UNIT III: HUMAN PHYSIOLOGY

4. BREATHING AND EXCHANGE OF GASES

1VSAQ+ 1SAQ = [2M + 4 M= 6 M]

ROOT POINTS

1. **Breathing** (respiration) is basically inhalation of O_2 and exhalation of CO_2.
   It is the exchange of O_2 from the atmosphere with CO_2 produced by the tissues at lungs.
2. **Main contents of this chapter** are i) Respiratory organs ii) Mechanism of Breathing iii) Exchange, transport, regulation of gases iv) Disorders of respiratory system
3. **Respiration provides energy** to the body. It is done by oxidation of food.
4. Breathing involves two stages: (i)**Inspiration** (ii) **Expiration**
5. **Intake** of atmospheric air into the Lungs is called **Inspiration**.
6. **Release** of alveolar air to the exterior is called **Expiration**.
7. **Respiration** consists of (i) breathing (ii) diffusion of gases at lungs (iii) transport of gases (iv) diffusion of O_2 and CO_2 at the tissues (v) utilisation of O_2 by the cells.
8. **Pulmonary respiration** involves the use of **lungs**. [VSAQ]
   Ex: Humans, birds, mammals, amphibians.
9. **Branchial respiration** involves the use of **gills.** [VSAQ]
   Ex: Aquatic animals like fish, arthropods,...
10. The muscles that help normal breathing movements [VSAQ]
    i) Diaphragm muscles (Phrenic muscles) ii) External and internal intercostal muscles.
11. **Three major layers of diffusion membrane:** Alveoli, alveolar capillaries, Basement membrane. [VSAQ]
12. **Oxygen transport:** Oxygen is transported from lungs to the tissues mainly by RBC (97%) and 3% by plasma in dissolved state.
13. A **rise** in **pCO_2 decreases** the **affinity of haemoglobin** for oxygen. [VSAQ]
14. **Mechanisms for CO_2 transport:** [SAQ]
    About 20–25% of CO_2, is transported by haemoglobin as carbaminohaemoglobin.
    Binding of CO_2 with Haemoglobin is influenced by pCO_2 and pO_2.
    At the Tissue Site CO_2 diffuses into blood.
    At the Alveolar Site the reaction reverses.

15. **Medulla oblongata** controls inhalation and exhalation of air.

16. **Tidal volume** is the volume of air inspired or expired during normal inspiration or expiration.

17. **Vital Capacity** is the maximum volume of air a person can **breathe in** after **'forced expiration'.**

VC = TV + ERV+ IRV [VSAQ]

18. The regulation of respiration is under the control of Respiratory rhythm centre(RRC), of medulla oblongata of the brain pneumotaxic centre of pons of cerebellum (brain stem).[SAQ]

19. **Disorders of Respiratory system:** [SAQ]

A) Asthma B) Bronchitis C) Emphysema D) Pneumonia.

E) Occupational disorders (Asbestosis, Silicosis, Siderosis , Black-lung disease)

20. Asthma may be attributed to **allergic reaction of the mast cells in the lungs**.[NEET-2016]

21. The chronic respiratory disorder caused mainly by cigarette smoking **Emphysema** [NEET-2016]

22. The partial pressure of oxygen in the alveoli of the lung is **more than that in the blood**. [NEET-2016]

23. The alveoli, air filled sacs in lungs donot collapse even after forceful respiration because of **residual volume**. [NEET-2017]

24. There are **seven pairs of Vertebro-sternal**, **three pairs of vertebro chondral** and **two pairs of vertebral ribs**. [NEET-2019]

25. The event that occurs during inspiration is **contraction of diagphragm**. [NEET-2020]

26. Total lung capacity of air is TV+IRV+ERV+RV (or) VC +RV. [NEET-2020]

27. **Vital Capacity** of Lung is IRV+ERV+TV. [NEET-2023]

28. Factors that are favourable for the formation of oxyhaemoglobin in alveoli are **high pO_2 & lesser H^+ concentration .** [NEET-2025]