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Solution 1

No.

Solution 2

Ethanol.

Solution 3

Yeast can live without oxygen.

Solution 4

Aerobic respiration.

Solution 5

Lactic acid.

Solution 6

Root hairs.

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Solution 7

Diffusion.

Solution 8

Stomata.

Solution 9

Lenticels.

Solution 10

Root hair.

Solution 11

(a) Respiration.

(b) Photosynthesis.

Solution 12

Gills.

Solution 13

Earthworm.

Solution 14

Amoeba.

Solution 15

Prawns and mussels.

Solution 16

Bronchi.

Solution 17

Alveoli.

Solution 18

Haemoglobin.

Solution 19

Oxygen and carbon dioxide.

Solution 20

Alveoli.

Solution 21

Alveoli.

Solution 22

Trachea.

Solution 23

Lungs.

Solution 24

(a) Oxygen.

(b) Carbon dioxide.

Solution 25

(a) False.

(b) True.

(c) False.

Solution 26

(a) Lungs.

(b) Alveoli.

(c) Alveoli.

(d) Anaerobic, aerobic.

(e) Fish.

Solution 27

A land plant may die if its roots remain water logged for a long time because too much water expels all the air from in-between the soil particles. Due to this, oxygen is not available to the roots for aerobic respiration. Under these conditions the roots will respire anaerobically producing alcohol which may kill the plant.

Solution 28

(a) Aerobic respiration

(i) Aerobic respiration takes place in the presence of oxygen.

(ii) Complete breakdown of food occurs in aerobic respiration.

(iii) The end products in aerobic respiration are carbon dioxide and water.

(iv) Aerobic respiration produces a considerable amount of energy.

Anaerobic respiration

(i) Anaerobic respiration takes place in the absence of oxygen.

(ii) Partial breakdown of food occurs in anaerobic respiration.

(iii) The end products in anaerobic respiration are ethanol and carbon dioxide (in yeast) and lactic acid (in animal muscles).

(iv) Much less energy is produced in anaerobic respiration.

(b) Yeast and some bacteria.

Solution 29

(a) Ethanol and carbon dioxide.

(b) Lactic acid.

Solution 30

Anaerobic respiration takes place in human muscles during vigorous physical exercise because oxygen gets used up faster in the muscle cells than can be supplied by the blood.

Solution 31

(a) Anaerobic respiration in yeast.

(b) Aerobic respiration in humans.

(c) Anaerobic respiration in muscle tissue of animals.

Solution 32

The mechanism by which an organism obtains oxygen from the air and releases carbon dioxide is called breathing. Difference between breathing and respiration:-

Breathing:

(i) Breathing is a simple process.

(ii) Breathing involves taking in oxygen from the air and releasing carbon dioxide into the air.

(iii) Breathing is a physical process.

Respiration:

(i) Respiration is a complex process.

(ii) Respiration includes breathing as well as the oxidation of food in the cells of the organism to release energy.

(iii) Respiration is a bio-chemical process.

Solution 33

There are two ways in which glucose is oxidized to provide energy in various organisms:

(i) Anaerobic respiration ? The respiration which takes place without oxygen is called anaerobic respiration. Example: Yeast and some bacteria break down glucose into ethanol and carbon dioxide.

(ii) Aerobic respiration ? The respiration which uses oxygen is called aerobic respiration. Example: Plants and animals break down glucose completely into carbon dioxide and water to release energy.

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Solution 34

During the breathing cycle, when air is taken in and let out, the

lungs always contain a certain residual volume of air so that there is sufficient time 'for the oxygen absorbed' into the blood and 'for the carbon dioxide to be released' from the blood.

Solution 35

It is dangerous to inhale air containing carbon monoxide as it binds very strongly with haemoglobin in the blood and prevents it from carrying oxygen to the brain and other parts of the body. Due to lack of oxygen, the person cannot breathe properly and may become unconscious or may even die.

