

# UNIT-10

## GASEOUS EXCHANGE

**Q.1: How Gaseous exchange occurs in plants? OR**

**How do the different parts of the plant body exchange gases with the environment?**

**Ans. Gaseous exchange occurs in plants**

It is the process of taking in O<sub>2</sub> and CO<sub>2</sub> out. It is of two types

**1. Breathing**

**2. Cellular respiration**

**(1) Breathing:**

It is the physical movement occurring to take O<sub>2</sub> into lungs and CO<sub>2</sub> out of lungs is called breathing it is also called external respiration.

**(2) Cellular respiration:**

The breakdown of C-H bonds of glucose to form energy in the cells is called cellular respiration. Breathing is a mechanical process which includes movements by body. But cellular respiration is a chemical process. Which includes enzymatic actions

Organisms need energy in the form of ATP for their activities
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**Gaseous exchange in plants:**

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

**(i) Through stomata (leaves and young stems)**

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

Leaf cells face two situations.

**During Daytime:**

During daytime 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.

**During Night:**

During night when there is no photosynthesis occurring. The leaf cells get oxygen from the environment and release CO<sub>2</sub> through stomata.

**(ii) Through woody stems and mature roots:**

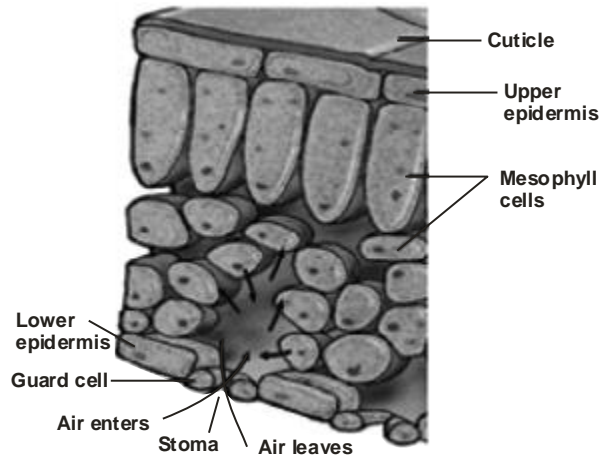
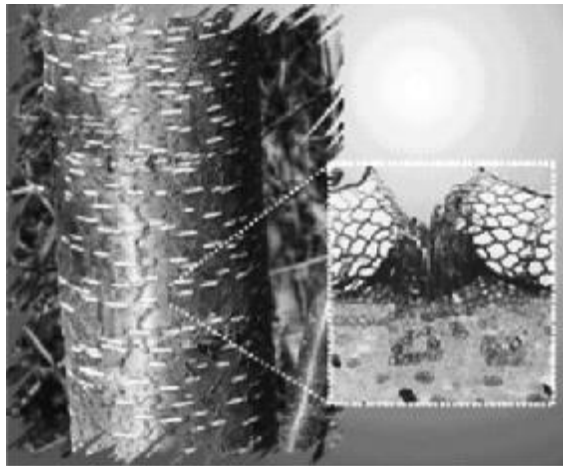
In woody stems and mature roots, the entire surface is covered by bark which is impervious to gases or water. However these are called **lenticels**. The lenticles allow air to pass through them.

**(iii) Through young Roots:**

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

**(iv) Gaseous exchange aquatic plants:**

The aquatic plants get the oxygen dissolved in water and release CO<sub>2</sub> in the water.



*Gaseous exchange in a leaf*

<p>The lenticels are slightly more raised than the general surface of the stem</p>	<p>In young stems and leaves, some gaseous exchange also occurs through the cuticle which is present over their epidermis.</p>
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**Q.2: Explain the process of Gaseous Exchange in Humans?**

**Ans: Gaseous Exchange in Humans:**

In humans and other higher animals the exchange of gases are carried out by the respiratory system. We can divide the respiratory system in two parts

- (a) **The air passage ways**
- (b) **The lungs**

**(a) Air passage way:-**

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

This passage of air consist of the following parts.

- 1. **Nasal Cavity**
- 2. **Pharynx**
- 3. **Larynx**
- 4. **Trachea**
- 5. **Bronchi**
- 6. **Bronchioles**

**1. Nasal Cavity:**

The nose encloses the nasal cavity. It opens to the outside through the openings called the **nostrils**.

**Portions of 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 air. The mucous also moistens and warms the incoming air and keeps its temperature nearly equal to that of body.

**2. Pharynx:**

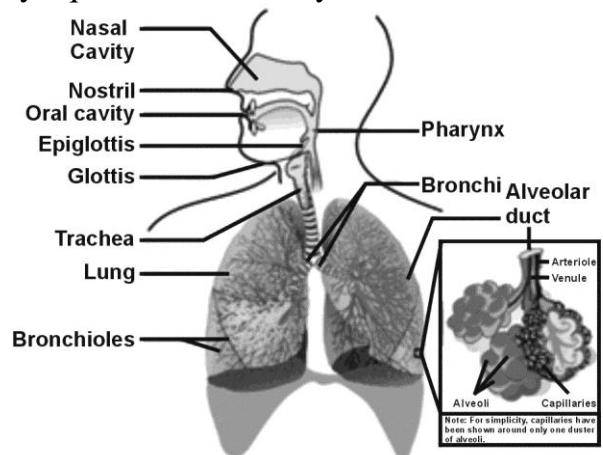
The nasal cavity opens into the pharynx by means of two small openings called **internal nostrils** and is common to both food and air. It extends to the opening of oesophagus and larynx. The air goes from pharynx to larynx.

