Respirations

Improve your learning

Q. 1 A. Distinguish between (AS1)

inspiration and expiration

Answer :

Inspiration	Expiration
Taking of air in the lungs.	Given out air from the lungs.
It is an active process	It is a passive process
It takes place when external intercostal muscles contracts and internal intercostal relax.	It takes place when external intercostal muscles relax and internal intercostal contracts.
Diaphragm contracts and become flattened	Diaphragm relax and become dome-shaped

Q. 1 B. Distinguish between (AS1)

aerobic and anaerobic respiration

Answer :

Aerobic respiration.	Anaerobic respiration.
Aerobic respiration takes place in the presence of 0_2.	Anaerobic respiration takes place in the absence of 0_2.
It occurs in cytoplasm and mitochondria of the cell	It occurs only in the cytoplasm.
The end product is CO_2 and H_20 and 36 ATP.	The end products vary. It may be CO_2, alcohol or may lactic acid and only 2 ATP.

Q. 1 C. Distinguish between (AS1)

respiration and combustion

Answer :

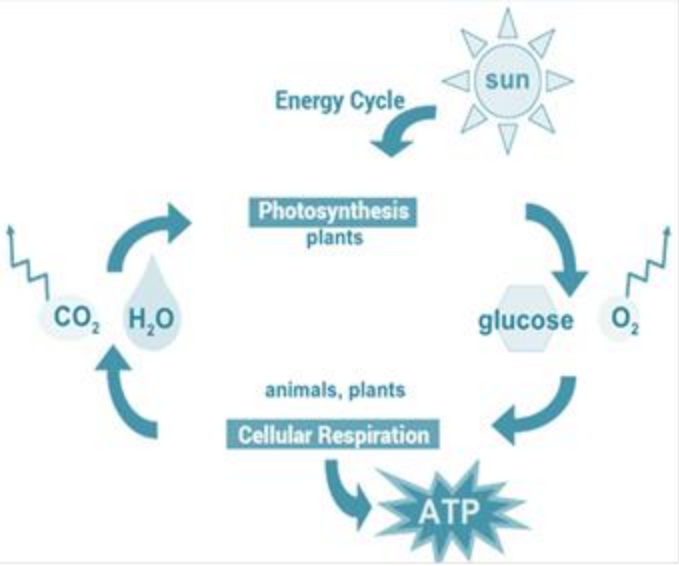
Respiration	Combustion
Respiration is the process of oxidation of food like glucose, Amino acids, and fatty acids to release carbon dioxide, water, and energy.	Combustion is the process of burning to form water and carbon dioxide which helps in the release of energy in the form of heat
In respiration, energy is released in several stages throughout the process.	Energy is released only once in this process.
Respiration does not require any external heat to carry on the process.	Requires external heat to burn materials.

Q. 1 D. Distinguish between (AS1)

photosynthesis and respiration

Answer :

Photosynthesis	Respiration
A process of making food (carbohydrate) by green plants using sunlight, carbon dioxide, and water	A process in which oxidation of food such as glucose in presence of oxygen to release carbon dioxide and energy.
It takes place in all the green plants, algae such as *Spirogyra* and photosynthetic bacteria in presence of light.	It takes place in all the living cells all the time.
It requires energy.	It releases energy in many steps



Difference between photosynthesis

Q. 2. State two similarities between aerobic and anaerobic respiration. (AS1)

Answer : I. Both the processes release energy by oxidizing glucose.

II. Both the processes take place in cytoplasm of the cell and uses glycolysis process to release energy and byproduct

Q. 3. Food sometimes enters the wind pipe and causes choking. How does it happen? (AS1)

Answer : i. The wind pipe is technically called the trachea.

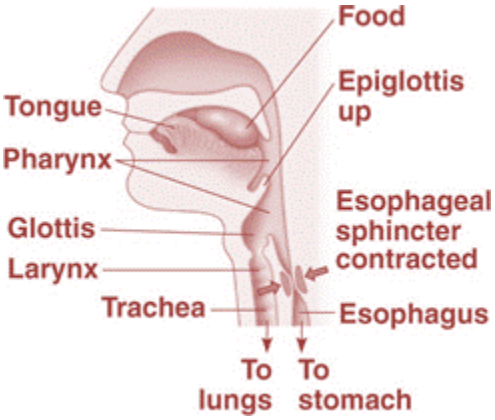
ii. Its opening is covered with a covering called the epiglottis. The opening of the food pipe (esophagus).