Solution 36

(a) Respiration in amoeba: Amoeba depends on simple diffusion of gases for breathing. The diffusion of gases takes place through the thin cell membrane of amoeba. Amoeba lives in water which contains dissolved oxygen. The oxygen from water diffuses into the body of amoeba through its cell membrane. The oxygen spreads quickly into the whole body and is used for respiration inside the amoeba cell. The process of respiration produces carbon dioxide which diffuses out through its cell membrane into the surrounding water.

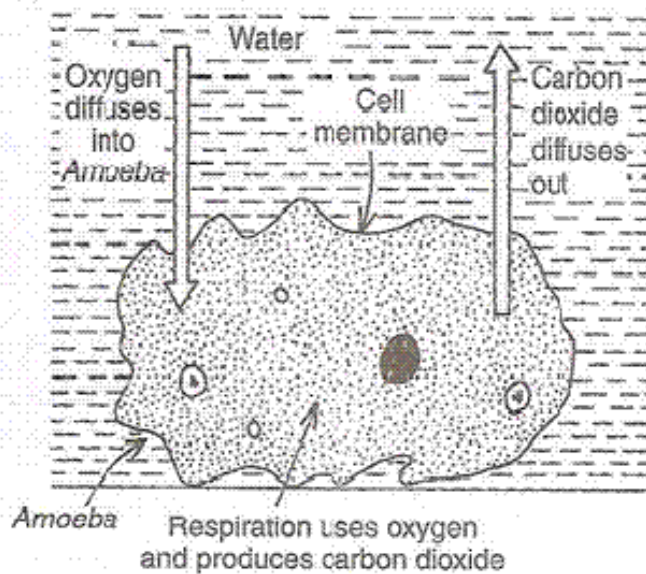


Diagram to show the process of breathing (gaseous exchange) in *Amoeba*.

(b) It is aerobic respiration.

Solution 37

The common features of all respiratory organs ? skin, gills and lungs are: (i) All the respiratory organs have a large surface area to get enough oxygen.(ii) All the respiratory organs have thin walls for easy diffusion and exchange of respiratory gases.(iii) All the respiratory organs like skin, gills and lungs have a rich blood supply for transporting respiratory gases.

Solution 38

Respiration and fish: The fish has special organ of breathing called gills on both the sides of its head. The gills are covered by gill covers. The fish lives in water which contains dissolved oxygen. The fish breathes by taking in water through its mouth and sending it over the gills. When water passes over the gills, the gills extract dissolved oxygen from the water. The extracted oxygen is absorbed by the blood and carried to all the parts of the fish. The carbon dioxide produced by respiration is brought back by the blood into the gills for expelling into the surrounding water.

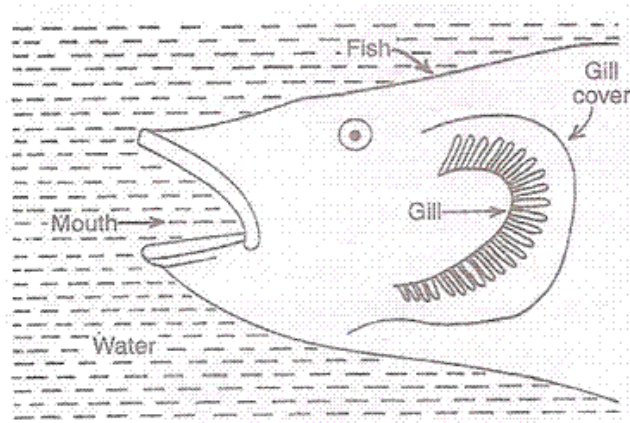


Diagram to show the gills in fish which extract dissolved oxygen from water.

#### Solution 39

The deficiency of haemoglobin in the blood of a person reduces the oxygen carrying capacity of blood resulting in breathing problems, tiredness and lack of energy.

