



IQRA NATIONAL UNIVERSITY

DEPARTMENT OF ALLIED HEALTH SCIENCES

Final-Term Examination
DPT 2nd Semester

Course Title: Human Physiology II

Instructor: Dr Sara Naeem

Time: 6 Hours

Max Marks:50

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Q1. What would be the total lung capacity (TLC) if expiratory reserve volume (ERV) is 1000 ml , (RV) residual volume is 1200 ml keeping the inspiratory capacity (IC) as 3000 ml.

Answer:

Given data:

Expiratory reserve volume (ERV) = 1000ml.

Residual volume (RV) = 1200ml.

Respiratory capacity (IC) = 300ml.

Required:

Total lung capacity (TLC) = ?

Solution:

As,

$$TLC = FRC + IC$$

So,

$$\begin{aligned} FRC &= ERV + RV \\ &= 1000 + 1200 \\ &= 2200 \end{aligned}$$

$$\begin{aligned} TLC &= FRC + IC \\ &= 2200 + 3000 \end{aligned}$$

$$TLC = 5200ml.$$

Q2. What is pulmonary edema. Enlist the muscles of inspiration and muscles of expiration.

Answer:

Pulmonary edema:

It is a condition the lungs become filled with fluid. This condition is also known as lung congestion. Lung water or pulmonary congestion.

Pulmonary edema makes gas exchange difficult oxygen and carbon dioxide must diffuse to wide layer of interstitial fluid.

The blood cannot be fully oxygenated.

Causes:

Maybe cardiogenic and non-cardiogenic.

Cardiogenic:

It is the result of heart disease.

- Left side heart failure
- Severe hypertension

Non-cardiogenic:

Damage pulmonary capillaries or alveoli.

- Pulmonary infections
- Inhalation of toxic substances
- Trauma to the chest
- Kidney failure
- High BP

Symptoms:

- Shortness of breath
- Weight gain
- Fatigue
- Swelling in lower part of the body.

Treatment:

- Supplemental oxygen.
- Heart medication.
- Manage illness.
- Preload reducers.

Muscles of inspiration:

- Neck muscles.
- Sternocleidomastoid muscles.

- Scalene muscles.
- Pectoralis major and minor.
- Serratus interior.
- Latissimus dorsi.
- Thoracaic muscles.
- Diaphragm.
- External intercostal.

Muscle of expiration:

- Internal intercostal muscles
- Internal oblique
- External oblique
- Transversus abdominis
- Rectus abdominis

Q3. Compare the properties of different blood groups. Also mark universal donor and universal recipient.

Answer:

Blood group:

Classification of blood which is based on the presence and absence of antibodies and also the inherited antigenic substances on the surface of red blood cells.

ABO blood group system:

The classification of human blood based on the inherited properties of red blood cells which is determined by the presence of antigens A and B.

Different blood groups and their properties:

Blood type	Antigens on surface	Antibodies made
A	Antigen A	Antibodies A
B	Antigen B	Antibodies A
AB	Antigen A and B	None
O	None	Antibodies A and B

Type A:

Contains antigen A and produces antibodies B.

Type B:

Contain antigen B and produces antibodies A.

Type AB:

Contain both antigens A and B and doesn't produce antibodies.

Type D:

Contain no antigens and produces antibodies A and B.

Universal Acceptor:

Type A and B blood is a universal acceptor it contains antigens A and B and doesn't produce antibodies Because it accepts both antigens A and B. Hence AB blood group is able to accept any type of blood.

Universal Donor:

Type O blood group is a universal donor. Which means that type O blood group will not with antibodies which are produced by other blood groups which means it universal donor.

Q4. Explain respiratory membrane. What are the factors that affect diffusion of gases across the membrane.

Answer:

Respiratory membrane:

The membranous structure which carry the exchange of respiratory gases.

- Respiratory membrane separates air in the alveoli from the blood in capillaries.

Formation:

Respiratory membrane is formed by the

- Alveolar membrane.
- Capillary membrane.
- Epithelium of respiratory unit
- Endothelium of pulmonary capillary

Factor affecting diffusion of gases across the membrane:

Following are the factors which affects the rate of diffusion of gases across the membrane.

1. The thickness of the membrane.
2. The surface area of membrane.
3. Diffusion coefficient of the gas in the substance of membrane.
4. The partial pressure difference of the gas between the two sides of the membrane.

Q5. What is the difference between anatomical dead space and physiological dead space. What are the clinical manifestations of pulmonary effusion.

Answer:

Dead space:

Any air in the respiratory system that don't exchange oxygen and carbon dioxide with the pulmonary capillary blood.

Difference between anatomical and physiological:

Anatomical dead space	Physiological dead space
Definition: Anatomical Dead space: The volume of conducting airways is called Anatomical dead space.	Definition: The part of tidal volume which is not participating in gas exchange.
Measurement: By Fowler's method.	Measurement: By Bohr's equation.
Not more clinically useful than physiological dead space.	More clinically useful than anatomic dead space.

Pleural effusion:

The amount of fluid around the lung. It is caused by many medical conditions. It can b caused by cancer, pneumonia, tuberculosis etc.

Symptoms:

Following are the clinical manifestations of pleural efusion.

- Chest pain, especially when breathing in deeply.
- Fever.
- Shoulder pain.
- Acute pleuritic pain.
- Dry, nonproductive cough.
- Dyspnea.
- Orthopnea (the inability to breathe easily unless the person is sitting up straight or standing erect)