 B vibrate about their fixed positions  
 C are far apart  
**D move randomly and freely**

4 The smell of perfume can be detected at a distance because the perfume particles

- A move at random and collide with one another**  
 B vibrate about their fixed positions  
 C move in one direction  
 D combine chemically with the air molecules

5 The process of diffusion can take place in gases. Which of the following is **true** of the gas molecules? (95)

- A They attract each other only                      **C They move freely**  
 B They do not occupy space                          D They move quickly in one direction only

6 The process of diffusion can be easily seen in (97BJCE)

- A gases and liquids**                                      C gases, liquids and solids  
 B gases only    D liquids only

7 A small piece of copper sulphate crystal was added into a beaker of water. The water is left unstirred. After a few days a blue uniform solution was formed. What causes this effect? (97)

- A Brownian movement                                **C Diffusion**  
 B Convection current                                 D Tyndall effect

## 2.1(d) Elements, compounds and mixtures

1 Which of the following groups consists of free elements ?

- A earth, air, water  
 B salt, sand, sugar  
 C sulphur, carbon, water  
 D sodium, calcium, magnesium

2 Which of the following is **not** a compound?

- A calcium carbonate  
 B carbon dioxide  
 C oxygen  
 D sodium hydroxide

3 Which of the following groups contains an element, a mixture and a compound ?

	element	mixture	compound
A	carbon	water	air
B	carbon	air	magnesium
C	magnesium	air	carbon
D	magnesium	air	water

4 Which of the following is **not** an element?

- A aluminium    B carbon    C helium    D ammonia

5 Table salt is made of

- A sodium and carbon  
 B sodium and carbon  
 C sodium and chlorine  
 D hydrogen and chlorine

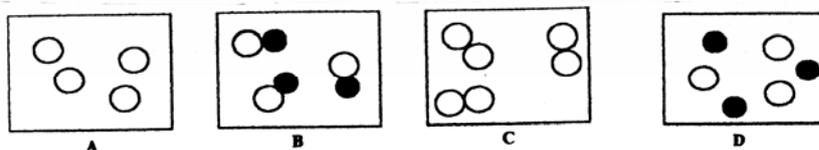
6 The chemical name for common salt is

- A sodium carbonate  
 B sodium bicarbonate  
 C sodium chloride  
 D potassium chloride

7 The elements present in common salt are

- A sodium and oxygen  
 B sodium and chlorine  
 C potassium and chlorine  
 D potassium and oxygen

8 The figure below shows particles in gases. Which diagram **best** represents oxygen gas, O<sub>2</sub> ?



Ans: C

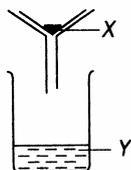
9 When iron filings and sulphur powder are heated strongly, a compound is formed. Choose the **correct** equation for the reaction.

- A iron + sulphur → iron sulphide  
 B iron + sulphur → iron sulphite  
 C iron + sulphur → iron sulphate  
 D iron + sulphur → iron hydrogen sulphate



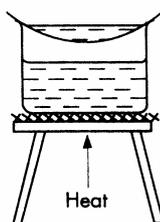
## 2.1(e) Filtration &amp; Evaporation

- 1 In filtration, solid X remains on the filter paper while liquid Y is collected in the beaker. X is the ..... and Y is the .....



- A boiling chips; filtrate  
B ink; distillate  
C filtrate; residue  
D residue; filtrate
- 2 Which one of the following mixtures cannot be separated by filtration?  
A sand and water  
B stones and water  
C honey and water  
D chalk and water
- 3 Which of the following methods separates a liquid from an insoluble solid?  
A Distillation    B chromatography    C Evaporation    D Filtration
- 4 Salt can be obtained from sea water by  
A chromatography    B evaporation    C distillation    D filtration