**3. Glottis:**

Glottis is the opening at the floor of pharynx which leads to **larynx**.

**4. Epiglottis:**

The glottis is guarded by a flap of tissue called the **epiglottis**.



*The air passageway and the Lungs*

**5. Larynx:**

The larynx is a box, made of cartilage. It is present between pharynx and trachea. It is also called the **voice box**.

**6. Vocal Cords:**

In larynx, two fibrous bands called vocal cords are stretched across the larynx. The vocal cords vibrate when air pass through them. These vibrations produce sounds.

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

**7. Trachea:**

Larynx continues to trachea which is also called **wind pipe**. It is about **12 cm** long tube which lies in front of esophagus. 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.

The trachea and the bronchi are also line with ciliated and glandular cells. The glandular cells secrete mucus which moistens the air and also traps any fine particles of dust or bacteria that have escaped form the nasal cavity. The cilia beat with an upward motion so that the foreign particles along the mucus are sent to the oral cavity from where it may be either swallowed or coughed out.

**8. Bronchi:**

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

**9. Bronchioles:**

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

**10. Alveolar Ducts:**

The bronchioles end as fine tubules called **alveolar duct**. 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 in respiratory system:**

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

**(b) The Lungs:-**

All the alveoli on one side constitute a **lung**. There is a pair of lungs in the thoracic cavity. The chest wall is made up of 12 pair of ribs.

**Intercostals muscles:**

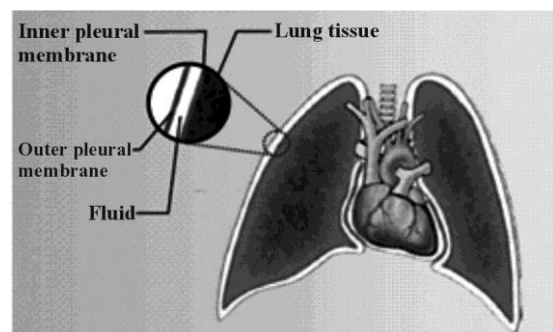
The rib muscles are called inter-coastal muscles.

**Diaphragm:**

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

**Structure of Lungs:**

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



*Lungs and Pleural membranes*

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

They are spongy and elastic organs. The lungs also have blood vessels that are the branches of the pulmonary arteries and veins.

### Pleural membranes:

Each lung is enclosed by two membranes:

- i. **Outer Pleural Membrane**
- ii. **Inner Pleural Membrane**

The membranes enclose a fluid which provides lubrication for the free expanding and contracting of the lungs.

### Q.3: Explain mechanisms of Breathing in Human.

#### Ans: Mechanisms of Breathing in Human:

It is a process through which animals take in air to get oxygen and then carries out air to get rid of carbon dioxide.

#### Breathing:

The physical movements involved in gaseous exchange are termed as breathing. The mechanism of breathing completes in two steps.

1. **Inhalation / Inspiration**
2. **Exhalation / Expiration:**

#### 1. Inhalation:

Taking in air to get oxygen is called inhalation.

#### Mechanism

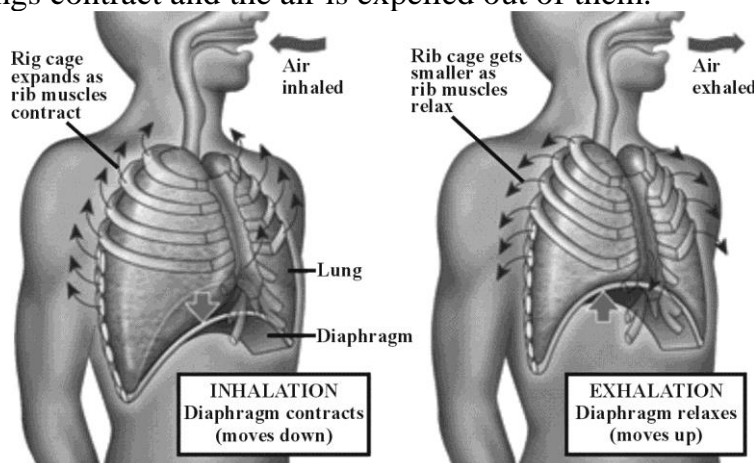
- (i) Contraction of rib muscles (intercostals muscles) and ribs are pulled out.
- (ii) The same time, contraction of the muscles of the Diaphragm which results in flattening of the diaphragm.
- (iii) The area of chest cavity increase which result in the reduction of pressure on lungs.
- (iv) The lungs expand and the air pressure within them also decreases.
- (v) The air from outside rushes into the lungs to equalize the pressure on both sides.

#### 1. Exhalation:

Move out air to get rid of CO<sub>2</sub> is called exhalation.

#### Mechanism

- (i) The ribs muscles relax bringing the ribs back to the original position.
- (ii) The diaphragm muscles also relax and it gets its raised dome shape.
- (iii) Area of chest cavity decrease which results, in the increase of pressure on the lungs.
- (iv) The lungs contract and the air is expelled out of them.



### Q.4: How is the Breathing rate controlled in human?

#### Ans: Breathing rate at rest: -

Human can breathe **16-20** times per minute at normal rate.

**Respiratory Centre: -**

The process of respiration is controlled by a respiratory centre present in **brain** and it is sensitive to the concentration of CO<sub>2</sub> in blood. During hard exercise more cellular respiration takes place which produces more carbon dioxide. The greater concentration of CO<sub>2</sub> in blood stimulate the respiratory centre in brain which will send message to ribs and diaphragm to increase the rate of respiration and the CO<sub>2</sub> will be given out of the body. Breathing movements are involuntary to a large extent. However we can control the rate of breathing but not for a long time.