#### Solution 40

(a) Respiration in roots: The roots of a plant take the oxygen required for respiration from the air present in-between the soil particles by the process of diffusion. The roots have extensions of epidermal cells of a root called root hair which are in contact with the air in the soil. Oxygen diffuses from root hairs and reaches all the other cells of the root for respiration. Carbon dioxide gas produced in the cells of the root during respiration moves out through the root hairs by the process of diffusion. Thus, the respiration in roots occurs by diffusion of respiratory gases through the root hairs.

(b) Respiration in stems: The stems of herbaceous plants takes place through stomata. The oxygen from the air diffuses into the stem of a herbaceous plant through stomata and reaches all the cells for respiration. The carbon dioxide produced diffuses out through stomata. In woody stems, the bark has lenticels for the exchange of gases.

(c) Respiration in leaves: The leaves of a plant has tiny pores called stomata through which the exchange of respiratory gases takes place by diffusion. Oxygen from air diffuses into a leaf through stomata and reaches all the cells, where it is used for respiration and the carbon dioxide produced diffuses out from the leaf into the air through stomata.

#### Solution 41

(a) Aquatic animals are the animals which live in water and the terrestrial animals are the animals which live on land.

(b) The aquatic animals use the oxygen dissolved in water to carry out respiration. The terrestrial animals obtain oxygen from air.

#### Solution 42

Fishes die when taken out of water because they do not have lungs to utilize the oxygen of air for breathing and respiration. They have gills which can extract only dissolved oxygen from water.

#### Solution 43

The rate of breathing in aquatic animals is much faster than terrestrial animals because the amount of oxygen dissolved in water is low as compared to the amount of oxygen dissolved in air.

#### Solution 44

The energy currency of the cell is 'ATP'. It is produced in cytoplasm in lower organisms which respire anaerobically. In higher organisms, 'ATP' is produced in mitochondria when they respire aerobically.

#### Solution 45

Plants do not move. In a large plant body there are many dead cells like sclerenchyma as a result it requires less energy as

compared to animals.

Solution 46

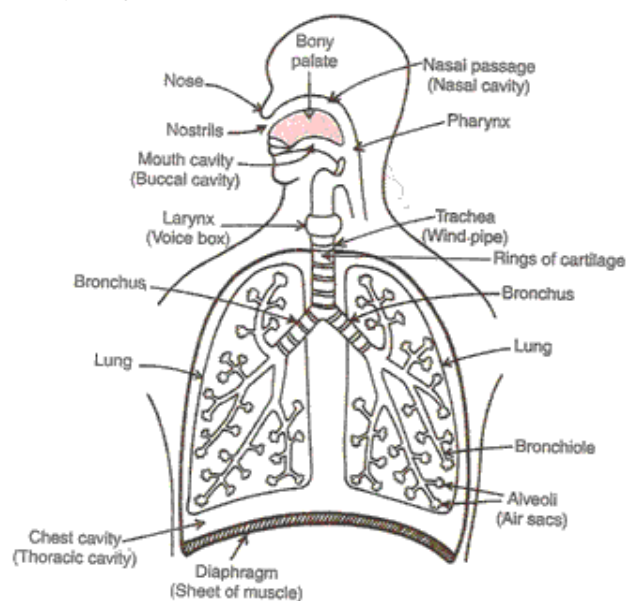
If humans also had gills then the deep sea divers could remain under sea water even without carrying oxygen cylinders for breathing as they would be able to extract the dissolved oxygen from water for breathing purpose just like a fish does.

Solution 47

(a) The function of respiratory system is to breathe in oxygen for respiration (producing energy from food), and to breathe out carbon dioxide produced by respiration.

(b) The major organs of respiratory system in human beings are:

- (i) Nose
- (ii) Nasal Passage
- (iii) Trachea
- (iv) Bronchi
- (v) Lungs and
- (vi) diaphragm.



The human respiratory system.