5



With the set-up as shown above, this method can

- A separate a liquid from a mixture of miscible liquids  
B separate a solid from a mixture of solids  
C separate a solid from its solution  
D separate impurities from a solution
- 6 During ....., the liquid changes to vapour leaving behind the solid  
A evaporation    B filtration    C chromatography    D distillation
- 7 Which one of the following mixtures can be separated by evaporation?  
A Salt and water  
B Alcohol and water  
C Oil and water  
D Petrol and water
- 8 The correct order for purifying impure salt (sodium chloride) using water is  
A filtration, evaporation, dissolving  
B evaporation, filtration, dissolving  
C dissolving, filtration, evaporation  
D dissolving, evaporation, filtration

**2.1(e) Filtration & Evaporation**

9 Sodium chloride dissolves in water but calcium carbonate does not. Which of the following methods is the **most** suitable for separating a mixture of these two substances? (97PMB)

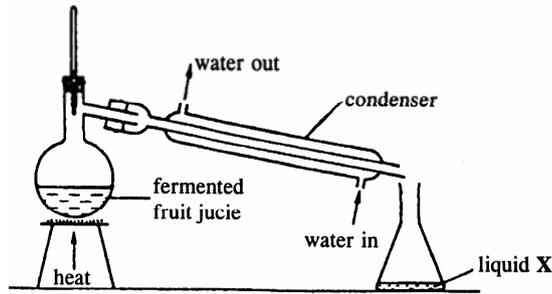
- A add water, cool and then evaporate to dryness
- B add water, stir and then separate by chromatography
- C add water, stir and then separate by distillation
- D add water, filter and then evaporate the filtrate

10 D

11 C

2.1(f) Distillation

1 The diagram shows an apparatus used to distill fermented fruit juice. What is liquid X ?

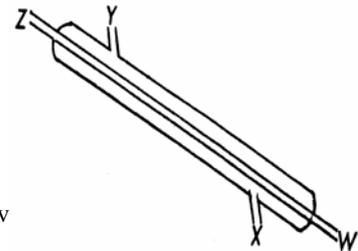


- A Alcohol and water    B Sugar and water    C Water only    D Sugar only

2 What is the use of condenser in the distillation process?

- A To purify the liquid  
 B To condense the vapour to liquid  
 C To remove impurities in the liquid  
 D To cool the liquid

3 The diagram shows a condenser used in the laboratory for distillation. The water acting as a coolant should enter at

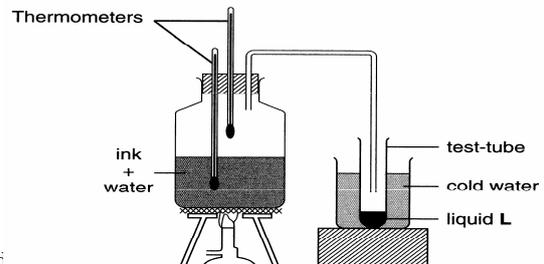


- A W    B X    C Y    D Z

4 In the figure the bottle contains water to which a few drops of blue ink have

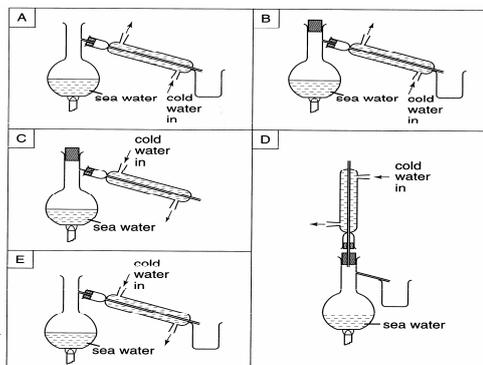
The liquid L collected in the test-tube will be

- A blue ink  
 B Chlorine  
 C Hydrogen peroxide  
 D pure water



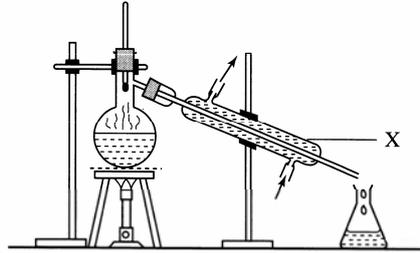
5 Which of the following apparatus shown below would if you wish to obtain some pure water from sea water? (90)