**Breathing Rate During Exercise/ Hard Job:**

During hard physical work the respiration rate increases upto 30-40 breaths per min.

What part of the blood transports oxygen from lungs to the cells of the body?

Hemoglobin in Red Blood Cells

**Q.5: Give the comparison between the inspired and expired air.**

**Ans: Table:** Comparison between the inspired and expired air.

<i>Comparison between the inspired and expired air</i>		
<b>Feature</b>	<b>Inspired Air</b>	<b>Expired Air</b>
<b>Amount of oxygen</b>	21%	16%
<b>Amount of carbon dioxide</b>	0.04%	4%
<b>Amount of nitrogen</b>	79%	79%
<b>Amount of water vapours</b>	Variable	Saturated
<b>Amount of dust particles</b>	Variable	Almost none
<b>Temperature</b>	Variable	Almost equal to body temperature

**Q.6: Differentiate between breathing and respiration.**

**Ans:**

<b>BREATING</b>	<b>RESPIRATION</b>
i. Breathing involves only the mechanical process (a physical movement associated with gaseous exchange.	i. Respiration is a biochemical and mechanical processes. During biochemical process, oxidative breakdown of food material occurs and energy is released which is used for various metabolic activities.
	ii. During mechanical process, gaseous exchange occurs.

**Q.7: Write the names of important respiratory disorders. What is Bronchitis? State its types, symptoms and causes.**

**Ans: Respiratory Disorders:**

1. Bronchitis
2. Pneumonia
3. Lung Cancer
4. Emphysema
5. Asthma

**i. BRONCHITIS:**

Bronchitis is the inflammation of bronchioles or bronchi.

**Effects:**

It results in excessive secretion of mucous in tubes and lead to swelling of walls and narrowing of tubes.

**Causes:**

It can be caused by:  
Virus, Bacteria, Exposure to chemical irritants e.g (Tobacco Smoke)

**Types:**

Bronchitis is of two types

- (i) Acute bronchitis
- (ii) Chronic bronchitis

**(i) Acute bronchitis:**

Acute bronchitis last for maximum two weeks and the patient recovers soon with no permanent damage in bronchi or bronchioles.

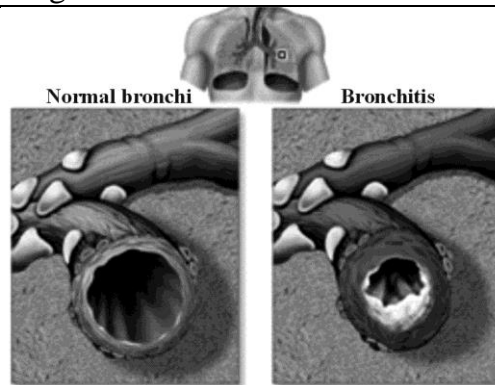
**(ii) Chronic bronchitis:**

In chronic bronchitis patient develop chronic inflammation which last for three months to two years.

**Symptoms:**

Symptoms for bronchitis involves Cough, Mild wheezing, Fever, Chills, Shortening of breath

The majority of people diagnosed with chronic bronchitis are 45 years of age or older.



*Narrowed bronchus with deposited mucous*

**Q.8: What do you know about Emphysema? Write its symptoms.**

**Ans: Emphysema:**

Emphysema is the damage of the wall of alveoli.

**Effect:**

- (i) The surface area of alveoli for gaseous exchange gets lowered due to formation of large sac-like alveoli.
- (ii) The lungs tissues breakdown. The lungs tissues cannot come back to original shape after exhalation. So air cannot be expelled from lungs thus air traps in lungs.

**Symptoms:**

Symptoms are Shortness of breath, Fatigue, Recurring respiratory infections, Weight loss  
By the time the symptoms appear, the patient has already lost 50-70% of its lung tissues.  
Due to less gaseous exchange, less oxygen will be obtained by body which can cause serious problems.



*The Alveoli; normal (left) and emphysema (right)*

**Q.9: Describe the signs and symptoms, causes and treatments of pneumonia.**

**Ans: Pneumonia:**

Pneumonia is an infection of lungs.

**Double Pneumonia:**

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

**Causes:**

The most common cause of pneumonia is a bacterium, **streptococcus pneumoniae**. Some viral and fungal infections may also lead to pneumonia.

**Effects:**

When causative organisms enter alveoli they settle down there and grow in number. They break the lung tissues and the areas become filled with fluid and pus.

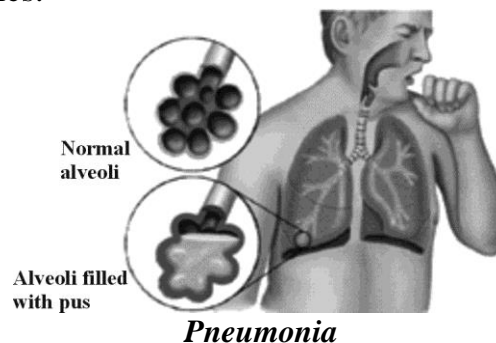
**Symptoms:**

The symptoms of pneumonia:

- (i) A cold followed by high fever
- (ii) Shivering
- (iii) A cough with sputum production
- (iv) Patient may become short of breath
- (v) The patient's skin colour becomes dusky or purplish. It is due to poor oxygenation of blood prevention.