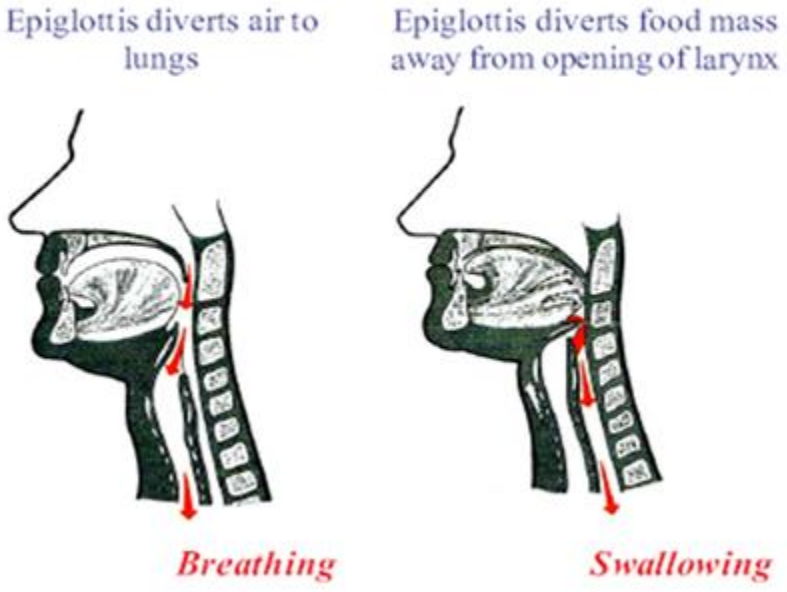
iii. The pharynx is a junction where both the oesophagus (food pipe) and the trachea (windpipe) open.

iv. In the absence of food, the oesophageal sphincter muscle is contracted and the epiglottis is up, allowing air to flow through the trachea to the lungs.

v. When food swallowing, the oesophageal sphincter muscle relaxes and the epiglottis comes and closes glottis which prevents food from entering the trachea.

vi. But food sometimes enters the wind pipe and causes choking.





Q. 4. Why does the rate of breathing increase while walking uphill at a normal pace in the mountains? Give two reasons. (AS1)

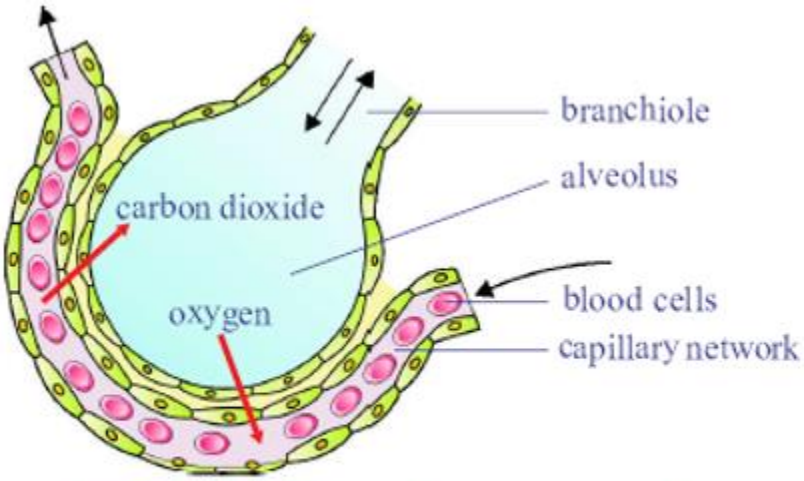
Answer : The rate of breathing increases while climbing uphill because:

I. The atmosphere is very thin at high altitudes, the amount of oxygen in the atmospheric air is low.

II. Our body needs more oxygen while climbing up hill as hemoglobin does carry sufficient oxygen to the cell for cellular respiration. So, to increase the amount of oxygen, the rate of breathing increases.