Ans: B



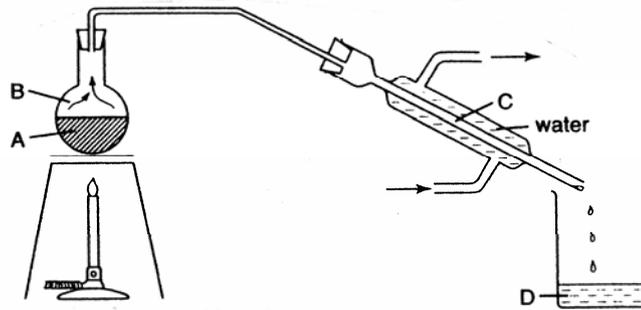
2.1(f) Distillation

6 The use of apparatus X in the following diagram is to



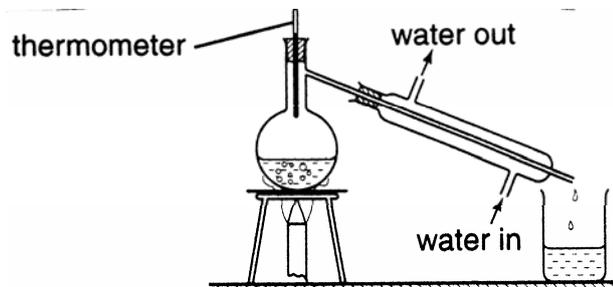
- A help the liquid to evaporate
- B cool the vapour passing through it
- C absorb the vapour
- D convert the vapour to solid

7 Figure shows the apparatus used to obtain pure water. At which region does condensation take place? (97PMB)



Ans: C

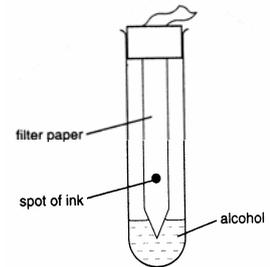
8 Name the method of separation as shown in the figure. (2000S)



- A Boiling
- B Distillation
- C Evaporation
- D Filtration

2.1(g) Paper chromatography

1 The following figure shows an experiment on paper chromatography.



In the above experiment,

- A the ink reacts with the alcohol
- B the ink spot disappears
- C the ink separates into different components
- D the ink remains unchanged

2 Chromatography is a separation method suitable for the following process **except** to

- A identify the coloured components in inks
- B test the purity of a substance
- C identify dyes in foodstuff
- D obtain a pure sample of dyes

3 Chromatography is the

- A combination of different substances to form a compound
- B separation of liquids from a solution
- C mixing of two or more liquids
- D separation of the different components in a mixture

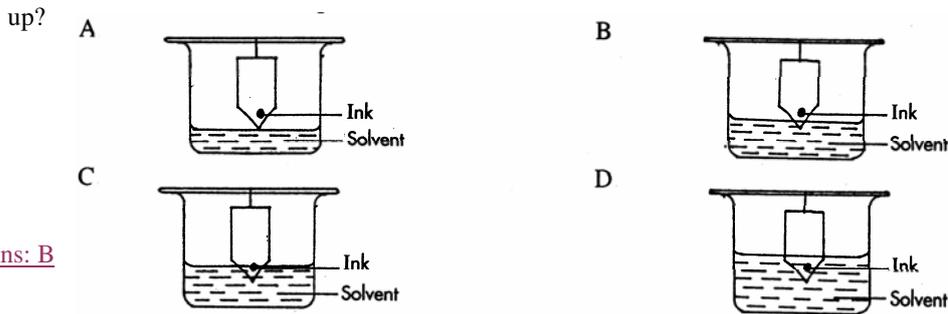
4 The different pigments in flower petals can be separated by

