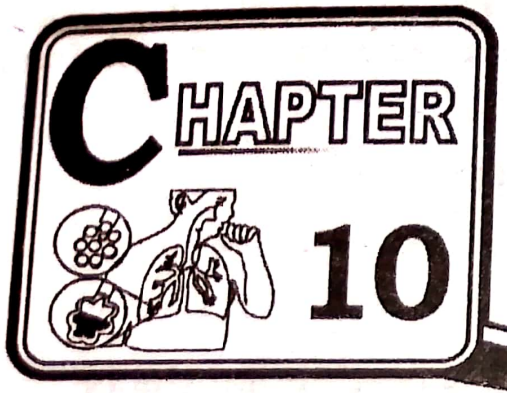


GASEOUS EXCHANGE

Q.No.1 Encircle the correct option from the given multiple choices.

GASEOUS EXCHANGES IN PLANTS

(1) _____ type of reactions are responsible for energy production in cells.

(a) Hydrolysis (b) Oxidation Reduction
(c) Acid base (d) All of following

(2) The aquatic plants get the oxygen form _____

(a) O of H_2O (b) O_2 dissolved in H_2O
(c) O_3 of air (d) All above

(3) Breathing is _____ process.

(a) Mechanical (b) Biochemical (c) Both a and b (d) Only b

(4) Gaseous exchange can occur through

(a) Stomata (b) Lenticels
(c) Cuticle of young plant (d) All of above

GASEOUS EXCHANGES IN HUMAN

(5) Pulmonary vein contain _____ blood.

(a) Oxygenated (b) Deoxygenated (c) Mixed (d) None

(6) _____ characteristics of man is superior to all other creations.

(a) Exercise (b) haris on skins (c) Speech (d) Playing

(7) If a person has eaten something or drunk any fluid, he is not given anesthesia because _____

(a) Epiglottis can remain open (b) Glottis can close
(c) Nostrils can occlude (d) Heart stops beating

(8) When volume in a container decreases _____ increases

(a) Temp (b) Kinetic Energy (c) Pressure (d) All of above

(9) The breathing movement are _____

(a) Voluntary (b) Involuntary (c) Both a and b (d) None of above

(10) _____ Help in warming of air and keep it temperature equal to that of body

(a) Lung (b) Mucus (c) Hairs (d) Pharynx

(11) The flap of tissue that guard the glottis is called _____

(a) Pharynx (b) Epiglottis (c) Trachea (d) Both of a and b

(12) **Bronchi are present at _____**

(a) Above chest cavity (b) Below chest cavity

(c) In chest cavity (d) None

(13) **_____ have no cartilage in walls**

(a) Trachea (b) Bronchi (c) Bronchioles (d) Alveolar ducts

(14) **The function of fluid between pleural fluid is _____**

(a) Provide lubrication (b) Pumping of lungs

(c) Provide vitamins (d) All above

(15) **The partial pressure of O_2 is _____ in blood as compared to environment.**

(a) High (b) Low (c) Equal (d) Very high

(16) **The concentration of CO_2 stimulates the respiratory center in brain which are _____**

(a) Medulla oblongata (b) PONS

(c) Cerebrum (d) Both a and b

RESPIRATORY DISORDERS

(17) **The conc. of CO_2 in expired air is _____**

(a) 16% (b) 4% (c) 79% (d) 3%

(18) **_____ can cause bronchitis.**

(a) Virus (b) Bacteria (c) Tar (d) All of above

(19) **Mild wheezing, fever chills and short of breath are symptoms of _____**

(a) Cancer (b) Emphysema (c) Lung cancer (d) Asthma

(20) **Bronchodilators are usually used in _____**

(a) Emphysema (b) Lung cancer (c) Asthma (d) All above

(21) **The surface area of lungs are decreased majority in _____**

(a) Pneumonia (b) Emphysema (c) Lung cancer (d) Asthma

(22) **_____ is disease in which patient skin colour may change and become dusky or purplish.**

(a) Pneumonia (b) Lung cancer (c) Asthma (d) All

(23) **_____ are symptoms of Pneumonia**

(a) High fever (b) Shivering (c) Sputum production (d) All above

(24) **Pneumonia can occur because of _____**

(a) Bacteria (b) Virus (c) Fungi (d) All above

(25) **Pollens of flowers cause _____**

(a) Allergy (b) Asthma (c) Both a and b (d) Only b

(26) **_____ was used as insecticide in past**

(a) Phosphorous (b) Carbon (c) Nicotine (d) All above

(27) **World No Tobacco day is celebrated on _____**

(a) 21st May (b) 31st May (c) 25th May (d) 25th June

(28) **α, β, γ and X-rays can cause**

(a) Bronchitis (b) Lung cancer (c) TB (d) Pneumonia

(29) **Cigarette affects our body at _____**

(a) Lungs (b) Mouth (c) Kidney (d) Bones

(e) All of the above

(30) **The effect of CO is _____**

(a) Enhance R.B.C's (b) Enhance W.B.C's

(c) Decrease oxygen carrying capacity (d) None of above

ANSWER KEY

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	b	11	b	21	b
2	b	12	c	22	a
3	a	13	d	23	d
4	d	14	a	24	d
5	a	15	b	25	c
6	c	16	d	26	c
7	a	17	b	27	b
8	c	18	d	28	b
9	b	19	b	29	e
10	b	20	c	30	c

Q.No.2 Answer these questions. Answer to each part should not exceed three to four lines.

GASEOUS EXCHANGES IN PLANTS

Q.1 Deferenciate between following

(a) Stomata (b) Lenticles

Ans:

(a) Stomata

The leaves and young stems have stomata in their epidermis. The gaseous exchange occurs through these stomata. The inner cells of leaves (mesophyll) and stems also have air spaces among them, which help in the exchange of gases

(b) Lenticles

In woody stems and mature roots, the entre surface is covered by bark which is impervious to gases or water. Howere. There are certain pores in the layer of bark. These are called the lenticels

Q.2 What do you know about the terms.