Q. 5. Air leaves the tiny sacs in the lungs to pass into capillaries. What modification is needed in the statement? (AS1)

Answer : In the lungs, there are millions of tiny sacs called alveoli. The alveoli are surrounded by blood capillaries. Oxygen from the alveoli air diffuses into the surrounding blood capillaries and carbon dioxide diffuses from the blood capillaries into the alveoli. Diffusion is the movement of molecules from an area of high concentration to an area of low concentration



Diffussion path way for gaseous exchange between lung and blood capillaries

Q. 6. Plants photosynthesize during daytime and respire during the night. Do you agree with this statement? Why? Why not? (AS1)

Answer : No, I don't agree with the statement. Though photosynthesis takes place in presence light only. But respiration occurs in all the living cells all the time whether it is day or night. Therefore, a plant respires all the time and photosynthesis in plants occurs only during day time.

Q. 7. Why does a deep-sea diver carry oxygen cylinder on her back? (AS1)

Answer : 1. Human beings are adapted to a terrestrial habitat. They respire through lungs (pulmonary respiration).

2. Humans use oxygen in a gaseous state. Whereas organisms living in water (aquatic organisms) use oxygen dissolved in water.

3. Therefore, deep sea water diver carries gaseous oxygen cylinder for breathing as under water cannot use dissolved oxygen.

Q. 8. How are alveoli designed to maximize the exchange of gases? (AS1)

Answer : 1. In the lungs of humans, millions of alveoli are present where gaseous exchange occurs.

2. Each alveolus (plural alveoli) is made from single squamous epithelial cellswhich provides a very large surface area for the exchange of gases.

3. Availability of large surface area maximizes the exchange of gases.

Q. 9. Where will the release of energy from glucose in respiration take place? Mala writes lungs while Jiya writes muscles. Who is correct and why? (AS1)

Answer : Jiya is correct because, in the lungs, the gaseous exchange takes place. From the lungs, oxygen is transported to the muscle cells. In the muscle cells, glucose is oxidized to release energy in the form of ATP. The energy is utilized for doing work.

Q. 10. What is the role of epiglottis and diaphragm in respiration? (AS1)

Answer : Epiglottis:

1. The epiglottis is a covering of the glottis which prevents movement of food and liquid from going into the trachea or wind pipe.

2. It allows air to pass through the larynx and the respiratory system.

Diaphragm:

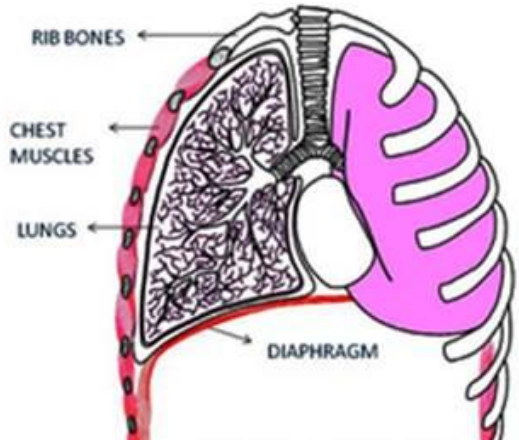
1. It is a muscular structure which separates the chest from the abdomen.

2. It contracts during inhalation, increasing the volume of the thoracic cavity.

3. Its contraction, allows air to enter into lungs.

4. The diaphragm relaxes during exhalation, decreasing the volume of the thoracic cavity.

5. Its relaxation guides the air to leave the air from lungs through the nose to the atmosphere.



Q. 11. How gaseous exchange takes place at blood level? (AS1)

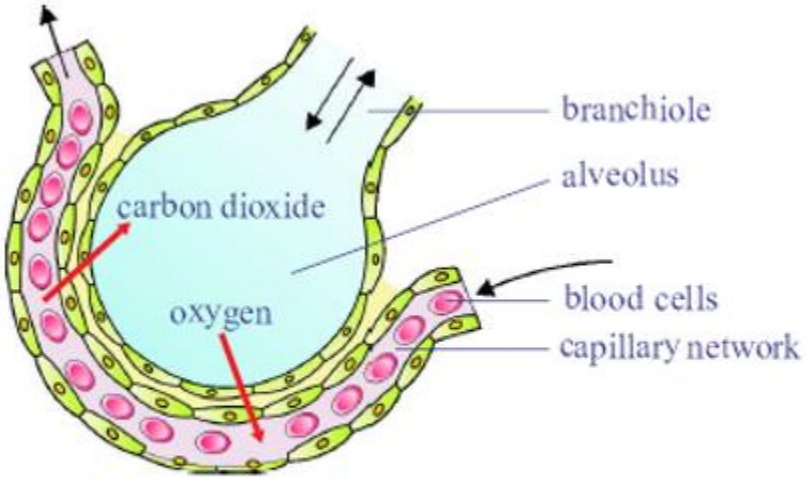
Answer : 1. The exchange takes place in the millions of alveoli in the lungs and the capillaries that envelop them.