**Treatment:**

- (i) Vaccines are available to prevent pneumonia caused by S pneumoniae.
- (ii) Use of Antibiotics.



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

**Q.10: State the symptoms, causes and treatment of Asthma.**

**Ans: Asthma:**

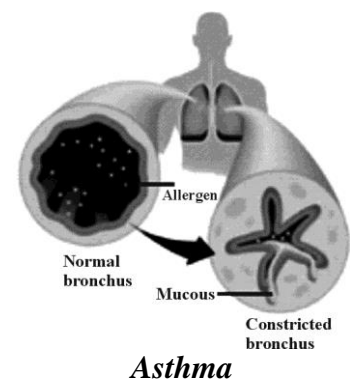
Asthma is a form of allergy, in which following abnormalities have been found:

- (i) Inflammation of the bronchi
- (ii) More mucous production
- (iii) Narrowing of airways.

In asthma patients, the bronchi and bronchioles become sensitive to different allergens e.g dust, smoke, perfumes, pollens etc. When exposed to any allergens, the sensitive airways show immediate and excessive response of constriction. In this condition the patient feel difficulty in breathing.

**Symptoms:**

The symptoms of asthma vary from person to person. The major symptoms include: Shortness of breath, 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 in inhaler.

**Q.11: Describe the symptoms, causes and prevention of lung cancer.****Ans: Lungs Cancer:**

Lung cancer is a disease of uncontrolled cell division in the tissues of the Lung.

**Tumor:**

- (i) The cells continue to divide without any control and form tumors.
- (ii) The cellular growth may also invade adjacent tissues beyond the Lungs.

**Symptoms:**

- (i) Shortness of breath
- (ii) Coughing (including coughing of blood)
- (iii) Weight loss
- (iv) Memory problems

**Causes:**

Following are the main causes of Lungs Cancer:

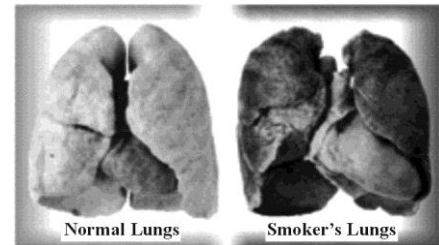
- (i) Pollution
- (ii) Smoking
- (iii) Ionizing radiation
- (iv) Viral infections
- (v) Carcinogens

**Carcinogens:**

Carcinogens are cancer causing chemicals which are present in cigarette smoke. Cigarette smoke contains over 50 known carcinogens. The risk of lung cancer is significantly lower in non-smokers.

**Passive Smoking:**

The inhalation of smoke from another's smoking 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. Lung Cancer is responsible for more than 1.3 million deaths worldwide annually.

**Preventions:**

Lung Cancer is prevented by eliminating tobacco smoking. In this regard W.H.O (World Health Organizations) has called for Government to stop the advertisement of cigarette. This is helpful to prevent young people from taking up smoking.

Lung cancer is the most common cause of cancer-related deaths and is responsible for more than 1.3 million deaths worldwide annually.

**Q.12: Give a detail account of bad effect of smoking.****Ans: Smoking Chemicals:**

Smoking is harmful due to the chemicals in cigarettes and smoke. Tobacco smoke contains over **4000** chemicals out of which at least **50** are **carcinogens** and many are poisonous.

**Effects 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.

According to many people, lung cancer is the only smoking related disease and thus is the major cause of death among smoker but this is not correct.



- Cigarette smoke affects the body from head to toe. Thus the smokers have greater risk of developing many life threatening diseases, which are as follows:

1. **Cancers:**

Smoking lead to the cancers in kidneys, oral cavity, larynx, breast, bladder and pancreas etc

The World No Tobacco Day is celebrated on the 31 <sup>st</sup> of May every year.	Smoking also affects the social life of a person. Smokers may face social un-acceptance because other people may not want to be exposed to other's smoke.
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2. **Damage to the Air Passageway:**

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

3. **Effects on Circulatory Systems:**

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

- **Arteriosclerosis:**

Narrowing of blood Arteries is called arteriosclerosis. Many other chemicals in smoke increase the production of blood platelets. When platelets are more than the normal numbers then they make the blood viscous and it can lead to arteriosclerosis.

4. **Greater Risk of Developing Infections:**

Smoking is at the greater risk of developing infections, particularly in the Lungs. Smoking increases the risk of tuberculosis by two to four times, and of pneumonia by four times.

5. **Weakening and Staining of 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.

According to the WHO, the rates of smoking have declined in the developed world. In the developing world, however, it is rising by 3.4% per year as of 2002.	Non-smokers who are exposed to second-hand smoke (passive smoke) at home or work increase their disease risk by 25-30% and their lung cancer risk by 20-30%.
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## SHORT QUESTIONS

**Q.1 Differentiate between breathing and cellular respiration.**

Ans:

BREATHING	RESPIRATION
i. Breathing involves only the mechanical process (a physical movement associated with gaseous exchange.	i. Respiration is a biochemical and mechanical processes. During biochemical process, oxidative breakdown of food material occurs and energy is released which is used for various metabolic activities. ii. During mechanical process, gaseous exchange occurs.

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

Ans: Nose → Pharynx → Larynx → Trachea → Bronchi → Bronchioles → alveolar ducts → alveoli

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

Ans:

Stoma	Lenticel
These are small opening which are present in the leaves and young stems epidermis. These helps in exchange of gases.	In woody stems and mature roots, the entire surface is covered by bark, which is impervious to gaseous exchange. So, there are certain pores in the layer of bark, these are called lenticles. These lenticles allow air to pass through it.

