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***Question no.01***

***ANSWER***

**Given that:**

 Expiratory reserve volume **(ERV) = 1000 ml**

 Residual Volume **(RV) = 1200ml**

Inspiratory capacity **(IC) = 3000 ml**

**Required:**

 Total lungs capacity **(TLC) = ?**

**Solution:**

 ***TLC= FRC+IC***

***So,***

FRC= ERV+RV

 = 1000ml + 1200ml

 **= 2200ml**

 **TLC= FRC+IC**

 = 2200ml + 3000ml

 ***= 5200ml*** ***(ANSWER)***

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***Question no.02***

***Pulmonary edema***

* Pulmonary edema is a condition caused by excess fluid in the lungs.
* This fluid collects in the numerous air sacs in the lungs, making it difficult to breath.
* In most cases, heart problems cause pulmonary edema.

**Muscles of Inspiration:**

1. *Sternocleidomastoid muscles*
2. *Scalenes muscles*
3. *External intercostal muscles*
4. *Diaphragm*
* The primary muscles of inspiration are the diaphragm, the upper and more lateral external intercostal, and the parasternal portion of the internal intercostal muscles.
* Both the external intercostal muscles and the parasternal portion of the internal intercostal muscles elevate the ribs.

**Muscles of Expiration:**

1. *Internal intercostal muscles*
2. *External oblique muscles*
3. *Internal oblique muscles*
4. *Transversus abdominis muscles*
5. *Rectus abdominis muscles*
* During active expiration, the most important muscles are those of the abdominal wall (including the rectus abdominus, internal and external oblique, and transverses abdominus.
* Which derive intra-abdominal pressure up when the contract, and thus push up the diaphragm, raisning pleural pressure, which arises alveolar.

***Question no.03***

***Properties of different blood groups***

***Blood types:***

* There are four different types of blood group which are,
* A
* B
* AB
* O
* ***Properties:***
* ***Blood type A*** : has A antigens in the red blood cells and anti-B antibodies in plasma
* ***Blood type B*:** has B antigens in the red blood cells and anti-A antibodies in plasma.
* ***Blood type AB*:** has both **A&B antigens** on red blood cells but neither A and B anti bodies in plasma.

It accepts both antigens as being natural to the body. This means **AB** blood is able to accept any type of blood during transfusions making it universal acceptor.

* ***Blood group O*:** has neither **A** nor **B antigens** on red blood cells. But both **A**&**B** antibodies in the plasma.

It means that **O blood** will not react with antibodies produced by other blood types making it universal accepted blood type for transfusion , also called a **Universal donor.**

***Universal donor and universal recipient***

* **Donor** with type **O-**red blood cell are referred to as universal donors and their red blood cells can be given to any other blood type
* **Donors** with type **AB+** are referred to universal recipients and can receive red blood cells from any other blood type.
* In transfusions a packed red blood cells, individuals with type **O Rh D** negative blood are often called ***Universal donors.***
* Those with type **AB Rh D** positive blood are called ***Universal recipients.***

***Question no.04***

***Respiratory Membrane***

* The membrane separating air within the alveoli from the blood within pulmonary capillaries.
* It consist of the alveolar wall, the capillary wall, and their basement membranes.
* Gas exchange across across this membrane.
* The respiratory membrane is very thin (less than 0.5mm).

**Size:**

* The whole membrane however is only between 0.2µm at its thinnest part and 0.6 µm at its thickest.

**Layers:**

* Alveolar wall
* Epithelial basement membrane- under the alveolar wall
* Capillary basement membrane – fused to the epithelial basement membrane.
* Capillary epithelium.

**Importance:**

* The respiratory membrane allows gases to be exchanged b/w the almonry capillaries, blood vessels, and the respiratory units of the lungs which consist of bronchioles, alveolar ducts, atria and alveoli.

***FACTORS:***

* **Membrane thickness-** the thinner the membrane, the faster the rate of diffusion.
* **Membrane surface area-** the larger the surface area, the faster the rate of diffusion.
* **Pressure difference-** across the membrane.
* **Diffusion coefficient-** of the gas.

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***Question no.05***

***Diff. b/w Anatomical dead space***

***And physiological dead space***

***Anatomical Dead Space:***

* Anatomical dead space is the total volume of the conducting airways from the nose or mouth down to the level of the terminal bronchioles
* It is about 150 ml on the average in humans.
* The anatomical dead space fills with inspired air at the end of each inspiration, but there is exhaled unchanged.

***Physiological Dead Space:***

* Physiological dead space is also known as dead space.
* Physiological dead space is equal to anatomic plus alveolar dead space which is volume of air in the respiratory zone that does not take part in gas exchange.
* The respiratory zone is comprised of respiratory bronchioles, alveolar duct, alveolar sac, and alveoli.

***Clinical manifestations:***

***Symptoms:***

* Chest pain
* Dry, nonproductive cough
* Dyspnea (shortness of breath, or difficult, labored breathing)
* Orthopnea (inability to breathe easily unless the person is sitting up straight or standing erect)

***Causes:***

* *Heart failure*
* *Pulmonary embolism*
* *Cirrhosis*
* *Post open heart surgery*

***Treatment:***

* *Diuretics and other heart failure medications are used to treat pleural effusion caused by congestive heart failure or other medical causes.*
* *A malignant effusion may also require treatment with* ***chemotherapy****,* ***radiation therapy,*** *or a medication infusion within the chest.*