(a) Cellular Respiration

(b) Aerobic respiration

Ans:

(a) Cellular Respiration:

Cellular Respiration is the process in which C–H bonds in food are broken by oxidation reduction reactions and energy is transformed into ATP.

(b) Aerobic Respiration?

In Aerobic Respiration oxygen is used and there is complete oxidation of food material carbon dioxide and water are also produced in this process

Q.3 What is the fate of oxygen and CO_2 during this cellular respiration

Ans: Organisms get the oxygen needed for cellular respiration, from their environment and provide it to their cells the carbon dioxide produced during cellular respiration is taken out of the cells and ultimately from body

GASEOUS EXCHANGES IN HUMAN

Q.4 What is voicebox and why it is called so

Ans: The **larynx** is a box, made of cartilage. It is present between pharynx and tracheas. It is also called the voice box. Two pairs of fibrous bands called vocal cords are stretched across the larynx. **The vocal cords vibrate when the air passes through them. This vibration produces sounds.**

Q.5 Write short note on windpipe?

Ans: Trachea is called windpipe. It is about 12 cm log tube which lies in from of oesophegus. There are C- shape cartilage in ring in the walls of trachea. The cartilage keep the trachea from collapsing even when there is no air in it.

Q.6 Oifferenciate between following

(a) Broncholes (b) Alveolar duct (c) Alveoli

Ans:

(a) Broncholes

The bronchi continue dividing in the lungs until they make several fine tubes called bronchioles.

(b) Alveolar duct

The bionchioles progressively lose the cartilages as they become narrower. The bronchioles end as fine tubules called the alveolar ducts.

(c) Alveoli.

Each alveolar duct opens into a cluster of pouches called alveoli. The alveoli form the respiratory surface in human body. Each alveolus is a sac-like structure lined by a single layer of epithelial cells. It is bound on the outside by a network of capillaries

Q.7 Write short note on lungs

Ans: All the alveoli on one side constitute a lung. There is a pair of lungs in the thoracis cavity. The chest wall is made up of 12 pairs of ribs and the rib muscles called intercoastal muscles. A thick muscular structure, called diaphragm, is present below the lungs.

The left lung is slightly smaller and has two lobes and the right lung is bigger with three lobes. They are spongy and elastic organs. The lungs also have blood vessels that are the branches of the pulmonary arteries and veins. Each lung is enclosed by two membranes called the outer pleural membrane and the inner pleural membrane. The membranes enclose a fluid which provides lubrication for the free expanding and contracting of the lungs.

Q.8 How a person breath?

Ans: During inspiration, the rib muscles contract and ribs are raised. At the same time the dome –shaped diaphragm contracts and is lowered. These movements increase the area of the thoracic cavity, which reduces the pressure on lungs. As a result, the lungs expand and the air pressure within them also decreases. The air from outside rushes into the lungs to equalize the pressure on both sides.

After the gaseous exchange in the lungs, the impure air is expelled out in exhalation. The rib muscles relax bringing the ribs back to the original position. The diaphragm muscles also relax and it gets its raised dome shape. This reduces the space in the chest cavity and increases the pressure on lungs. The lungs contract and the air is expelled out of them.

Q.9 Why during exercise the rate of respiration / Breathing is increased

Ans: The rate of breathing is controlled by the respiratory centre in the brain. The respiratory centre is sensitive to the concentration of carbon dioxide in the blood. When we do exercise or some hard job our muscle cells carry out cellular respiration at greater rate. It results in the production of more carbon dioxide which is released in the blood. This greater than normal concentration of carbon dioxide stimulates the respiratory centre of brain. The respiratory centre sends messages to the rib muscles and diaphragm to increase the rate of breathing so that the excess carbon dioxide present in blood can be removed out of body.

Q.10 What is pharynx, discuss its role.

Ans: The nasal cavity opens into the pharynx by means of two small openings called internal nostrils. Pharynx is a muscular passage and is common to both food and air. It extends to the opening of the oesophagus and the larynx. The air goes from the pharynx into the larynx.

Q.11 Differentiate between breathing and respiration? Also define gaseous exchange

Ans:

Breathing	Respiration
• The term breathing is used for process through which animals take air in their bodies to get oxygen from it and then give out the air for getting rid of carbon dioxide • Breathing is only mechanical or physical process of exchange of gases	• Respiration involves mechanical and biochemical process

Gaseous exchange

Taking in oxygen and giving out carbon dioxide is termed as gaseous exchange

Q.12 How speech is produced? Also discuss the function of mucus and cilia?

Ans: Speech:

The vibrations in vocal cords and movements of lips cheeks, tongue and jaws produce specific sounds which result in speech. Speech is an ability that ALLAH has gifted only to human and this is one of characteristics which has put human beings superior to all.

Fntion of Mucus land Cilia

The mucus moistens the air and also traps any fine particles of dust or bacteria that have escaped from nasal cavity. The cilia beat with an upward motion so that foreign particles along the mucus are sent to the oral cavity from where it may be either swallowecl or couaned out

RESPIRATORY DISORDERS

Q.13 Why the % of respiratory disorders are high in Pakistan? Also tell horrers of pneumonia and lung cancer?

Ans: The percentage of respiratory disorders are particularly high in Pakistan. It is due to more concentration of air pollutants not only in urban but also in rural atomosphere

Harrers of Pneumonia and cancer

Prior to the discovery of antiabiotics one third of pneumonia patients dicd from infection

And

Lung cancer is the most common cause of cancer related deaths. It is responsible for more 1.3 million deaths world wide annually

BAD EFFECTS OF SMOKING

Q.14 What is nicotine? What are its bad effects?

Ans: Nicotine is a powerful poison and was widdly used as an insecticide in the past. When inhaled through tobacco smoking, It reaches our circulatory system and hot only hardens the walls of arteries but also damages the brain tissue

Q.15 What is % age of passive smokers to develop heart diseases and lungcancer? (B) Also tell when world not tobacco day is celerebrated

Ans: According to WHO, the rate of smoking have declined in developed world but non smokers who are exposed to second hand smoke at home or work increase their heart disease risk by 25-30% and their lung cancer risk by 20 – 30%

World Natobaccoday

The world No Tobacco Day is celebrated on 31st of may every year

Q.16 Answer the following

(a) What happen to lungs if person stop smoking?