**Q.4 Define gaseous exchange?**

Ans: The process of taking oxygen in and giving out CO<sub>2</sub> is called gaseous exchange. It is of 2 types.

- (i) Breathing                      (ii) Cellular respiration

**Q.5 What is glottis?**

Ans: Glottis is a narrow opening at the floor of pharynx. Which leads into larynx. The air enters into the larynx through glottis.

**Q.6 What is the role of epiglottis in the respiration?**

Ans: The glottis is guarded by a flap of tissues called epiglottis. It allows air into larynx not oesophagus and it also prevents food to enter into larynx.

**Q.7 What is larynx and what material it is made?**

Ans: The upper most part of the trachea is called larynx. It is a box made up of cartilage it contains two fibrous bands called vocal cord. When air pass through them they vibrate and produce sound so, it is also called voice box.

**Q.8 What is trachea?**

Ans: It is called wind pipe. It is 12cm long. There are C-shaped cartilagenous rings present in the wall of trachea. The cartilage keep the trachea in position and prevent it from collapsing even there is no air in it.

**Q.9 What are alveoli?**

Ans: These are cluster of pouches which form the respiratory surface in human body. Each alveolus is a sac like structure lined by a single layer of epithelial cells. It is bounded by a net-work of capillaries.

**Q.10 What is diaphragm?**

Ans: It is a thick muscular, dome shaped structure present below the lungs. It helps in breathing.

**Q.11 Define breathing.**

Ans: The physical movement associated with gaseous exchange is called breathing.

**Q.12 How many types of bronchitis?**

Ans: Bronchitis are of two type

- (i) Acute bronchitis  
(ii) Chronic bronchitis

**Q.13 What is acute bronchitis?**

Ans: It usually lasts about two weeks. It has no permanent damage.

**Q.14 What is chronic bronchitis?**

Ans: It usually lasts about three months to two years and it is develop by bronchi.

**Q.15 What is pneumonia?**

Ans: It is an infection of lungs. If it affects both lungs is called double pneumonia.

**Q.16 What are causes of pneumonia?**

**Ans:** Pneumonia is mostly caused by a bacterium streptococcus. It is also caused by virus or by fungal infection.

**Q.17 What are the causes of cancer?**

**Ans:** (i) Smoking (ii) Ionizing radiation (iii) Viral infection

**Q.18 What are bad effect of smoking?**

**Ans:** (i) Smoking causes cancer in kidney oral Cavity, larynx, breast, bladder  
(ii) Smoking effect air passage way.  
(iii) Smoking effect circulatory system.  
(iv) Smoking cause arteriosclerosis (Increase production of blood platelets) and narrowing the arteries.

**Q.19 Why do organisms need energy?**

**Ans:** The organisms need energy in the form of ATP for their activities and processes.

**Q.20 What structure are responsible for gaseous exchange in leaves and young stems?**

**Ans:** Stomata and Lenticels.

**Q.21 What structures are responsible for woody stems and mature roots?**

**Ans:** Lenticels

**Q.22 What is the significance of C-Shaped cartilaginous rings of trachea?**

**Ans:** These prevent the trachea from collapsing.

**Q.23 Different between bronchi and bronchioles.**

**Ans:** Trachea divided into two branches which are called bronchi. Each bronchus further divided into very fine tubes called bronchioles.

**Q.24 What are pleural membranes and pleural fluid?**

**Ans:** Each lung is covered by outer and inner pleural membranes. Between these two membranes there is a pleural fluid which provides lubrication for expansion and contraction of lungs.

**Q.28. What are two phases of breathing?**

**Ans:** (i) Inspiration (ii) Expiration

**Q.29. Differential between inspiration and expiration**

**Ans:** Intake of air from atmosphere into lungs is called inspiration and in expiration impure air is expelled out.

**Q.30 What is rate of breathing at rest?**

**Ans:** 16-20 times minute.

**Q.31 What is the rate of breathing during exercise?**

**Ans:** 30-40 times minute.

**Q.32 Where is located the respiratory centre?**

**Ans:** It is located in the brain. It is sensitive to the concentration of CO<sub>2</sub>.

**Q.33 What are the % ages of inspired air and expired air?**

**Ans:** 21 % O<sub>2</sub> in inspired air , 16 % O<sub>2</sub> in expired air

**Q.34. Name some respiratory disorders.**

**Ans:** Bronchitis, Emphysema, Pneumonia, Asthma, Lung cancer etc.

**Q.35 What is bronchitis?**

**Ans:** It is the inflammation of the bronchi & bronchioles. It results in more secretions of mucous into these tubes. It leads to swelling of tubes.

**Q.36 What are causes of bronchitis?**

**Ans:** It is caused by viruses, bacteria or exposure to chemical irritants.

**Q.37 What are symptoms of bronchitis?**

**Ans:** Cough, Mild wheezing, Chills, Shortness of breath.

**Q.38 What is the treatment of Bronchitis?**

**Ans:** Antibiotics are used to treat the patient.

**Q.39 What is emphysema?**

**Ans:** It is respiratory disorder in which break down of alveolar wall occur. It result in larger sac but with has surface area for gaseous exchange.