2. Gaseous exchange occurs between alveoli and capillaries through Diffusion.

3. The exchange of oxygen and carbon dioxide takes due to the difference in their concentrations.

4. When the blood surrounding the alveoli has a lower concentration in oxygen than alveolar air, oxygen moves into the capillaries.

5. When the blood has a higher concentration of carbon dioxide than in the alveoli, it moves into the lungs from where it is exhaled.



Diffussion path way for gaseous exchange between lung and blood capillaries

Q. 12. Explain the mechanism of gaseous exchange at bronchiole level. (AS1)

Answer : 1. In the lungs, the trachea divides into bronchi.

2. Bronchi then divide into smaller tubes known as bronchioles.

3. The bronchioles end into millions of tiny air sacs called alveoli.

4. In the alveoli diffusion of gases between alveoli and capillaries takes place.

5. The concentration of oxygen present in the alveolar air is more than in the blood capillaries.

6. In this condition, the oxygen moves from diffuses from alveoli into the capillaries.

7. Since there is more carbon dioxide in the capillaries than in the alveolar air, carbon dioxide diffuses from the blood capillaries to the alveolar air in the alveoli. It is expelled out of the body.

Q. 13. After a vigorous exercise or work, we feel pain in muscles. What is the relationship between pain and respiration? (AS1)

Answer : 1. Our body meets its energy requirement by aerobic respiration.

2. But under some situations, anaerobic respiration takes place in our body.

3. During vigorous exercise oxygen used up faster than the normal to meet the increased energy need.

4. Therefore, anaerobic respiration takes place in human muscles to produce more energy.

5. Due to the anaerobic respiration in the muscles glucose is converted into lactic acid with the release of a small amount of energy.

6. The accumulation of lactic acid in the muscles causes muscular pains or cramps

Q. 14. Raju said stem also respire along with leaves in plants. Can you support this statement? Give your reasons. (AS1)

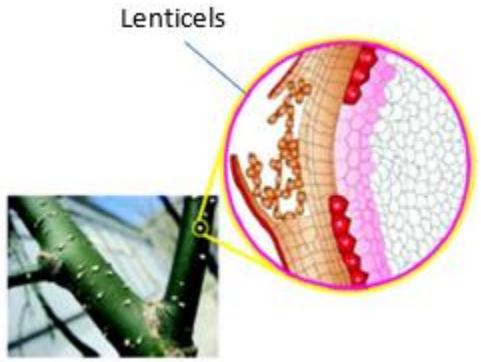
Answer : 1. Leaves have small openings, called stomata on their lower surfaces.

2. Through stomata gaseous exchange takes place.

3. In young green stems stomata are also present for gaseous exchange.

4. In old stems there are pores called lenticels are present through which gaseous exchange takes place.

5. Yes, stem also respires along with leaves in plants.



Q. 15. What happens if the diaphragm is not there in the body? (AS2)

Answer : 1. Diaphragm, a muscular separator between thorax and abdomen.