(b) How does smoking affect the social life of a person.

(c) Either breathing movements are voluntary or pnvoluntry?

Ans: Cessaltion of smoking

If a person stops smoking the chance to develop cancer decreases as damage to lungs is repaired and contaminant particles are gradually removed

Effect of smoking on social life

Smoking effects the social life of a person. Smokers may face social unacceptance because other people may not want to be exposed to others smoke

Breathing movements

The breathing movements are involuntary to a large extent. However we can control the rate of breathing but not for a lingtime

Q.17 (a) What is Bronchitis

(b) Discuss its types

Ans:

(a) **Bronchitis** is the inflammation of the bronchi or bronchioles. It results in excessive secretions of mucus into the tubes, leading to the swelling of tubular walls and narrowing of tubes

Types of Bronchitis

(b) There are two major types of bronchitis. i.e. acute and chronic. The acute bronchitis usually lasts about two weeks and patients recovers with no permanent damage to the bronchi or bronchioles. In chronic bronchitis the bronchi develop chronic inflammation. It usually last for three months to two years.

Q.18 What is Emphysema? Discuss its symptoms

Ans: Emphysema is the destruction of the walls of the alveoli. It results in larger sacs but with less surface area for gaseous exchange (Fig. 10.9). As lung tissue breaks down, the lungs do not come back to their original shape after exhalation. So air cannot be pushed out and is trapped in the lungs.

Figure 10.9: The Alveoli; normal (left) and emphysema (right)

The symptoms of emphysema include shortness of breath, fatigue, recurrent respiratory infections and weight loss. By the time the symptoms of emphysema appear, the patient has usually lost 50% to 70% of his / lung tissue. The level of oxygen in blood may get so low that it causes serious complications.

Q.19 What is pneumonia? Discuss it pathophysiology?

Ans: Pneumonia is an infection of lungs. When the causative organisms enter the alveoli, they settle there and grow in number. They break the lung tissues and the area becomes filled with fluid and pus.

Q.20 What are causes and symptoms of Asthma?

Ans: In asthma patients, the bronchi band bronchioles become sensitive to different allergents (allergy causing factors) e.g. dust. Smoke. Perfumes, pollens etc. When exposed to any of such allergens, the sensitive airways show immediate and excessive response of constriction. In this condition, the patient feels difficulty in breathing.

The **symptoms** of asthma vary from person to person. The major symptoms include shortness of breath (especially with exertion or at night), wheezing (whistling sound when breathing out), cough and chest tightness.

Q.21 Is Lung cancer a serious and proliferative disease?

Ans: **Yes** Lung cancer is a disease of uncontrolled cell divisions in the tissues of the lung. The cells continue to divide without any control and form tumours. The cellular growth may also invade adjacent tissues beyond the lungs. So it is serious and proliferative disease.

Q.22 Give your comments on

(a) Causes of smoking

(b) Passive smoking

Ans: The main cause of any cancer include carcinogens (such as those in cigarette smoke), ionizing radiation and viral infection. Smoking is the main cause of lung cancer. This risk of lung cancer is significantly lower in non-smokers. Cigarette smoke contains over 50 known carcinogens.

Passive smoking (the inhalation of cancerous smoke from another's smoking) is also a mass cause of ling cancer. The smoke from the burning end of a cigarette is more dangerous than the smoke from the filter end.

Q.23 Smoking dangerous for blood?

Ans: Yes smoking also has effects on the circulatory system. The carbon monoxide present in tobacco smoke lessens the oxygen- carrying capacity of haemoglobin. Many other chemicals in smoke increase the production of blood platelets. When platelets are more than the normal numbers, they make the blood viscous and it can lead to arteriosclerosis.

LONG QUESTIONS

Q.No.1 Explain gaseous exchange in plants.

GASEOUS EXCHANGE IN PLANTS

Lack of Organ System Level:

Plants have no organs or systems for the exchange of gases with the environment. Every cell of the plant body exchanges gases with the environment by its own.

Gaseous Exchange through Cuticle:

In young stems and leaves, some gaseous exchange occurs through the cuticle which is present over their epidermis.

Gaseous Exchange through Stomata:

The leaves and young stems have stomata in their epidermis. The gaseous exchange occurs through these stomata.

Gaseous Exchange through Air Spaces:

The inner cells of the leaves (mesophyll) and stems have air spaces among them, which help in the exchange of gases.

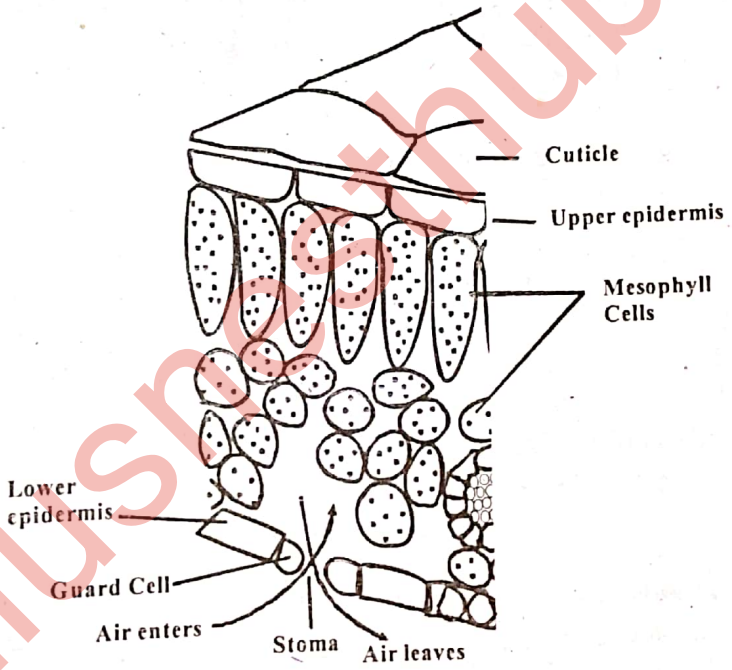


Figure: Gaseous Exchange in a Leaf

Leaf Cells during Day Time:

During the day time, when the mesophyll cells of leaves are carrying out photosynthesis and respiration side by side, the oxygen produced in photosynthesis is utilized in cellular respiration. Similarly, the carbon dioxide produced during cellular respiration is utilized in photosynthesis.