**Q.40 What is the major cause of emphysema?**

**Ans:** The major cause of emphysema is Smoking.

**Q.41 What are the symptoms of emphysema?**

**Ans:** Shortness of breath, Fatigue, weight loss

**Q.42 What is the treatment of emphysema?**

**Ans:** Drug therapy, Antibiotics

**Q.43 What are symptoms of pneumonia?**

**Ans:** Cold that is followed by a high fever, shivering, cough with sputum production, Shortness of breath, skin purplish due to the poor oxygenation.

**Q.44 What is treatment of pneumonia?**

**Ans:** (i) Vaccines prevent pneumonia. (ii) Antibiotics are used.

**Q.45 What is asthma?**

**Ans:** It is chronic inflammation of bronchi which results in swelling and narrowing of air passageways.

**Q.46 What are causes of asthma?**

**Ans:** (i) Allergens. (ii) Irritants

**Q.47 What are symptoms of Asthma?**

**Ans:** Shortness of breath, Wheezing, Chronic cough, Tightness of chest.

**Q.48 What is treatment of Asthma?**

**Ans:** (i) Bronchodilators (ii) Antibiotics

**Q.49 What are bronchodilators?**

**Ans:** These are chemicals which dilate the bronchioles. These are given to asthma patients in the form of inhalers.

**Q.50 What is lung cancer?**

**Ans:** It is disease of uncontrolled cell divisions in tissue of lungs.

**Q.51 What are causes of lung cancer?**

**Ans:** (i) Carcinogens present in tobacco smoke (ii) Ionizing radiations (iii) Viral infection

**Q.52 How many carcinogens are found in cigarette smoke?**

**Ans:** Over 50 carcinogens are found in cigarette smoke.

**Q.53 What is passive smoking? What is its effect?**

**Ans:** Inhalation of smoke from another's smoking, is known as passive smoking. It may cause lung cancer.

**Q.54 Differentiate between Stomata and Air Spaces?**

**Ans:**

Stomata	Air Spaces
These are small opening which are present in the leaves and young stems epidermis. These helps in exchange of gases.	Air spaces are the small pores in leaves. Air spaces allows CO <sup>2</sup> to diffuse through leaf.

**Q.55 What are preventive measures of lung cancer?**

**Ans:** (i) Elimination of tobacco smoking  
(ii) Cessation of smoking

**Q.56 What is W.H.O?**

**Ans:** W.H.O means World Health Organization.

**Q.57 What is treatment of lung cancer?**

**Ans:** (i) Chemotherapy (ii) Radiotherapy

**Q.58 Does smoking effect only lungs?**

**Ans:** No, smoking may also effect other organs of body e.g. kidneys, oral cavity, larynx, breast, bladder, pancreas etc.

**Q.59 What is the effect of carbon monoxide present in tobacco smoke?**

**Ans:** Co in tobacco smoke decreases the O<sub>2</sub> carrying capacity of hemoglobin.

**Q.60 Does smoking increases chances of tuberculosis and pneumonia?**

**Ans:** Yes, smoking increases chances of tuberculosis by 2-4 times and of pneumonia by 4 times.

**Q.61 How many different chemicals are found in cigarette smoke?**

**Ans:** Over 4000.

**Q.62 What is the effect of smoking on teeth?**

**Ans:** Smoking causes weakening and staining of teeth. The loss of teeth is 2-3 times higher in smokers than in non-smokers

**Q.63 What are allergens?**

**Ans:** Allergens are the chemical or substances that can irritate the respiratory tract are called as allergens. For example pollens, fragrant particles, dust particle etc

**Q.64 What is the function of mucous in Nasal cavity?**

**Ans:** Nasal cavity contains 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.

**Q.65 What is nicotine?**

**Ans:** 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.

**Q.66 How sound is produced in voice box?**

**Ans:** The upper most part of the trachea is called larynx. It is a box made up of cartilage it contains two fibrous bands called vocal cord. When air pass through them they vibrate and produce sound so, it is also called voice box.

**Q.67 What are vocal cords?**

**Ans:** The larynx is a box, made of cartilage. It is present between pharynx and trachea. It is also called the **voice box**. Two pairs of fibrous bands called vocal cords are stretched across the larynx.

**Q.68 What is the role of pharynx?**

**Ans:** 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.69 What is meant by respiratory center?**

**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.

**Q.70 What is diaphragm?**

**Ans:** A thick muscular structure, called **diaphragm**, is present below the lungs.

**Q.71 Write down the name of chemicals found in cigarette smoke cause cancer.**

**Ans:** Tobacco smoke contains over 4,000 different chemicals, out of which at least 50 are carcinogens and many are poisonous.

**Q.72 Why does blood become thick due to smoking?**

**Ans:** 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.

## MULTIPLE CHOICE QUESTIONS

- 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 body.
- Most of the gaseous exchange in a leaf occurs through.  
(a) stomata (b) general surface (c) cuticle (d) lenticels
- How many bronchi are there in the air passage way.  
(a) one (b) two (c) many (d) none
- Where does the gaseous exchange occur in humans?  
(a) pharynx (b) trachea (c) bronchi (d) alveoli
- Which structure actively helps in taking the air out of lungs.  
(a) nasal cavity (b) bronchus (c) bronchiole (d) diaphragm
- The primary chemical stimulus for breathing is the concentration of  
(a) carbon dioxide in blood (b) oxygen in blood  
(c) carbon in blood (d) oxygen in muscles
- 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 large surface area  
(c) in emphysema the walls of alveoli break and there is more surface area  
(d) dust particles can damage the lungs by irritating the inner alveoli surface
- A disease involving the breakdown of air sacs of the lungs is.  
(a) pneumonia (b) bronchitis (c) asthma (d) emphysema
- 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
- What type of blood vessels surrounds the alveoli?  
(a) artery (b) arteriole (c) capillary (d) vein
- Organisms need energy in the form of \_\_\_\_\_ for their activities.  
(a) bond (b) ATP (c) oxygen (d) respiration

