



# **IQRA NATIONAL UNIVERSITY**

## **DEPARTMENT OF ALLIED HEALTH SCIENCES**

Final-Term Examination  
DPT 2<sup>nd</sup> Semester

Course Title: Human Physiology II      Instructor: Dr Sara Naeem

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Time: 6 Hours

Max Marks:50

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### **QUESTION NO 1**

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 :-**

Expiratory reserve volume (EVR) = 1000ml

Residual volume = 1200ml

Inspiratory capacity = 3000ml

#### **TO FIND**

Total lung capacity = ?

#### **FORMULA**

TLC=FRC+IC

#### **SOLUTION:**

FRC = EVR + RV

= 1000+1200

= 2200

TLC = FRC + IC

= 2200 + 3000

**TLC = 5200ML.**

## **QUESTION NO 2 :-**

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

### **ANSWER :-**

#### **PULMONARY EDEMA :-**

Pulmonary edema is often caused by congestive heart failure when the heart is not able to pump effectively blood into the veins that take blood through the lungs. In these blood vessels the pressure increases.

#### **MACHANISMS:-**

The leakage of both plasma proteins and fluid out of the capillaries and into the lung's interstitial space and the alveoli.

#### **CAUSES :-**

Lungs contain numerous small, elastic air sacs called alveoli. With each breath, these air sacs take in oxygen and release carbon dioxide. A number of things can cause fluid to accumulate in the lungs. But most of them have to do with the heart (cardiogenic pulmonary edema).

#### **SYMPTOMS :**

- Difficulty breathing when lying down (orthopnea)
- Coughing up blood or bloody froth.
- Waking up at night with a breathless feeling that goes away when you sit up
- Rapid weight gain, especially in the legs
- Irregular, rapid heartbeat
- Difficulty walking uphill and on flat surfaces
- Fever

#### **THE MUSCLES OF RESPIRATION:-**

The muscles of respiration are those muscles that contribute to inhalation and exhalation.

#### **THE MUSCLES OF INSPIRATION AND EXPIRATION :-**

- Sternocleidomastoid
- Scalenes
- External intercostal
- Diaphragm
- Rectus abdominis
- Internal intercostal
- External oblique

- Internal oblique
- Transverse abdominis

**QUESTION NO 3:-**

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

**ANSWER :-**

**INTRODUCTION :-**

Blood group also called blood type. The blood classification which based on the absence and presence of the antibodies. Inherited antigenic substances on the surface of re blood cell (RBC). These antigens may be in **carbohydrates, glycolipids, glycoproteins, proteins**, depends on the blood group

**ABO:-**

Abo blood group system which classified blood types according to different types of antigens in the red blood cells. ABO is use to alongside of RHD antigens status which determine blood types or types will match or safe red blood cells (RBC).

**ABO BASICS:-**

- The absence or presence of antigens B, or antigen A.
- Blood group is divided into four groups.  
**A, B, AB, O**
- Blood having B antigens and A antibody belongs to B group.
- Blood having A antigen belongs to A group. This group have B antibody.
- When both antigens A,B are presence is called AB.
- If both antigens are absent the blood group is called O.  
But having both antibodies A and B. Are present in it.

**COMPARISON :-**

<b><u>ABO</u></b> <b><u>Group</u></b>	<b><u>ANTIGENS</u></b> <b><u>PRESENTS</u></b>	<b><u>ANTIGENS</u></b> <b><u>MISSING</u></b>	<b><u>ANTIBODIES</u></b> <b><u>PRESENTS</u></b>
A	A	B	Anti-B
B	B	A	Anti-A
O	None	A and B	Anti A-B
AB	A and B	None	None

### **UNIVERSAL DONOR:-**

Donor's with O type blood cells are referred to as universal donors. Their red blood cells (RBC) can be given to another blood type. Donor's with AB+ type are referred to as received blood from all types.

### **UNIVERSAL RECEIPIENTS:-**

A person with blood group AB who can in theory receive or donate blood of any ABO group. AB positive type is known as universal recipients.

### **QUESTION NO 4:-**

**Explain respiratory membrane . What are the factors that affect diffusion of gases across the Membrane?**

### **ANSWER :-**

#### **RESPIRATORY MEMBRANE :-**

The membrane separating air with in the alveoli from the blood with in the pulmonary capillaries.It consist of the **capillary wall, alveoli wall**, and the **basement membrane**. The respiratory membrane is very thin (less than **0.05mm**). Respiratory membrane is composed of two layers extremely thin layers of simple squamous epithelium. The purpose of the respiratory system is to perform gas exchange pulmonary ventilation provides air to the alveoli for this gas exchange process,the membranes entering with oxygen into the blood streams and carbon dioxide exiting.

#### **IMPORTANCE :-**

Respiratory membrane allows gasses to be exchanged between the blood vessels and pulmonary capillaries.The respiratory units of the lungs are **Alveolar ducts, alveoli, bronchioles, atria**.

#### **FACTOR THAT AFFECTS THE RATE OF GAS DIFFUSION:-**

The factors that determine how rapidly a gas will pass through the membrane are:

- The diffusion coefficient of the gas in the substance of the membrane.
- The partial pressure difference of the gas between the two sides of the membrane.
- The thickness of the membrane.
- The surface area of the membrane.

### **QUESTION NO 5:-**

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

## **ANSWER :-**

### **ANATOMICAL DEAD SPACE:-**

It refers to the volume of air sacs located in the segments of the respiratory track, which are responsible for conducting air to the respiratory bronchioles and alveoli but do not penetrate to the gas exchange.

### **PHYSIOLOGICAL DEAD SPACE :-**

It refers to the portion of the air that reaches the gas exchange region of the lungs but does not receive enough blood flow for gas exchange occurs. It is comprised of alveolar ducts, respiratory bronchioles, alveoli, alveolar sacs.

### **CLINICAL MANIFESTATIONS OF PULMONARY EFFUSION :-**

#### **PULMONARY EFFUSION :-**

An abnormal collection of fluid between thin layer of tissue lining the lungs and the wall of the chest cavity.

#### **CAUSES :**

The excess fluid may be either protein-poor (transudative) or protein-rich (exudative). These two categories help physicians determine the cause of the pulmonary effusion.

- Infections
- Trauma
- Pulmonary embolism
- Kidney failure
- Congestive heart failure

#### **SYMPTOMS :**

- Dry, nonproductive cough.
- Chest pain.
- Generally feeling unwell.
- Dyspnea (shortness of breath, or difficult, labored breathing)
- Feeling of chest heaviness or tightness
- Inability to lie flat.
- Inability to exercise.

#### **TREATMENT :-**

Heart failure and diuretics medication are used to treat pulmonary effusion caused by the Congestive heart failure or other medical causes. It also require treatment with **radiation therapy, chemotherapy**, or a **medication infusion** within the chest.