Leaf Cells during Night Time:

During night, when there is no photosynthesis occurring, the leaf cells get oxygen from the environment and release carbon dioxide through stomata.

Gaseous Exchange through Lenticels:

In woody stems and mature roots, the entire surface is covered by bark which is impervious to gases or water. The lenticels allow air to pass through them.

Lenticels: The pores in the layer of bark are called as lenticels.

Presence: The lenticels are slightly more raised than the general surface of the stem.

Gaseous Exchange through Roots:

Gases diffuse in and out of the general surface of the young roots. The gases are found in the soil surrounding the roots.

Gaseous Exchange in Aquatic Plants:

The aquatic plants get the oxygen dissolved in water and release carbon dioxide in the water.

Q.No.2 Write a note on human respiratory system.

HUMAN RESPIRATORY SYSTEM

The human respiratory system consists of two parts:

1) The Air Passageway 2) The Lungs

1) THE AIR PASSAGEWAY

The air passageway consists of the parts through which the outside air comes in the lungs and after the exchange of gases it goes out. The passage of air consists of the following parts:

(i) Nostrils (ii) Nasal cavity (iii) Internal Nostrils (iv) Pharynx
(v) Larynx (vi) Trachea (vii) Bronchi (viii) Bronchioles
(ix) Alveolar Ducts (x) Alveoli

(i) Nostrils:

The nasal cavity opens to the outside through the openings called nostrils.

(ii) Nasal cavity:

The nose encloses the nasal cavity. The nasal cavity is divided into two portions by a wall. Each portion is lined by fine hairs and mucous which filter the dust particles from the air. The mucous also moistens and warms the incoming air and keeps its temperature nearly equal to that of the body.

(iii) Internal Nostrils:

The nasal cavity opens into pharynx by means of two small openings called internal nostrils.

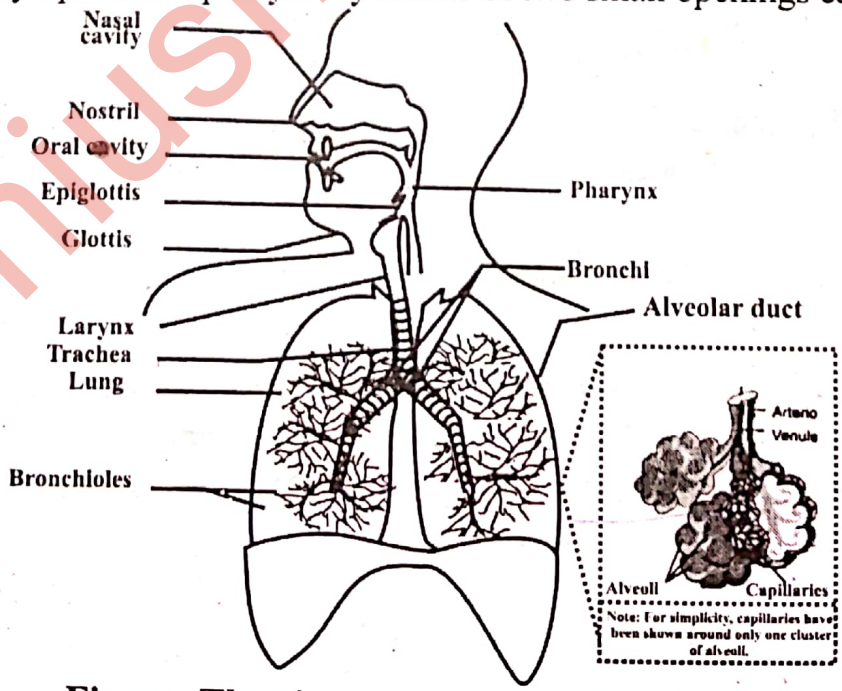


Figure: The air passageway and the lungs

(iv) Pharynx:

Pharynx is a muscular passage and is common to both food and air. It extends to the opening of oesophagus and the larynx.

(v) Larynx:

The air goes from the pharynx into the larynx. The larynx is the box made of cartilage. It is present between pharynx and trachea. It is also called as voice box.

- **Glottis:**
  Glottis is a narrow opening at the floor of the pharynx which leads to larynx.
- **Epiglottis:**
  The glottis is guarded by a flap of tissue called the epiglottis.
- **Vocal Cards:**
  Two pairs of fibrous bands called vocal cards are stretched along the larynx. The vocal cards vibrate when the air passes through them. This vibration produces sounds.

(vi) Trachea:

Larynx continues to the trachea, which is also called as wind pipe. It is about 12 cm long tube which lies in front of the oesophagus. There are C-shaped cartilaginous rings in the wall of trachea. The cartilages keep the trachea from collapsing even when there is no air in it.

(vii) Bronchi:

On entering the chest cavity, the trachea divides into two smaller tubes called bronchi. The singular of bronchi is bronchus. The bronchi also have cartilaginous plates in their walls. Each bronchus enters into the lung of its side and then divides into smaller branches.

(viii) Bronchioles:

The bronchi continue dividing in the lungs until they make several fine tubes called bronchioles.

(ix) Alveolar Ducts:

The bronchioles progressively lose the cartilage and they become narrower. The bronchioles end as fine tubules called the alveolar ducts.

(x) Alveoli:

Each alveolar duct opens into a cluster of pouches called alveoli. The alveoli form the respiratory surface in human body. Each alveolus is a sac like structure lined by a single layer of epithelial cells. It is bound on the outside by a network of capillaries.

Blood Circulation:

The pulmonary artery from the heart containing deoxygenated blood enters the lungs and branches into arterioles and then into capillaries which surround the alveoli. These then join together to form the venules which form pulmonary vein. The pulmonary vein carries the oxygenated blood back to heart.