12. Taking in oxygen and giving out of carbon dioxide is termed as  
(a) gaseous exchange (b) cellular respiration (c) breathing (d) none
13. The leaves and young stems have stomata in  
(a) lenticels (b) stems (c) epidermis (d) cuticles
14. Leaf cell faces \_\_\_\_\_ situation.  
(a) one (b) two (c) three (d) four
15. The gases are found in the \_\_\_\_\_ surrounding the roots.  
(a) oxygen (b) water (c) soil (d) carbon dioxide
16. The aquatic plants get the oxygen and release.  
(a) CO (b) CO<sub>2</sub> (c) H<sub>2</sub>O (d) O<sub>2</sub>
17. The carbon dioxide produce during \_\_\_\_\_ is taken out of the cell and from body.  
(a) breathing (b) cellular respiration (c) gaseous exchange (d) none
18. Breathing is used for the process through which animals take \_\_\_\_\_ in their bodies to get oxygen.  
(a) gases (b) air (c) CO<sub>2</sub> (d) respiration
19. \_\_\_\_\_ have no organs or systems for exchange of gases with the environment.  
(a) root (b) plant (c) stem (d) cell
20. During the day time \_\_\_\_\_ cells of leaves are carrying out photosynthesis.  
(a) leaves (b) phylum (c) mesophyll (d) xylem
21. The physical movements associated with gaseous exchange is called \_\_\_\_\_  
(a) inhalation (b) breathing (c) exhalation (d) none
22. Phases of breathing are  
(a) inhalation (b) exhalation (c) respiration (d) a, b both
23. In inspiration, dome-shaped diaphragm.  
(a) contracts (b) relaxed (c) lowered (d) a, c both
24. Humans breath \_\_\_\_\_ times per minute in normal circumstances.  
(a) 18-20 (b) 20-16 (c) 16-20 (d) 30-40
25. The rate of \_\_\_\_\_ is controlled by the respiratory center in brain.  
(a) breathing (b) respiration (c) exhalation (d) a, b both
26. Humans breath \_\_\_\_\_ times per minute during exercise.  
(a) 60-80 (b) 30-40 (c) 16-20 (d) 19-21
27. The amount of nitrogen is 79% in  
(a) inspired air (b) expired air (c) a, b both (d) nothing
28. Temperature in inspired air is  
(a) saturated (b) variable (c) constant (d) almost none
29. Percentage of respiratory disorders is particularly \_\_\_\_\_ in Pakistan.  
(a) less (b) normal (c) high (d) none
30. Bronchitis is the inflammation of  
(a) bronchi (b) alveoli (c) bronchioles (d) a, c both
31. Bronchitis is caused by  
(a) viruses (b) bacteria (c) chemical irritants (d) all
32. Major types of bronchitis are  
(a) two (b) three (c) eight (d) twelve
33. The acute bronchitis usually lasts about  
(a) 2 weeks (b) 3 weeks (c) 1 month (d) 10 months

34. Symptoms of bronchitis are  
(a) chills (b) mild wheezing (c) cough (d) all
35. The destruction of the walls of alveoli is called \_\_\_\_\_  
(a) pneumonia (b) emphysema (c) asthma (d) all
36. In emphysema, patient usually lost his/her lungs tissues.  
(a) 80-90% (b) 60-70% (c) 50-70% (d) 90-100%
37. Pneumonia is the infection of  
(a) Lungs (b) brain (c) stomach (d) alveoli
38. Pneumonia is due to poor oxygenation of  
(a) nerves (b) blood (c) veins (d) arteries
39. Pneumonia are treated by  
(a) vaccines (b) analgesic (c) antibiotics (d) a and c
40. Asthma is the form of  
(a) disease (b) inflammation (c) infection (d) allergy
41. In asthma, the medicine is given in the form of  
(a) exhales (b) a, b both (c) nothing (d) inhaler
42. Lungs cancer is responsible for \_\_\_\_\_. Deaths worldwide annually.  
(a) 1.3 billion (b) 1.3 million (c) a, b both (d) none
43. Cigarette smoke contains over \_\_\_\_\_ known carcinogens.  
(a) 60 (b) 80 (c) 50 (d) 90
44. The main causes of any cancer is  
(a) carcinogens (b) ionizing radiation (c) viral infection (d) all
45. The inhalation of smoke from another smoking is called \_\_\_\_\_ smoking.  
(a) passive (b) active (c) addictive (d) nothing
46. Tobacco smoke contain over \_\_\_\_\_ different chemical.  
(a) 5000 (b) 3000 (c) 4000 (d) 9000
47. Cigarette smoke affects the body from head to  
(a) foot (b) leg (c) thigh (d) toe
48. Nicotine is widely used as  
(a) antibiotic (b) insecticide (c) analgesics (d) sedatives
49. Many chemicals in tobacco smoke damage the  
(a) air passage way (b) lungs (c) kidney (d) esophagus
50. The world No Tobacco Day is celebrated on the \_\_\_\_\_ every year.  
(a) 21<sup>st</sup> may (b) 31<sup>st</sup> may (c) 31<sup>st</sup> march (d) 21<sup>st</sup> march
51. Smoking has affects on the \_\_\_\_\_ system  
(a) circulatory (b) digestive (c) urinary (d) all
52. \_\_\_\_\_ is present in tobacco smoke.  
(a) CO<sub>2</sub> (b) CO (c) H<sub>2</sub>O (d) O<sub>2</sub>
53. Smoking increases the risk of  
(a) tuberculosis (b) cancer (c) pneumonia (d) all
54. Smoking is responsible for  
(a) weakening (b) staining the teeth (c) a, b both (d) none
55. Tooth loss is \_\_\_\_\_ times higher in smokers than in non-smokers.  
(a) 2-4 (b) 3-6 (c) 2-9 (d) 2-3