Solution 48

(a) When air passes through the nasal passage, the dust particles and other impurities present in it are trapped by nasal hair and mucus so that clean air goes into the lungs.

(b) Trachea does not collapse even when there is no air in it because it is supported by rings of soft bones called cartilage.

(c) During the process of 'breathing in' the air sacs or alveoli of the lungs get filled with air containing oxygen. The alveoli are surrounded by capillaries carrying blood so the oxygen of air diffuses from the alveoli walls into the blood from where it is carried to all the parts of the body. As the blood passes through the tissues of the body, the oxygen present in it diffuses into the cells. This oxygen combines with the digested food to release energy. Carbon dioxide gas is produced as a waste product during respiration in the cells of the body tissues which diffuses into the blood. Blood carries the carbon dioxide back to the lungs where it diffuses into the alveoli.

(d) The human lungs have been designed to maximise the exchange of gases as there are millions of alveoli in the lungs which provides a large surface area for the exchange of gases.

Solution 49

Respiration in plants

- (i) All the parts of the plants perform respiration individually.
- (ii) During respiration in plants there is a little transport of respiratory gases from one part of the plant to the other.
- (iii) The respiration in plants occurs at a slow rate.

## Respiration in Animals

- (i) An animal performs respiration as a single unit.
- (ii) Respiratory gases are usually transported over long distances inside an animal during respiration.
- (iii) The respiration in animals occurs at a much faster rate.
- (b) (i) During daytime when photosynthesis occurs, oxygen is produced. The leaves use some of this oxygen for respiration and the rest of oxygen diffuses out into the air. Carbon dioxide produced by respiration is all used up in photosynthesis by leaves during the daytime. Even more carbon dioxide is taken in from air. Thus, the net gas exchange in leaves during daytime is: Oxygen diffuses out; Carbon dioxide diffuses in.
- (ii) At night time, when no photosynthesis occurs and hence no oxygen is produced, oxygen from air diffuses in leaves to carry out respiration. Carbon dioxide produced by respiration diffuses out into air. So, the net gas exchange in leaves at night is: Oxygen diffuses in; Carbon dioxide diffuses out.
- (c) Exhaled air contains more carbon dioxide because during the respiration process when oxygen breaks down glucose, then a lot of carbon dioxide is produced hence the exhaled air has a higher proportion of the same.

## Solution 50

- (a) Respiration is a vital function of the body as it provides energy for carrying out all the life processes which are necessary to keep the organism alive.
- (b) Aerobic respiration
  - (i) Aerobic respiration takes place in the presence of oxygen.
  - (ii) Complete breakdown of food occurs in aerobic respiration.
  - (iii) The end products in aerobic respiration are carbon dioxide and water.
  - (iv) Aerobic respiration produces a considerable amount of energy.

Example: Human Beings.

## Anaerobic respiration

- (i) Anaerobic respiration takes place in the absence of oxygen.
- (ii) Partial breakdown of food occurs in anaerobic respiration.
- (iii) The end products in anaerobic respiration are ethanol and carbon dioxide (in yeast) and lactic acid (in animal muscles).
- (iv) Much less energy is produced in anaerobic respiration. Example: Yeast.
- (c) (i) Anaerobic respiration.
- (ii) Aerobic respiration.

## Solution 51

- (a) Diffusion is insufficient to meet the oxygen requirements of large multicellular organisms like humans because the volume of human body is so big that the oxygen cannot diffuse into all the cells of the human body quickly and oxygen will have to travel large distances to reach each and every cell of the body.
- (b) Large organisms contain a respiratory pigment called haemoglobin which carries the oxygen from the lungs to all the body cells very efficiently.
- (c) A terrestrial animal has an advantage over an aquatic animal in regard to obtaining oxygen for respiration that it is surrounded by an oxygen rich atmosphere from where it can take any amount of oxygen.

\*\*\*\*\* END \*\*\*\*\*