2) THE LUNGS

All the alveoli on one side constitute a lung.

Number:

There is a pair of lung in the thoracic cavity.

Chest Wall:

The chest wall is made up of 12 pairs of ribs and the rib muscles called the intercoastal muscles.

Diaphragm:

A thick muscular structure called diaphragm is present below the lungs.

Size:

The left lung is slightly smaller and has two lobes and the right lung is bigger and has three lobes.

Elasticity:

The lungs are spongy and elastic organs.

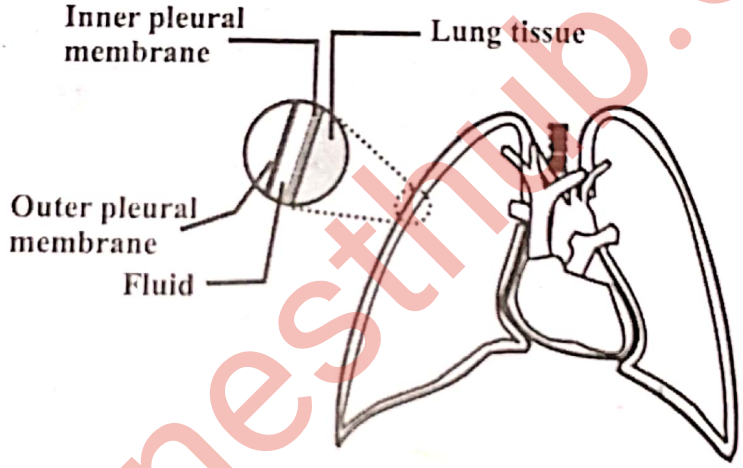


Figure: Lungs and Pleural Membranes

Blood Circulation:

The lungs have blood vessels that are the branches of pulmonary arteries and veins.

Protection:

Each lung is enclosed by two membranes called the outer pleural membrane and the inner pleural membrane. The membranes enclose a fluid which provides lubrication for the free expanding and contracting of the lungs.

Q.No.3 Explain the mechanism of breathing.

THE MECHANISM OF BREATHING

Breathing:

The physical movements associated with the gaseous exchange are called breathing.

Phases of Breathing:

There are two phases of breathing:

1) Inhalation 2) Exhalation

1) INSPIRATION OR INHALATION

During inspiration, the rib muscles contract and ribs are raised. At the same time the dome-shaped diaphragm contracts and is lowered. These movements increase the area of the thoracic cavity, which reduces the pressure on lungs. As a result, the lungs expand and the air pressure within them also decreases. The air from outside rushes into the lungs to equalize the pressure on both sides.

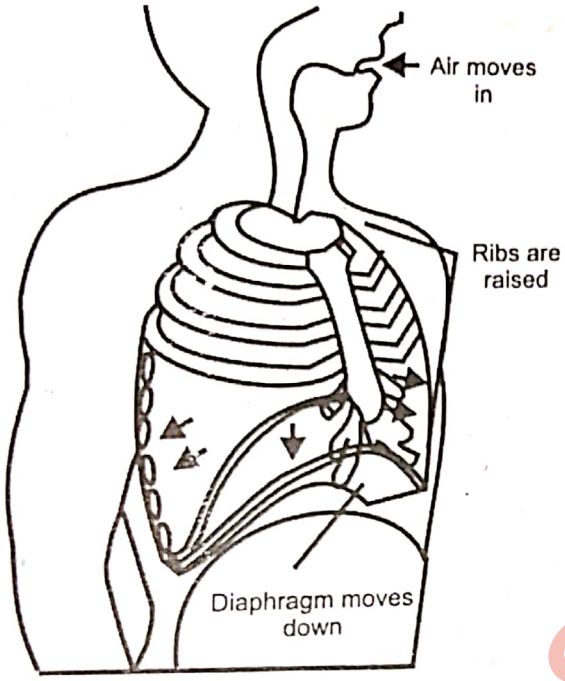


Figure: Steps of Inhalation

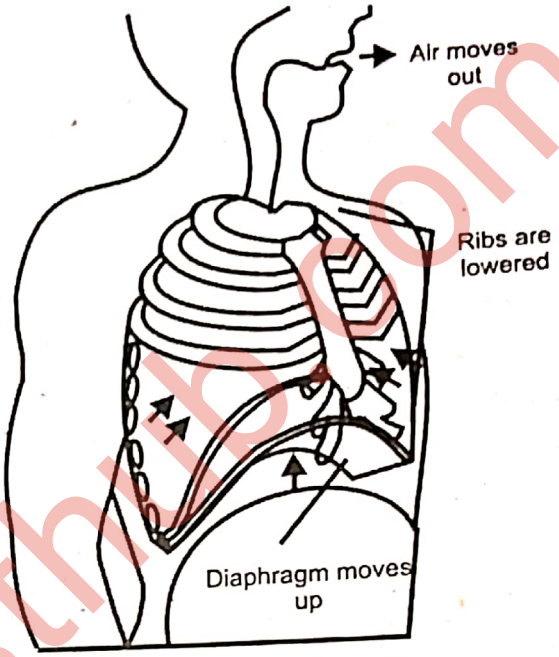


Figure: Steps of Exhalation

2. EXPIRATION OR EXHALATION

After the gaseous exchange in the lungs, the impure air is expelled out in exhalation. The rib muscles relax bringing the ribs back to the original position. The diaphragm muscles also relax and it gets its raised dome shape. This reduces the space in the chest cavity and increases the pressure on lungs. The lungs contract and the air is expelled out of them.

Normal Breathing Rate:

Humans breathe 16-20 times per minute in normal circumstances i.e. at rest.

Control of Breathing Rate:

The rate of breathing is controlled by the respiratory centre in the brain. The respiratory centre is sensitive to the connect ration of carbon dioxide in the blood.

Stimulation of Respiratory Centre:

When we do exercise or some hard job our muscle cells carry out cellular respiration at greater rate. It results in the production of more carbon dioxide which is released in the blood. This greater than normal concentration of carbon dioxide stimulates the respiratory centre of brain.