2. Its contraction and relaxation regulate breathing (inspiration and expiration)

3. In absence of diaphragm, all the breathing movements will stop.

4. The body is dependent on the diaphragm for normal respiratory function; in its absence, we cannot do anything.

Q. 16. If you have a chance to meet pulmonologist what questions are you going to ask about pulmonary respiration? (AS2)

Answer : The following questions can be asked about pulmonary respiration:

1. Why do humans respire by pulmonary respiration?

2. What role does hemoglobin play during respiration?

3. How deficiency of hemoglobin may impact on pulmonary respiration?

4. How does smoking affect breathing/ respiration?

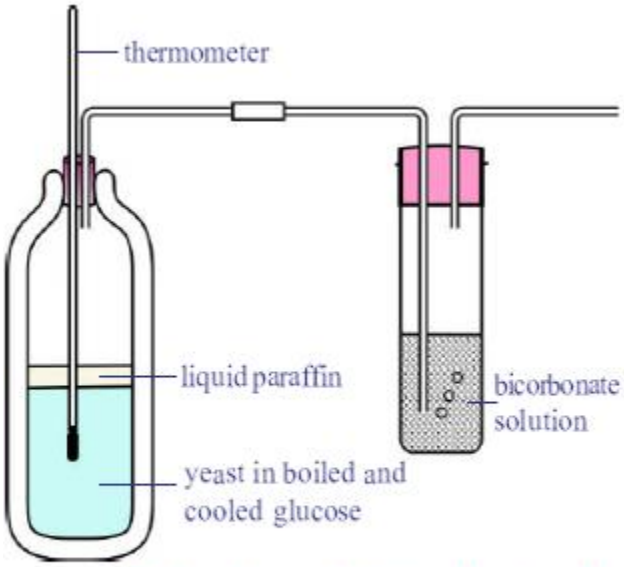
5. What type of diagnostic tests will be performed to assess the function of lungs?

Q. 17. What procedure do you follow to understand anaerobic respiration in your school laboratory? (AS2)

Answer : To understand anaerobic respiration in our school laboratory, I will demonstrate that CO_2 is released during anaerobic respiration.

The following apparatus to be set accordingly:

Thermos flask, split corks, thermometer, wash bottle, glass tubes, liquid paraffin, glucose solution, yeast cells, bicarbonate solution.



Testing for production of heat and CO_2 under anaerobic respiration

<u>Procedure</u>:

1. Glucose solution after heating is poured into a thermos flask.

2. The thermos flask containing glucose solution is heated for a minute to remove dissolved oxygen from glucose solution and then kept to cool t without shaking.

3. Some yeast is added to the glucose solution and fixes two-holed rubber stopper to the flask.

4. Oxygen supply from the air is cut off by pouring a layer of liquid paraffin on the mixture (Thermos is heat resistant can't be used for boiling).

5. Insert one end of the thermometer into the thermos flask. See the end of thermometer kept in the solution.

6. Gas released is collected in a tube containing bicarbonate solution or lime water as shown in apparatus setup. Keep the apparatus undisturbed for one or 2 days.

Observations:

1. After two days it is observed that lime water turns into milky white precipitate.

2. Increase in temperature noted on yeast cells respire and release energy.

3. The smell of alcohol comes from the flask.

Result

These observations indicate that yeast cells respire anaerobically and release carbon dioxide.

Q. 18. What are your observations in the combustion of sugar activity? (AS3)

Answer : Observations in the combustion of sugar:

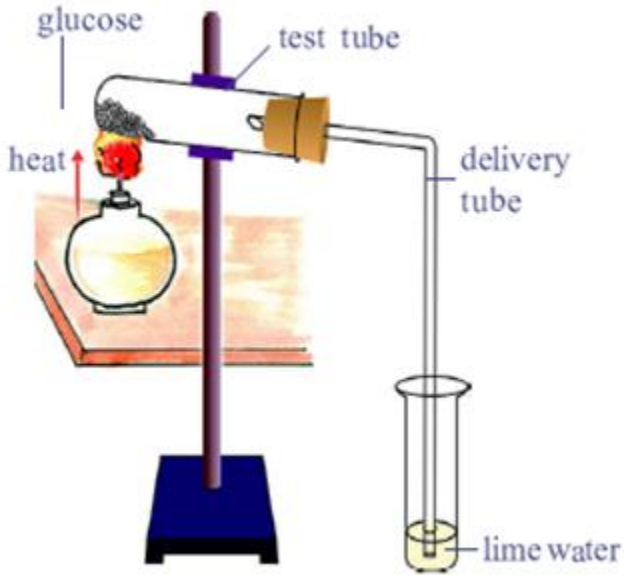
1. When sugar is heated first it chars and later burns producing flames.

