Hello students, unit one meristematic and permanent issues. Module name complex tissue Xylem module number 06 myself. Miss Shreeveni Tari, MSc Assistant Professor in PES's. RSN and College of Arts and Science Farmagudi Ponda, Goa. Components of Xylem tissue structure of Xylem tissue components. Learning outcomes students will be able to describe the components of Xylem tissue, recognize its characteristics, study the functions, compare and differentiate between the elements. In module number three, we have already seen that the permanent tissues are subdivided into simple tissue, and the complex tissue. Simple tissue is that issue that is made up of only one type of cells.

Complex tissue is made up of more than one type of cells and further it is divided into Xylem and phloem. Xylem is involved in conduction of water. Phloem is involved in conduction of food. Now, the words xylem is derived from Greek word, Xylon, meaning wood. That is basically due to the secondary growth that is seen by the Xylem, and the term is coined by Nageli. Now when you study the Xylem, you can study it with respect to origin and you will see two different Xylem cells. You have primary Xylem, and you have the secondary xylem. Primary Xylem is derived from the promeristem, whereas you have the secondary Xylem that is derived from the vascular cambium that you can see in the diagram over here.

2nd is formation. When you study it, you will find Proto Xylem, an meta Xylem. Now Proto Xylem components are the first formed and they will be smaller in size. Meta Xylem are formed later and they will be larger in size. Now there are four main components of Xylem. We have tracheids, vessels, Xylem fibers, and xylem parenchyma. Out of these you have tracheids vessels and Xylem fibers, which are dead, and you have Xylem parenchyma, which is a living tissue. Tracheid, it is primitive conducting tissue because It is mainly present in case of gymnosperm, but it is also seen in case of angiosperm, but to a lesser extent. The cells are elongated, thick, lignified walls and they are dead.

They don't show any presence of protoplast and they show the presence of thickenings. Now, based on the patterns of thickenings you have different types. You have Annular where in the thickenings are in the annular form that is in the form of annular ring. Spiral will be in the spiral form. Scalariform will be in the staircase manner. Reticulate will be in the network manner and the pitted we're going to see now. We have the presence of pits for the tracheid, Pits are nothing but the unthickened areas for the primary wall. So when you have the primary wall that is showing you the unthickened areas, you call it as simple. pit, and when you have the primary wall overarched by the secondary wall in the form of Dome you refere To it as the bordered pit. Then the primary wall will show

you the thickening at the center that is referred to as Torus that is present in the border pits. You have the tracheids, arranged connecting their sides. bearing the presence of the pits. The pits help in. transfer of materials from 1 cell to the other and that's how they will be arranged in the tissue. We have the 2nd element that is the vessel which is one of the main characteristic that is found in angiosperm. Each of the vessels will appear short and cylindrical. They have hard lignified walls and they will show you the presence of thickening of different types like the way we have seen for the tracheids. It's now each of the vessel member will be arranged in longitudinal series

to form a continuous channel so that it helps in the conduction of water. Each of the vessel member. Will be having the presence of end walls and this end wall will be showing you the presence of pores. And the plates will be referred to as the perforation plates. This perforation plates can be of two types. You have simple and you have multiple simple perforation. Plate will only have one large pore whereas multiple will be having the several pores arranged in the plate. Based on the pattern of. the pore arrangement you have the types -Scalariform, Foraminate, and you have the reticulate. Now the function of vessel is conduction of water. Since it is forming the continuous change.

3rd element of Xylem is the Xylem fiber Wherein the cells as sclerenchymatous cells. In nature, they are dead cells with the pointed ends. The lumen turns narrow due to the deposition of Lignin along the side walls. Then there are two different types of fibers. You have fiber, tracheids and libri form fibers based on differences in their cell wall thickenings. Fiber tracheids will be showing you higher thickening as compared to the Libriform fibers. Then you have the last component that is the Xylem parenchyma, which is only living tissue in xylem. They are thin walled and the walls are made of cellulose and their main function is storage of food materials. Now sometimes they are also found to be involved in the lateral conduction.

Now, when it comes to this secondary Xylem parenchyma, you have two types. One that is referred to as a axial or wood parenchyma, and second one is the ray parenchyma, The axial/I woold parenchyma will be derived from fusiform initials of cambium, and they will be lying in vertical series in this particular diagram you can see that they are arranged in the vertical series, whereas ray, parenchyma are derived from the Ray initials of cambium and. In the section you will see them in the transverse series this way. Now, in this particular diagram you can tracheids. It's the smaller cells, the vessls vessels. Xylem fibers. And the xylem parenhyma.

This is the tangential section very. You can see the vessels with the pitted thickenings. The tracheids are lightly stained. Now we have already seen that the tracheids are considered to be the primitive conducting tissue, mainly because they are present in case of gymnosperm and angiosperm have the vessels which are the characteristic features and during the secondary growth it is very much clear. This is the transverse section of secondary growth in gymnosperm and this is the transverse section of secondary growth in angiosperm that is showing you the peculiar vessels. Now these are few of the books and websites for your reference. Thank you.