Response by Respiratory Centre:

The respiratory centre sends messages to the rib muscles and diaphragm to increase the rate of breathing so that the excess carbon dioxide present in blood can be removed out of body.

Maximum Breathing Rate:

During exercise or other hard physical works the breathing rate may increase up to 30-40 times per minute.

Q.No.4 Give a comparison between inspired and expired air.

COMPARISON BETWEEN THE INSPIRED AND THE EXPIRED AIR		
Feature	**Inspired Air**	**Expired Air**
Amount of oxygen	21%	16%
Amount of carbon dioxide	0.04%	4%
Amount of nitrogen	79%	79%
Amount of water vapours	Variable	Saturated
Amount of dust particles	Variable	Almost none
Temperature	Variable	Almost equal to body temperature

Q.No.5 Write a note on bronchitis.

BRONCHITIS

Definition:

The inflammation of the bronchi or bronchioles is called bronchitis.

Outcomes:

It results in excessive secretions of mucus into the tubes, leading to the swelling of tubular walls and narrowing of tubes.

Causes:

It is caused by:

- Viruses
- Bacteria
- Exposure to chemical irritants (e.g. tobacco smoke)

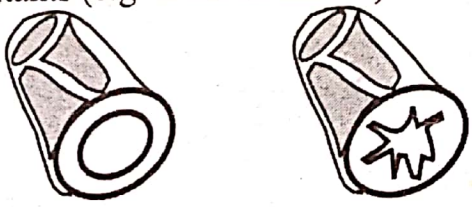


Figure: Normal Bronchus **Inflamed Bronchus**

Types of Bronchitis:

There are two major types of bronchitis i.e. acute and chronic.

Acute Bronchitis:

The acute bronchitis usually lasts about two weeks and patients recover with no permanent damage to the bronchi or bronchioles.

Chronic Bronchitis:

In chronic bronchitis, the bronchi develop chronic inflammation. It usually lasts for three months to two years. The majority of the people diagnosed with chronic bronchitis are 45 years of age or older.

Symptoms:

Symptoms of bronchitis include:

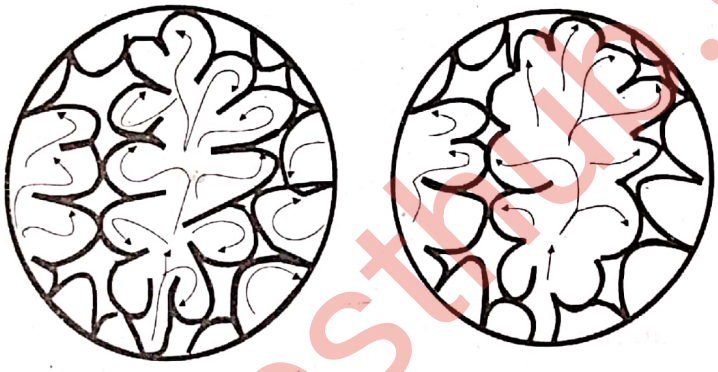
- Cough
- Mild wheezing
- Fever
- Chills
- Shortness of breath especially when doing hard job

Q.No.6 Write a note on emphysema.

EMPHYSEMA

Introduction:

Emphysema is the destruction of the walls of the alveoli.



Normal **Emphysema**

Figure: The Alveoli

Outcomes:

It results in larger sacs but with less surface area for gaseous exchange. As lung tissue breaks down, the lungs do not come back to their original shape after exhalation. So air cannot be pushed out and is trapped in the lungs.

Symptoms:

The symptoms of emphysema include:

- Shortness of breadth
- Fatigue
- Recurrent respiratory infections
- Weight loss

Appearance of Symptoms:

By the time the symptoms of emphysema appear, the patient has usually lost 50% to 70% of lung tissue.

Serious Complications:

The level of oxygen in blood may get so low that it causes serious complications.

Q.No.7 Write a note on pneumonia.

PNEUMONIA

Introduction:

Pneumonia is an infection of lungs.

Double Pneumonia:

If this infection affects both lungs, it is called double pneumonia.

Common Cause:

The most common cause of pneumonia is a bacterium, *Streptococcus pneumoniae*.

Other Causes:

- Viral infections (influenza virus)
- Fungal infections

Mode of Infection:

When the causative organisms enter the alveoli, they settle there and grow in number. They break the lung tissues and the area becomes filled with fluid and pus.

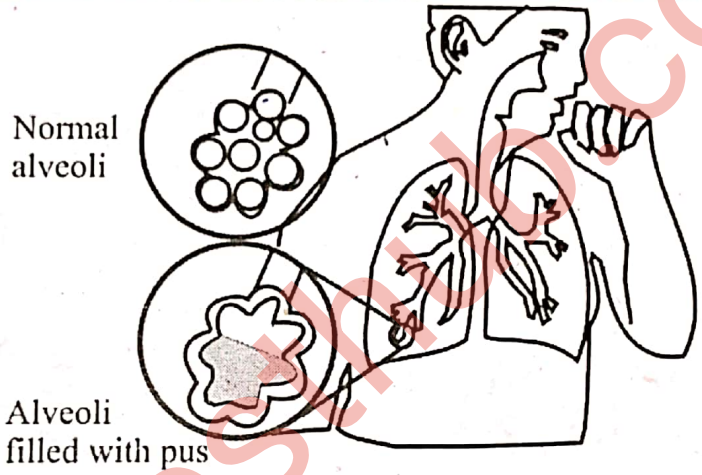


Figure: Pneumonia

Symptoms:

The symptoms of pneumonia include:

- Cold
- High fever
- Shivering
- Cough
- Sputum production
- Short of breath

Skin Colour:

The patient's skin colour may change and become dusky or purplish. It is due to poor oxygenation of blood.

Prevention:

Vaccines are available to prevent pneumonia caused by *S. pneumoniae*.

Treatment:

Antibiotics are used in the treatment of this type of pneumonia.