2. The burning of sugar is called combustion.

3. On combustion of sugar, it releases carbon dioxide, water, and energy.

4. Energy is released in the form of heat.

5. Once glucose starts burning it cannot be stopped easily.



Q. 19. Collect information about cutaneous respiration in the frog. Prepare a note and display them in your classroom. (AS4)

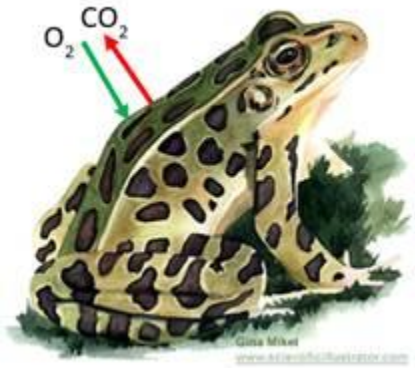
Answer : 1. Cutaneous respiration is a type of respiration in which gas exchange occurs across the skin.

2. This type of respiration carried out when frog is in winter sleep or under water.

3. For this type of respiration the skin should be moist to allow efficient respiration through skin.

4. Frog skin has mucus glands which secrete mucus on the surface of skin when they are out of water.

5. Frog is an amphibian which can respire through pulmonary as well as through gills.



Q. 20. Collect information about respiratory diseases (because of pollution, tobacco) and discuss with your classmates. (AS4)

Answer : 1. Chronic obstructive pulmonary disease (C O P D): The Global Initiative for Chronic Obstructive Lung disease is characterized by airflow obstruction that interferes with normal breathing. Typical symptoms include increased.

2. Pneumonia: Pneumonia is an inflammatory condition of the lung that can be caused by infection.

3. Tuberculosis: Tuberculosis is an infectious disease caused by the tuberculosis bacteria.

4. Asthma: Asthma is a chronic inflammatory disease that affects the airways and is characterized by respiratory symptoms such as wheeze, shortness of breath.

5. Emphysema: *It is a condition in which there is over-inflation of structures in the lungs known as alveoli or air sacs. This over-inflation results from a breakdown of the walls of the alveoli.*

6. <u>Lung cancer</u>: Lung cancer has been the most common type of cancer in the world for a number of decades and is the leading cause of cancer -related death in both genders worldwide.

Q. 21. What is the pathway taken by air in the respiratory system? Illustrate with a labeled diagram. (AS5)

Answer : A. The pathway taken by air in the respiratory system:

Nostrils —› Nasal Cavity —› Pharynx —› Larynx —› Trachea —› Bronchus—› Bronchioles —› Alveoli —› Blood

1. Air enters the body through the nostrils.

2. Air is filtered by a hair in the nasal cavities.

3. Nasal cavities lead into the trachea is also called the wind pipe.

4. Trachea after entering into lungs divides into 2 bronchi one leading to each lung.

5. The bronchi further divide into smaller and smaller branches called bronchioles.

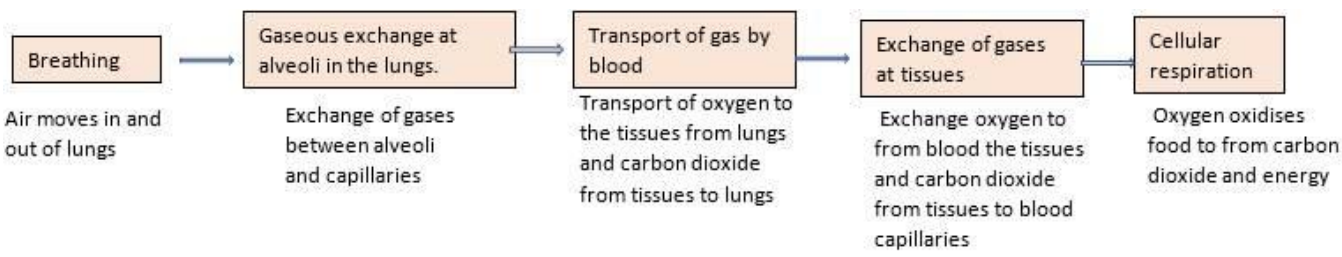
6. Bronchioles finally terminate in clusters of air sacs called alveoli in lungs which are very small and numerous.

