**IQRA NATIONAL UNIVERSITY**

**DEPARTMENT OF ALLIED HEALTH SCIENCES**

**Final-Term Examination(Summer-20) (BS. Dental, Rad, MLT)**

**Course Title: Human Anatomy-l Instructor: Ms. Maria Feroze**

**Time: 4 hours Max Marks: 50**

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 **Department:. Bs radiology**

 **Section:. B**

**Note:**

* **Attempt all questions from this section, all questions carry equal marks.**

Q1: Explain the mechanism of breathing.

Q 2: What do you know about the origin of diaphragm?

Q3: Classify the ribs according to their attachments to the sternum.

Q4: What do you know about the general features of first rib?

Q5: How is the mediastinum divided?

Q6: Briefly discuss the structure of lungs.

*Answers:-*

*Ans no 1:*

*Ans.1:*

*Mechanism Of Breathing*

*The air which we breathe in and out of the lungs varies in its pressure. So basically when there is a fall in air pressure the alveolar spaces falls and the air enters the lungs (inspiration) and as the pressure of the alveoli within exceeds the atmospheric pressure, the air is blown from the lungs (expiration). The flow rate of air is in proportion to the magnitude of the pressure difference.*

*The breathing mechanism involves two processes:*

*Inspiration*

*Expiration*

*Inspiration*

*Mechanism Of Inspiration:*

*#The process of intake of atmospheric air is known as inspiration.*

*# It is an active process.*

*#When the volume of the thoracic cavity increases and the air pressure decreases, inspiration takes place.*

*#Contraction of external intercostal muscles increases the volume of the thoracic cavity.*

*#Contraction of the diaphragm further increases the size of the thoracic activity. Simultaneously, the lungs expand.*

*#With the expansion of the lungs, the air pressure inside the lungs decreases.*

*#The pressure equalizes and the atmospheric air rushes inside the lungs.*

*Mechanism Of Expiration:*

*#The process of exhaling carbon dioxide is called expiration.*

 *#It is a passive process.*

*#It occurs when the size of the thoracic activity decreases and the air pressure outside increases.*

*#Now the external intercostal muscles relax and the internal intercostal muscles contract.*

*#As a result, the ribs are pulled inwards and the size of the thoracic cavity is reduced.*

*#The diaphragm is relaxed and the lungs get compressed.*

*#Consequently, the pressure increases and the air is forced outside.*

*Ans no 2 :*

*Ans.2:*

*Introduction*

*The diaphragm in the thorax is called the thoracic diaphragm and serves as an important anatomical landmark that separates the thorax, or chest, from the abdomen. It functions during breathing when it contracts to enlarge the thoracic cavity and reduce the intrathoracic pressure so that lungs may expand and fill their alveoli with air. It is a dome-shaped muscle and tendon that functions as the main muscle of respiration and is essential to the breathing process.It is a fibromuscular sheet that has a convex upper surface that forms the floor of the thoracic cavity and a concave under surface to form the roof of the abdominal cavity. The esophagus, phrenic, and vagus nerves, descending aorta, and inferior vena cava pass through the diaphragm between the thoracic and abdominal cavities. The diaphragm is asymmetric with the left side slightly more inferior than the right, chiefly because of the presence of the liver located on the right.*

*Origin of Diaphragm:*

*Sternal:*

*The sternal part originates as 2 fleshy slips from the back of the xiphoid process.*

*Costal:*

*The costal part originates from inner surfaces of the cartilages, adjacent parts of the lower sixth ribs on each side. It interdigitates with transversus abdominis.*

*Lumbar:*

*The medial lumbocostal arch is a tendinous arch in fascia covering psoas major. Medially, it attaches to the side of the body of vertebra L1. Laterally, it connects to the front of the transverse process of vertebra L1.*

*#The lateral lumbocostal arch is a tendinous arch in fascia covering the upper part of quadratus lumborum. Medially, attach to the front of the transverse process of vertebra L1. Laterally, it connects to the lower border of the 12th rib.*

*The right crus arises from the anterolateral surface of the bodies of the upper three lumbar vertebrae and also the intervening intervertebral disc.*

*#The left crus arises from the corresponding parts of the upper 2 lumbar vertebrae.*

*#Medial margin of two crura forms a tendinous arc across the front of the aorta called the median arcuate ligament.*

*And no 3:*

*Ans.3:*

*Introduction:*

*#The ribs are the bony framework of the thoracic cavity.*

*#The ribs form the main structure of the thoracic cage protecting the thoracic organs, however their main function is to aid respiration.*

*#There are twelve pairs of ribs.*

*#Each rib articulates posteriorly with two thoracic vertebrae by the costovertebral joint. An exception to this rule is that the first rib articulates with the first thoracic vertebra only.*

*Classification of Ribs on the basis of attachment to sternum:*

*According to their attachment to the sternum, the ribs are classified into 3 groups: true, false, and floating ribs.*

*True Ribs:*

*The true ribs are the ribs that directly articulate with the sternum with their costal cartilages - ribs 1-7. They articulate with the sternum by the sternocostal joints. The first rib is an exception to that rule; it is a synarthrosis and the first rib could uniquely articulate with the clavicle by the costoclavicular joint.*