Fatal Disease:

Prior to the discovery of antibiotics, one-third of pneumonia patients died from the infection.

Q.No.8 Write a note on asthma.

ASTHMA

Introduction:

Asthma is a form of allergy.

Outcomes:

There is

- Inflammation of the bronchi
- More mucous production
- Narrowing of the airways

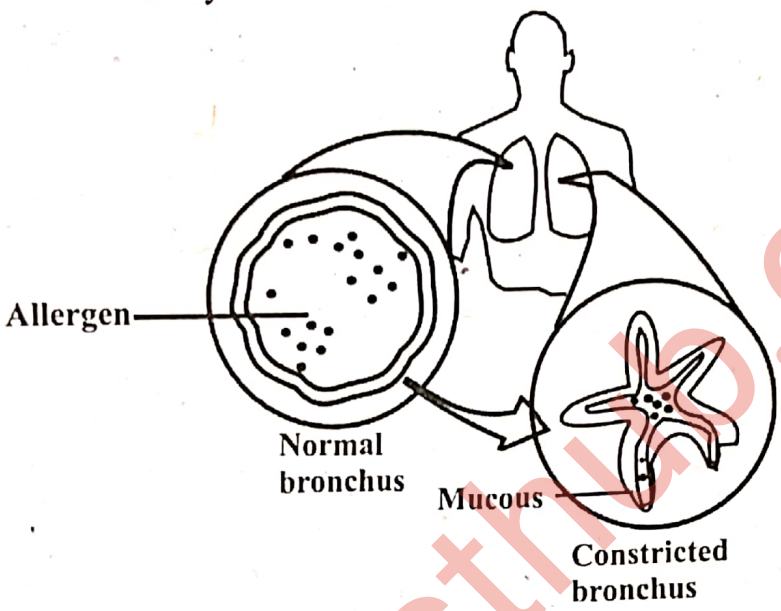


Figure: Asthma

Sensitivity:

In asthma patients, the bronchi and bronchioles become sensitive to different allergens. When exposed to any of such allergens, the sensitive airways show immediate and excessive response of constriction. In this condition, the patient feels difficulty in breathing.

Allergens:

The agents that cause allergy are called allergens.

Examples:

- Dust
- Smoke
- Perfumes
- Pollens

Symptoms:

The symptoms of asthma vary from person to person. The major symptoms include:

- Shortness of breath (especially with exertion or at night)
- Wheezing (whistling sound when breathing out)
- Cough
- Chest tightness

Treatment:

The chemicals with ability to dilate the bronchi and bronchioles are used in the treatment of asthma. Such medicine is given in the form of inhalers.

Q.No.9 Write a note on lung cancer.

LUNG CANCER

Introduction:

Lung cancer is a disease of uncontrolled cell divisions in the tissues of the lung. The cells continue to divide without any control and form tumours.

Malignant Tumours:

The cellular growth may also invade adjacent tissues beyond the lungs.

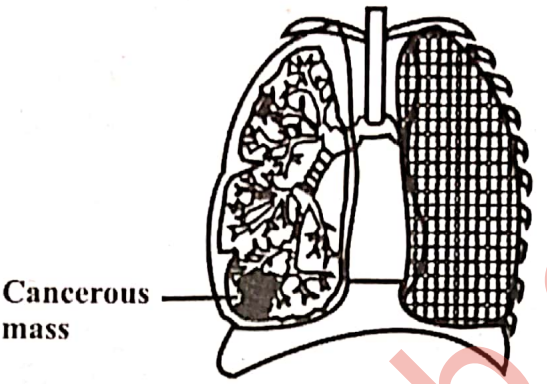


Figure: Lung Cancer

Symptoms:

The most common symptoms are:

- Shortness of breath
- Coughing (including coughing up blood)
- Weight loss

Major Cause:

Smoking is the main cause of lung cancer. This risk of lung cancer is significantly lower in nonsmokers. Cigarette smoke contains over 50 known carcinogens.

Other Causes:

The main causes include:

- Carcinogens
- Ionizing radiation
- Viral infection

Passive smoking:

The inhalation of smoke from another's smoking is called passive smoking. It is also a cause of lung cancer. The smoke from the burning end of a cigarette is more dangerous than the smoke from the filter end.

Prevention:

Eliminating tobacco smoking is a primary goal in the prevention of lung cancer.

Role of WHO:

The World Health Organization has called for governments to stop tobacco advertising to prevent young people from taking up smoking.

Q.No.10 Describe bad effects of smoking.

BAD EFFECTS OF SMOKING

Smoking is harmful due to the chemicals in cigarettes and smoke. Tobacco smoke contains over 4,000 different chemicals, out of which at least 50 are carcinogens and many are poisonous.

Misperception:

Many people think that lung cancer is the only smoking-related disease and it is the number one cause of death among smokers. But it is not right. Cigarette smoke affects the body from head to toe. Smokers have a much higher risk of developing a number of life threatening diseases.

Carcinogenic:

Smoking may also lead to the cancers in:

- Kidneys
- Oral cavity
- Larynx
- Breast
- Bladder
- Pancreas

Damage to Respiratory System:

Many chemicals in tobacco smoke damage the air passageway, which lead to emphysema and other respiratory disorders.

Effect on Circulatory System:

Smoking also has effects on the circulatory system. The carbon monoxide present in tobacco smoke lessens the oxygen-carrying capacity of haemoglobin.

Cause of Arteiosclerosis:

Many other chemicals in smoke increase the production of blood platelets. When platelets are more than the normal numbers, the make the blood viscous and it can lead to arteriosclerosis.

Lung Infections:

Smokers are at greater risk of developing infections, particularly in the lungs. For example, smoking increases the risk of tuberculosis by two to four times, and of pneumonia by four times.

Effect on Teeth:

Smoking is also responsible for weakening and staining the teeth. Tooth loss is 2 to 3 times higher in smokers than in non-smokers.

Effect of Nicotine:

Nicotine is a powerful poison and was widely used as an insecticide in the past. When inhaled through tobacco smoking, it reaches our circulatory system and not only hardens the walls of the arteries but also damages the brain tissues.