56. We can divide respiratory system into \_\_\_\_\_ parts.  
(a) 1 (b) 2 (c) 3 (d) 4
57. The passage of air consist of \_\_\_\_\_  
(a) nasal cavity (b) nostrils (c) alveoli (d) all
58. The nose is enclosed by \_\_\_\_\_ cavity.  
(a) nasal cavity (b) nostril (c) pharynx (d) glottis
59. Nasal cavity opens outside through the openings called \_\_\_\_\_.  
(a) pharynx (b) nasal cavity (c) nostrils (d) glottis
60. Nasal cavity is divided into \_\_\_\_\_ portions.  
(a) 1 (b) 2 (c) 3 (d) 4
61. \_\_\_\_\_ filters dust particles.  
(a) fine hairs (b) mucus (c) both a & b (d) none
62. \_\_\_\_\_ moistens and warms the incoming air  
(a) fine hairs (b) mucus (c) both a , b (d) none
63. The nasal cavity opens into \_\_\_\_\_ .  
(a) larynx (b) pharynx (c) glottis (d) nostrils
64. The glottis is guarded by a flap of tissues called \_\_\_\_\_.  
(a) epiglottis (b) glottis (c) larynx (d) none
65. Pharynx is common to \_\_\_\_\_.  
(a) food (b) air (c) both a & b (d) none
66. Pharynx extends to openings of \_\_\_\_\_.  
(a) esophagus (b) larynx (c) glottis (d) pharynx
67. The air goes from pharynx to \_\_\_\_\_.  
(a) glottis (b) nasal cavity (c) larynx (d) nostrils
68. \_\_\_\_\_ is a narrow opening at floor of pharynx.  
(a) glottis (b) nasal cavity (c) nostrils (d) none
69. Trachea is also called \_\_\_\_\_.  
(a) voice box (b) bronchi (c) windpipe (d) alveoli
70. Larynx continuous to \_\_\_\_\_.  
(a) voice box (b) trachea (c) wind pipe (d) both b & c
71. Length of trachea is \_\_\_\_\_  
(a) 12cm (b) 14cm (c) 16cm (d) 18cm
72. Trachea divides into smaller tubes called \_\_\_\_\_.  
(a) bronchi (b) bronchioles (c) alveoli (d) intercostals
73. Lungs make many fine tubes called \_\_\_\_\_.  
(a) bronchi (b) bronchioles (c) alveoli (d) intercostals
74. There are \_\_\_\_\_ pair of ribs in human body.  
(a) 9 (b) 10 (c) 11 (d) 12
75. Ribs muscles are called \_\_\_\_\_ muscles.  
(a) intercostals (b) skeleton (c) bronchi (d) none
76. Percentage of oxygen in expired air is:  
(a) 60% (b) 21% (c) 79% (d) 30%
77. Venules unite to form:  
(a) Pulmonary vein (b) Pulmonary artery (c) Trachea (d) Alveoli

78. The gift of speaking is given only to \_\_\_\_  
 (a) Man (b) Monkey (c) Parrot (d) Crow
79. Percentage of CO<sub>2</sub> in expired air during breathing is:  
 (a) 16% (b) 0.4% (c) 21% (d) 0.04%
80. Which disease is not related to lungs:  
 (a) Asthma (b) Emphysema (c) Myopia (d) Pneumonia
81. The number of lobes in right lung is \_\_\_\_  
 (a) 1 (b) 2 (c) 3 (d) 4
82. The cavity in which lungs are located is called:  
 (a) Thoracic cavity (b) Abdominal cavity (c) a & b both (d) None
83. Gaseous exchange in cow takes place in:  
 (a) Brohchi (b) Trachea (c) Pharynx (d) Alveoli
84. For gaseous exchange young stems have \_\_\_\_\_ in their epidermis:  
 (a) Stomata (b) Lenticels (c) Companion cell (d) Ground cells
85. Stomata are frequently present on:  
 (a) Upper side of leaf (b) Lower side of leaf (c) Both side of leaf (d) Stem

## ANSWERS

1	c	2	a	3	b	4	d	5	d	6	a	7	c	8	d	9	d	10	c
11	b	12	c	13	b	14	b	15	c	16	b	17	b	18	b	19	b	20	c
21	b	22	d	23	d	24	c	25	a	26	b	27	c	28	b	29	c	30	d
31	d	32	a	33	a	34	d	35	b	36	c	37	a	38	b	39	d	40	d
41	d	42	b	43	c	44	d	45	a	46	c	47	d	48	b	49	a	50	b
51	d	52	b	53	d	54	c	55	d	56	b	57	d	58	a	59	c	60	b
61	a	62	b	63	b	64	a	65	c	66	b	67	c	68	a	69	c	70	b
71	a	72	a	73	b	74	d	75	a	76	b	77	a	78	a	79	a	80	c
81	c	82	a	83	d	84	a	85	b										