- A evaporation
- B chromatography
- C distillation
- D filtration

5 The various components of a substance become separated during chromatography because its components

- A have different speed
- B have different colours
- C have different particle shape
- D have different temperature

6 A science student wanted to separate some ink using paper chromatography. Which diagram is the correct set-up?



Ans: B

7 A

## 2.2 (a) Gases in the air

1 When a gas was tested, the following properties were noticed: colourless, heavier than air, soluble in water, does not support combustion. The gas is

- A oxygen    B hydrogen    C nitrogen    **D carbon dioxide**

2 A gas is found to be colourless, odourless, not combustible but support combustion. This gas is

- A hydrogen    B carbon dioxide    **C oxygen**    D nitrogen

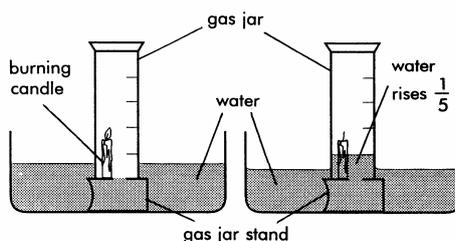
3 Ali carried out some experiments on a colourless gas. The results are shown as follows:

Test	Observation
i with glowing splint	rekindles
ii with lighted splint	burns brighter

What can be concluded from the above results ?

- A The gas does not support combustion    C The gas is hydrogen  
**B The gas supports combustion**    D The gas is nitrogen

4 In the experiment as shown in the figure, the candle was lit and a gas jar was placed over it. The candle continued to burn for a while



When the candle stopped burning, the water rose to one fifth the volume of the gas jar. This is because

- A air dissolved in water    **C 20% of air is oxygen**  
 B air does not support combustion    D 20% of oxygen in water is used up

5 Which of the following gases is a noble gas ?

- A neon**    B hydrogen    C oxygen    D chlorine

6 Ahmad tested a gas. The table below shows the observations of the tests.

Test	Observations
With glowing splint	Glowing splint did not relight
With burning splint	The gas did not burn
With lime water	Limewater remained clear

The gas is

- A oxygen    **B nitrogen**    C hydrogen    D carbon dioxide

7 The chemical name for lime water is

- A calcium oxide    **C calcium hydroxide**  
 B calcium chloride    D calcium carbonate

## 2.2 (a) Gases in the air

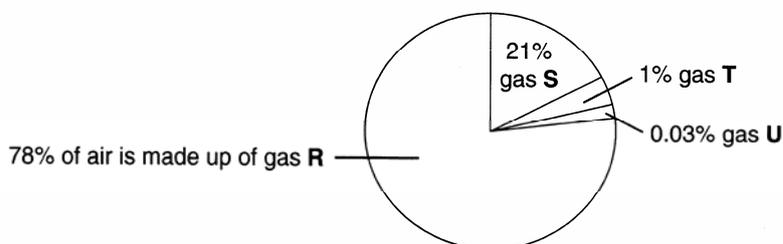
- 8 All the following contain carbon dioxide, **except** (95)
- A aerated drinks  
B exhaled air  
C hot air  
D welding gas
- 9 After a candle has stopped burning in a jar, the composition of air in the jar changes. Which of the gas constituents in the jar would most likely increase in percentage by volume? (95)
- A carbon dioxide  
B helium  
C hydrogen  
D oxygen
- 10 Which of the following Noble gases is used in balloons and airships? (97BJCE)
- A argon  
B helium  
C krypton  
D neon
- 11 Which gas puts out a burning splint and turns lime water milky? (98)
- A carbon dioxide  
B hydrogen  
C nitrogen  
D oxygen
- 12 Gas X and gas Y were tested with a red bicarbonate indicator solution and a glowing splint. The results obtained are shown in the table below.

