

CHAPTER 4 BREATHING FOR ENERGY.

Q1) Give brief description of parts of the respiratory system

→ Parts of respiratory system include.

i) Nostril - An opening through which air passes in & out of the body.

ii) Nasal cavity :- The cavity which connects the nostrils with the pharynx.

iii) Trachea (wind pipe) :- A long tube strengthened by 'C' shaped cartilaginous rings help trachea to remain open.

iv) Bronchus :- Branches of trachea which enter the lungs, supported by cartilaginous bronchial rings.

v) Bronchiole :- The terminal branches of bronchi that open to the alveoli. There are no cartilaginous rings in the bronchioles.

vi) Alveoli :- Delicate air sacs, elastic in nature, seen at the tip of bronchioles. The air sacs are surrounded by a large number of capillaries. The exchange of gases take place here.

vii) Pleura :- The double layered protective membrane of the lungs. Pleural fluid seen is between the membranous layers prevent friction between lungs & walls of the thoracic cavity.

vii) Diaphragm: The muscular wall that separates the thoracic & abdominal cavities.

Q2) What is breathing?

- Breathing is a process that takes place without our knowledge during which air is taken in & expelled.
- The basis of respiratory process is the expansion & contraction of the thoracic cavity. This repeats rhythmically. With the increase in size of the thoracic cavity, air enters the lungs. This is called inspiration.
 - As a result of the contraction of the cavity, air is expelled from the lungs. This is called expiration.
 - The combined working of intercostal muscles & the diaphragm help in increasing & decreasing the volume of thoracic cavity.

Q3) How exchange of gases takes place in Alveoli?

- Atmospheric air reaches the alveoli as a result of inspiration. The exchange of respiratory gases like oxygen & CO₂ takes place in alveoli.
- Bronchioles, the terminal branches of bronchi which enter the lungs end in millions of alveoli. Alveoli increases the respiratory surface area in lungs. They are surrounded by numerous blood capillaries.
 - The inner wall of the alveoli is always kept moist. The walls of the alveoli and capillaries are made up of a single layer of cells.
 - In short, the surface that separates the blood in the blood capillaries & the air in the alveoli, has the thickness of two rows of cells only.
 - During inspiration, the concentration of oxygen is higher & the concentration of CO₂ is lower in the alveoli. But, in the blood capillaries the concentration of oxygen is lower & the conc. of CO₂ is higher.
 - As a result of this, O₂ from the alveoli diffuses into the capillaries & CO₂ from the capillaries diffuses into the alveoli.

4) Explain cellular respiration.

→ The energy is mainly released from glucose. The process by which energy is released mainly from glucose in cells is called cellular respiration.

• Cellular respiration occurs in 2 steps:-

i) Glycolysis:- The first phase in cellular respiration. Glucose is converted to pyruvic acid. 2 ATP molecules are produced. This process occurs in cytoplasm. It does not require oxygen.

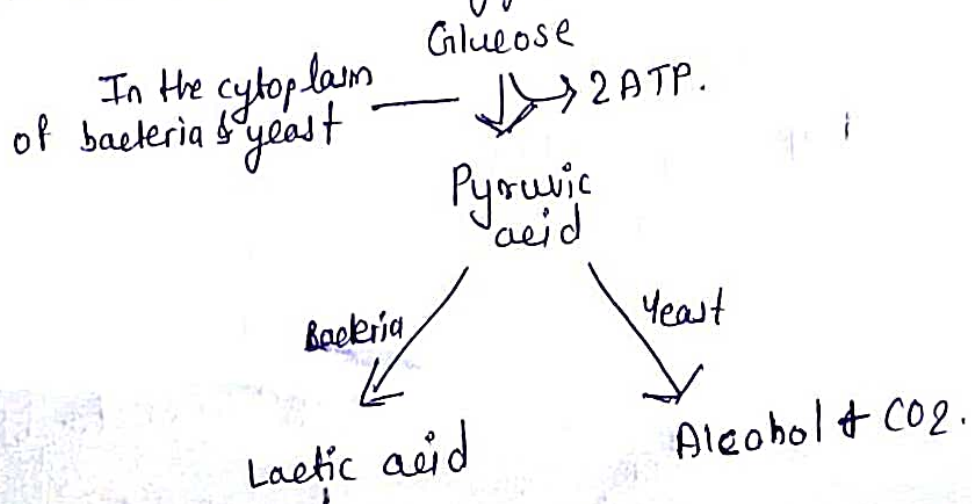
ii) Krebs cycle:- The second phase in cellular respiration is that which occurs in mitochondria. ~~Through~~ Through a series of chemical changes pyruvic acid is converted to CO_2 & water. 28 ATP molecules are produced. It requires oxygen.

Q5) How is the excess water & CO_2 eliminated?

→ Excess water is eliminated through exhaled air & in the form of urine & sweat. 70% CO_2 is eliminated as bicarbonate by dissolving in the water of plasma & the RBCs. 23% as carbaminohaemoglobin & 7% as dissolved in blood plasma.

Q6) Explain the process of anaerobic respiration.

→ Many organisms like bacteria, yeast, etc can survive even in the absence of oxygen.



Example of anaerobic respiration:-

Yeast $\xrightarrow{\text{Alcohol, CO}_2}$ Fermenting batter to soften it.

↓
Anaerobic
respiration

Lactobacillus
bacteria $\xrightarrow{\text{Lactic acid}}$ Curdling milk.

Q7) Which are the different respiratory disorders?

→ Lungs can be damaged by dust, germs, chemicals, etc, which are contained in the air we breathe in.

◦ Smoking is a bad habit that harmfully affects the human race.

◦ Lung cancer: Carcinogens present in tobacco cause lung cancer.

◦ Emphysema: Alveoli rupture due to the loss of elasticity by the deposition of toxic substances contained in tobacco. This reduces the respiratory surface & reduces vital capacity.

◦ Bronchitis: The tar, carbon monoxide, etc, in tobacco leads to the deposition of mucus & the swelling of lungs due to the proliferation of germs in the alveoli.

Q8) Explain mode of respiration in different organisms.

Organism	Respiratory surface	Exchange of gases
Amoeba	Cell membrane	Through cell membrane to cytoplasm.
Fish	Gills	Capillaries to blood.
Spider	Book lungs	Directly from air.
Cockroach	Trachea	Directly tissues from air.