*False Ribs:*

*The false ribs (8,9,10) are the ribs that indirectly articulate with the sternum, as their costal cartilages connect with the seventh costal cartilag by the costochondral joint.*

*Floating Ribs:*

*The floating ribs (11,12) do not articulate with the sternum at all (distal two ribs).*

*Ans no 4:*

*Ans.4:*

*#The first rib is the most curved and usually the shortest of all the ribs; it is broad and flat, its surfaces looking upward and downward, and its borders inward and outward.*

*Head:*

*#The head is small, rounded, and possesses only a single articular facet, for articulation with the body of the first thoracic vertebra.*

*Neck:*

*#The neck is narrow and rounded. The tubercle, thick and prominent, is placed on the outer border. There is no angle, but at the tubercle the rib is slightly bent, with the convexity upward, so that the head of the bone is directed downward.*

*Body:*

*#The upper surface of the body is marked by two shallow grooves, separated from each other by a slight ridge prolonged internally into a tubercle, the scalene tubercle, for the attachment of the Scalenus anterior; the anterior groove transmits the subclavian vein, the posterior the subclavian artery and the lowest trunk of the brachial plexus.*

*#Behind the posterior groove is a rough area for the attachment of the Scalenus medius. The under surface is smooth, and destitute of a costal groove. The outer borderis convex, thick, and rounded, and at its posterior part gives attachment to the first digitation of the Serratus anterior; the inner border is concave, thin, and sharp, and marked about its center by the scalene tubercle. The anterior extremity is larger and thicker than that of any of the other ribs.*

*Ans no 5 :*

*Ans.5:*

*The mediastinum is the central compartment of the thoracic cavity, located between the two pleural sacs. It contains most of the thoracic organs, and acts as a conduit for structures traversing the thorax on their way into the abdomen.*

*Division of mediastinum:*

*Anatomically, the mediastinum is divided into two parts by an imaginary line that runs from the sternal angle (the angle formed by the junction of the sternal body and manubrium) to the T4 vertebrae:*

*Superior mediastinum:*

*Superior mediastinum – extends upwards, terminating at the superior thoracic aperture.*

*Inferior mediastinum:*

*Inferior mediastinum – extends downwards, terminating at the diaphragm. It is further subdivided into the anterior mediastinum, middle mediastinum and posterior mediastinum.*

*In this article, we shall look at the anatomy of the superior mediastinum – its borders, contents and clinical correlations.*

*Borders:*

*The superior mediastinum is bordered by the following thoracic structures:*

*#Superior – Thoracic inlet.*

*#Inferior – Continuous #with the inferior mediastinum at the level of the sternal angle.*

*#Anterior – Manubrium of the sternum.*

*#Posterior – Vertebral bodies of T1-4.*

*#Lateral – Pleurae of the lungs.*

*Ans no 6 :*

*Ans.6:*

*Structure of lungs:*

*Cone shape:*

*The lungs are paired, cone-shaped organs which take up most of the space in our chests, along with the heart.*

*Role:*

 *Their role is to take oxygen into the body, which we need for our cells to live and function properly, and to help us get rid of carbon dioxide, which is a waste product.*

*No.of lungs:*

 *We each have two lungs, a left lung and a right lung.*

 *Lobes:*

*These are divided up into ‘lobes’, or big sections of tissue separated by ‘fissures’ or dividers.*

*Lungs Division:*

*The right lung has three lobes but the left lung has only two, because the heart takes up some of the space in the left side of our chest. The lungs can also be divided up into even smaller portions, called ‘bronchopulmonary segments’.*

*These are pyramidal-shaped areas which are also separated from each other by membranes. There are about 10 of them in each lung. Each segment receives its own blood supply and air supply.*

*How they work:*

*Air enters your lungs through a system of pipes called the bronchi. These pipes start from the bottom of the trachea as the left and right bronchi and branch many times throughout the lungs, until they eventually form little thin-walled air sacs or bubbles, known as the alveoli. The alveoli are where the important work of gas exchange takes place between the air and your blood. Covering each alveolus is a whole network of little blood vessel called capillaries, which are very small branches of the pulmonary arteries. It is important that the air in the alveoli and the blood in the capillaries are very close together, so that oxygen and carbon dioxide can move (or diffuse) between them. So, when you breathe in, air comes down the trachea and through the bronchi into the alveoli. This fresh air has lots of oxygen in it, and some of this oxygen will travel across the walls of the alveoli into your bloodstream. Travelling in the opposite direction is carbon dioxide, which crosses from the blood in the capillaries into the air in the alveoli and is then breathed out. In this way, you bring in to your body the oxygen that you need to live, and get rid of the waste product carbon dioxide.*

*Blood Supply:*

*The lungs are very vascular organs, meaning they receive a very large blood supply. This is because the pulmonary arteries, which supply the lungs, come directly from the right side of your heart. They carry blood which is low in oxygen and high in carbon dioxide into your lungs so that the carbon dioxide can be blown off, and more oxygen can be absorbed into the bloodstream. The newly oxygen-rich blood then travels back through the paired pulmonary veins into the left side of your heart. From there, it is pumped all around your body to supply oxygen to cells and organs.*

 *...........****the end..........***