7. Gaseous exchange takes place here as blood capillaries take up oxygen and expel carbon dioxide here.

8. Blood carries oxygen to each and every cell of the body. The whole passage from nostrils to alveoli is moist and warm.

Q. 22. Draw a block diagram showing events in respiration. Write what you understood about cellular respiration. (AS5)

Answer :



1. Cellular Respiration occurs in all living cells all the time.

2. During respiration, energy is produced when the glucose or fatty acids are oxidised in the cells. As this process occurs in the cells, this is called cellular respiration.
3. Respiration can be takes place in presence of oxygen that is aerobic respiration or in the absence of oxygen that is anaerobic respiration (fermentation).
4. Cellular respiration in prokaryotic cells like that of bacteria occurs within the cytoplasm.
5. In Eukaryotic cells, cytoplasm and mitochondria are the site of cellular respiration.
6. The complete breakdown of sugar molecule with the release of all its available energy involves a series of chemical reactions.
7. The energy released in cellular respiration is stored as ATP.
8. ATP is utilised for carrying out other functions in the cell.

Q. 23. How you appreciate the mechanism of respiration in our body? (AS6)

Answer : 1. Respiration is a necessary life as it provides energy to carry out all the life processes which are necessary to keep the organism alive.

2. The energy that is obtained from respiration is used to build the organism through cell growth and reproduction as well as cell repair.

3. All systems in a living being need energy to survive. Energy is defined as the ability to do work. So without respiration we would not have any energy to perform necessary day-to-day functions.

4. During respiration, carbon dioxide is given out which is a toxic gas. But the carbon dioxide is used by green plants to make food (photosynthesis).

5. The respiratory system goes into operation from the movement of our birth to death.

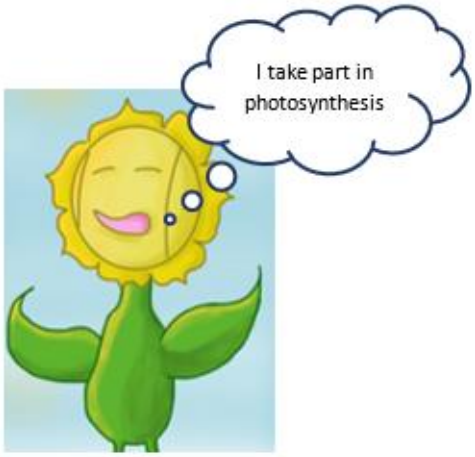
Q. 24. Prepare an article on anaerobic respiration to present school symposium. (AS7)

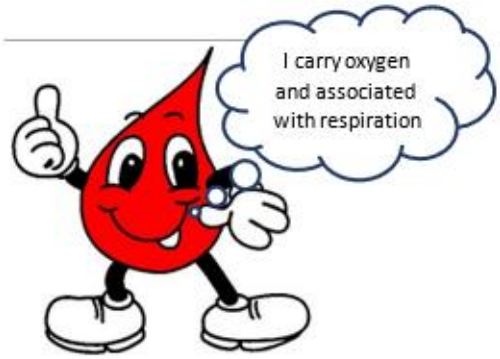
Answer :

Anaerobic respiration is a type of respiration in absence of oxygen. It takes place in some bacteria, and yeast and other prokaryotes. This process takes place in cytoplasm. Here, the glucose molecule is incompletely oxidised End products are either ethyl alcohol or lactic acid and water. Relatively small energy is liberated (2 ATP). This type of respiration takes place in human muscle cells and causes pain.

Q. 25. Prepare a cartoon on discussion between hemoglobin and chlorophyll about respiration (AS7)

Answer :





Fill in the blanks

Q. 1. Fill in the blanks:

Exhaled air contains _____ and _____.

Answer : Exhaled air contains carbon dioxide and water vapours.

After expiration carbon dioxide is expelled from lungs which contain carbon dioxide, water vapours and a small amount of oxygen.

Q. 2. Fill in the blanks:

A flap like muscular valve controls movement of air and food is _____.

Answer : A flap like muscular valve controls movement of air and food is epiglottis.