EXPERIMENT	GAS X	GAS Y
Gas tested with glowing splint.	The glowing splint rekindled.	The glowing splint extinguished.
Gas tested with a red bicarbonate indicator solution.	The red bicarbonate indicator solution turned purple.	The red bicarbonate indicator solution turned yellow.

What can be concluded about gas X and gas Y? (99)

- | Gas X            | Gas Y          |
|------------------|----------------|
| A carbon dioxide | oxygen         |
| B carbon dioxide | nitrogen       |
| C oxygen         | carbon dioxide |
| D oxygen         | nitrogen       |

- 13 Air is a mixture of gases. The average composition of air is shown in the pie chart the figure



Gas R is the most abundant gas in the air. Which of the following is the property of gas R? (99)

- A It supports rusting  
B It has a strong smell  
C It is a colourful gas  
D It is a neutral gas

**2.2 (a) Gases in the air**

14 B

15 C

16 B

17 B

## 2.2 (b) Air pollution

1 Global warming is the result of

- A excessive nitrogen in the atmosphere
- B excessive oxygen in the atmosphere
- C excessive carbon dioxide in the atmosphere
- D excessive carbon monoxide in the atmosphere

2 Which of the following are green house gases ?

- I Carbon dioxide    II Oxygen    III Nitrogen    IV oxides of nitrogen

- A I and II
- B I and IV
- C II and III
- D II and IV

3 One of the measures to reduce global warming is to stabilise the amount of carbon dioxide in the atmosphere. Which one of the following methods is the most suitable ?

- A use lime water to absorb excessive carbon dioxide
- B plant more trees to absorb carbon dioxide through photosynthesis
- C use hydrogen as fuel which do not emit carbon dioxide on burning
- D use bicycles as alternative to automobiles to reduce carbon dioxide emissions

4 Which one of the following gases is **not** a pollutant of the atmosphere ?

- A Sulphur dioxide
- B Oxides of nitrogen
- C Carbon monoxide
- D Carbon dioxide

There is NO answer. (ALL of A, B, C and D are pollutants)

**Definition of pollutants (from internet: wikipedia):**

Substances not naturally found in the air or at greater concentrations or in different locations from usual are referred to as 'pollutants'.

**Major primary pollutants produced by human activity include:**

- [Sulfur oxides](#) (SO<sub>x</sub>) especially [sulfur dioxide](#) are emitted from burning of coal and oil.
- [Nitrogen oxides](#) (NO<sub>x</sub>) especially [nitrogen dioxide](#) are emitted from high temperature combustion.
- [Carbon monoxide](#) is colourless, odourless, non-irritating but very poisonous gas. It is a product by incomplete combustion of fuel such as natural gas, coal or wood. Vehicular exhaust is a major source of carbon monoxide.
- [Carbon dioxide](#) (CO<sub>2</sub>), a [greenhouse gas](#) emitted from combustion and respiration.
- Smoke and dust. They affect the bronchi and lungs.
- [Chlorofluorocarbons](#) (CFCs), harmful to the [ozone layer](#)
- [Odors](#), such as from garbage, sewage, and industrial processes

## 2.2 (b) Air pollution

5 Carbon monoxide gas is harmful because it

- A poisons the blood  
B causes rusting  
C forms acid rain  
D causes cancer

6 Which one of the following gases can cause acid rain ?

- A Carbon monoxide  
B Carbon dioxide  
C Sulphur dioxide  
D Lead compounds

7 Which fuel causes the least pollution ?

- A Coal    B Diesel    C Natural gas    D Wood

8 Emissions resulting from combustion of fuels is largely the cause of pollution in the atmosphere. Which of the following emissions do not pollute ?

- A Emissions from rockets  
B Emissions from ships  
C Emissions from automobiles  
D Emissions from chimneys

9 Which class of vehicles do not emit pollutants ?

- A Buses    B Ships    C Trucks    D Electric trains

10 Which one of the following is a pollutant ? (2000S)

- A Nitrogen    B Oxygen    C Sulphur dioxide    D Water vapour

11C