Passive Smokers:

Non-smokers who are exposed to second hand smoke (passive smoke) at home or work increase their heart disease risk by 25-30% and their lung cancer risk by 20-30%.

Effect of Smoking on Social Life:

Smoking affects the social life of a person. Smokers may face social unacceptance because other people may not want to be exposed to other's smoke.

EXERCISE MULTIPLE CHOICE QUESTIONS

❋ **Each question has four possible answers. Circle the correct answer.**

(i) **The process of gaseous exchange involves:**
(a) Breakdown of C-H bonds to yield energy.
(b) Physical movements that take air in and out of body.
(c) Getting oxygen from the air and removing carbon dioxide.
(d) Transport of oxygen by the blood to different parts of the body.

(ii) **Most of the gaseous exchange in a leaf occurs through:**
(a) Stomata (b) General surface (c) Cuticle (d) Lenticels

(iii) **How many bronchi are there in the air passageway?**
(a) One (b) Two (c) Many (d) None

(iv) **Where does the gaseous exchange occur in humans?**
(a) Pharynx (b) Trachea (c) Bronchi (d) Alveoli

(v) **Which structure actively helps in taking the air out of lungs?**
(a) Nasal cavity (b) Bronchus (c) Bronchiole (d) Diaphragm

(vi) **The primary chemical stimulus for breathing is the concentration of:**
(a) Carbon dioxide in blood (b) Oxygen in blood
(c) Carbon dioxide in muscles (d) Oxygen in muscles

(vii) **Point out the FALSE statement about respiration:**
(a) Gases can easily pass through the walls of the alveoli
(b) Gas exchange in lungs is very efficient because lungs provide large surface area
(c) In emphysema the walls of alveoli break and there is more surface area
(d) Dust particles can damage the lung by irritating the inner alveoli surface.

(viii) **A disease involving the breakdown of air sacs of the lungs is:**
(a) Pneumonia (b) Bronchitis (c) Asthma (d) Emphysema

(ix) **Which process does not occur in the nasal cavity?**
(a) Trapping of large dust particles (b) Humidification of the inhaled air
(c) Warming of the inhaled air (d) Exchange of gases

(x) **What type of blood vessels surrounds the alveoli?**
(a) Artery (b) Arteriole (c) Capillary (d) Vein

ANSWER KEY

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	c	2	a	3	b	4	d	5	d
6	a	7	c	8	d	9	d	10	c

SHORT QUESTIONS

From Text Book Exercise

Q.1 Differentiate between breathing and cellular respiration.

DIFFERENCE BETWEEN BREATHING AND CELLULAR RESPIRATION

Breathing	Cellular Respiration
Definition: The process through which animals take air in their bodies to get oxygen from it and then give out the air for getting rid of carbon dioxide is called breathing.	***Definition:*** The process in which the carbon-hydrogen bonds in the food are broken by oxidation reduction reactions and the energy is transformed into ATP is called cellular respiration.
Energy Production: No energy is produced.	***Energy Production:*** Energy is produced in the form of ATP.
Level: It occurs at organ system level and respiratory system is involved	***Level:*** It occurs at cell level.

Q.2 Trace the path of air from the nasal cavity to the alveoli.

PATH OF AIR FROM THE NASAL CAVITY TO THE ALVEOLI

(i) Nasal cavity
(ii) Internal nostrils
(iii) Pharynx
(iv) Larynx
(v) Trachea
(vi) Bronchi
(vii) Bronchioles
(viii) Alveolar ducts
(ix) Alveoli

Q.3 How will you differentiate between a stoma and a lenticel?

DIFFERENCE BETWEEN STOMA AND LENTICEL

Stoma	Lenticel
Formation A pore opens when guard cells become turgid.	***Formation:*** Develops from cambium.
Presence: Present on lower epidermis of leaf.	***Presence:*** Present on stem of dicot stem.
Function: Helps in gaseous exchange during night	***Function:*** Helps gaseous exchange during night

UNDERSTANDING THE CONCEPT

(i) How do the different parts of the plant body exchange gases with the environment?

Consult Long Question No. 1

(ii) Write down the steps of inhalation and exhalation.

Consult Long Question No. 3

(iii) State the signs and symptoms, causes and treatments of bronchitis, emphysema and pneumonia.

Consult Long Question No. 5, 6 and 7

(iv) How does the tobacco smoke damage the respiratory system?

DAMAGE OF TOBACCO SMOKE TO RESPIRATORY SYSTEM

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THE TERMS TO KNOW

Alveolar duct:
Fine tubules at the end of bronchioles, open into alveoli

Alveolus:
A sac like structure present next to the alveolar duct

Asthma:
An inflammation of the bronchi that causes narrowing and swelling of the airways

Breathing:
The process through which animals take air in their bodies to get oxygen and then give out the air for getting rid of carbon dioxide

Bronchioles:
Fine tubules formed by the division of bronchi

Bronchitis:
Inflammation of the bronchi or bronchioles

Bronchus:
The part of the air passage way formed by the division of trachea

Diaphragm:
The muscular structure that forms the floor of the chest cavity

Emphysema:
A disease in which the walls of the alveoli are destroyed

Exhalation:
The phase of breathing in which air is expelled from the lungs

Gaseous exchange:
Taking in of oxygen and giving out of carbon dioxide by organisms

Inhalation:
The phase of breathing in which air is drawn into the lungs

Larynx:
The part of the air passage way between pharynx and trachea

Lenticels:
Pores in the bark of woody stems and mature roots

Nasal cavity:
Hollow space in the nose; opens to the outside through nostrils; divided into two portions by a wall

Nostril:
The opening of the nasal cavity

Pneumonia:
The infection of one or both lungs; caused by specific bacteria, viruses or fungi; the infected part of the lung becomes filled with fluid and pus

Trachea:
Wind pipe; part of the air passage way between larynx and bronchi

Vocal cords:
Two pairs of fibrous bands called vocal cards are stretched along the larynx. The vocal cards vibrate when the air passes through them. This vibration produces sounds.