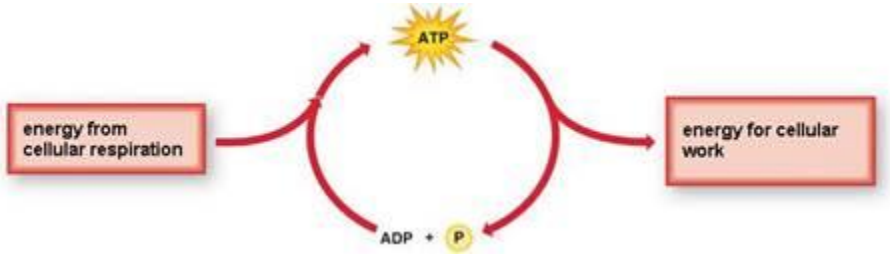
Epiglottis is a flap of tissue found at the most superior part of the larynx. It acts as a gatekeeper who closes and protects the gate (trachea) from the foods and drinks and directs it into the proper direction (oesophagus).

Q. 3. Fill in the blanks:

Energy currency of the cell is called _____.

Answer : Energy currency of the cell is called ATP.

ATP (Adenosine triphosphate) is the energy currency. It produce during respiration in the mitochondria. It releases energy when its terminal bond breaks.



Q. 4. Fill in the blanks:

Lenticels are the respiratory organs exists in _____part of plant.

Answer : Lenticels are the respiratory organs exists in stem part of plant.

Lenticels are the pores present in the stems, roots, potato tubers, etc. They. They are slightly raised spots on the surface of stem. They help in exchange of gases.

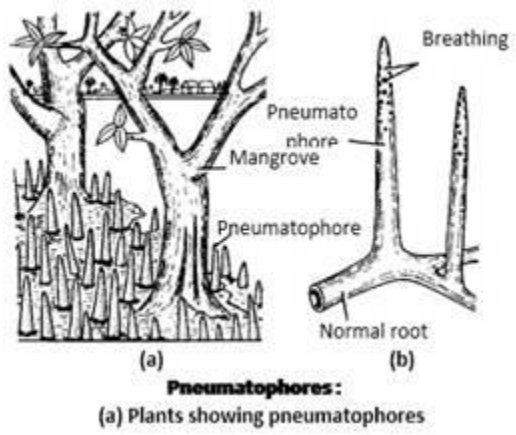
Q. 5. Fill in the blanks:

Mangrove trees respire with their _____.

Answer :

Mangrove trees respire with their pneumatophores.

Pneumatophores are special roots that develop in some plant species growing in waterlogged or strongly compacted soils, e.g. mangroves. These roots are above the ground and called breathing roots. Gaseous exchange occurs through these roots



Pneumatophores :
(a) Plants showing pneumatophores

Choose the correct Answer

Q. 1. Choose the correct answer

We will find vocal cords in

A. larynx
B. pharynx
C. nasal cavity
D. trachea

Answer : Vocal cord or larynx is present in the pharynx, which produces sound.

Q. 2. Choose the correct answer

Cluster of air sacs in lungs are called

A. alveoli
B. bronchi
C. bronchioles
D. air spaces

Answer : Alveoli are tiny sacs at the terminal part of the bronchioles within our lungs. It is the place where oxygen and carbon dioxide moves between the lungs and blood capillaries.

Q. 3. Choose the correct answer

Which of the following is correct?

i. the diaphragm contracts – volume of chest cavity increased
ii. the diaphragm contracts – volume of chest cavity decreased

iii. the diaphragm expands – volume of chest cavity increased
iv. the diaphragm expands – volume of chest cavity decreased

A. i
B. i & ii
C. ii & iii
D. iv

Answer : When the diaphragm contracts, the volume of chest cavity increased and when it relaxes, the volume of chest cavity decreased increased. Thus it helps in breathing process.

Q. 4. Choose the correct answer

Respiration is a catabolic process because of

A. breakdown of complex food molecules
B. conversion of light energy
C. synthesis of chemical energy
D. energy storage

Answer : Respiration is a catabolic (breakdown) process in which complex food molecules such as glucose, fats are oxidized in presence or absence of oxygen to release carbon dioxide, water and energy.

Q. 5. Choose the correct answer

Energy is stored in

A. nucleus
B. mitochondria
C. ribosomes
D. cell wall

Answer : Mitochondria is a cell organelle where major steps of cellular respiration occur. The energy released during respiration is stored in mitochondria in the form of ATP.