Q. Describe in detail the structure of Anthoceros sporophyte and mention its evolutionary importances.

INTRODUCTION → Anthoceros sporophyte has been considered as the most remarkable among bryophytes. as it throws light on the evolution of vascular plants. It has been considered as the ancestor of highe plants. The sporophyte has meristem that contributes its growth for a long period There is columella for conduction and stomata for transpiration and gaseous exchange. The sporophyte has been compared with the sporophyte of Rhynia.

DEVELOPMENT OF THE SPOROPHYTE → Zygote represents the first cell of the sporophyte It enlarges its size before undergoing segmentation. It undergoes vertical transverse divisions and then two transverse divisions to form a 12 cell stage. The cells are arranged in 3-tiers of four cells each. The cells of lower tier give rise to foot of the sporophyte. Seta develops from the cells of middle tier and capsule is formed from the cells of upper tier.

The cells of lower tier undergo repeated segmentation to form a bulbous foot. It consist to

parenchyma. Nature of foot is absorptive. The cells of middle tier undergo repeated transverse and vertical division to form the stalk like seta. It is finally becomes converted into meristem.

The cells of upper tier divide repeatadly by transverse division into several tiers of cells. These divide periclinally to differentiate the outer amphithecium from inner endothecium.

Endothecium gives rise to long strand like columella by repeated transverse and vertical division. It occupies the centre of the capsule.

Amphithecium again divide periclinally into two layers. The outer amphithecium divides periclinally and anticlinally into a multilayered wall of the capsule. Where as the inner amphithecium form the archesporium. It finally gives rise to spore mother cells when divide reductionally into spore tetrad. Some spore mother cells form the spiral pseudoelaters.

MATURE SPOROPHYTE → The mature sporophyte shows the following three parts.

① FOOT, ② SETA, ③ CAPSULE.

① FOOT → Foot is the basal bulbous part of the sporophyte. It remain sunken in gametophytic tissues and absorbs nutrition from the same. In some species like A. himalayensis, the foot surfaces bears finger like projection that go deep into gametophytic tissues. It has been considered as a step towards the evolution of root.

② SETA → The middle stem like portion of the sporophyte has been called as seta. It is small and parenchymatous in nature while immature but becomes meristematic at maturity.

③ CAPSULE → Capsule of the sporophyte is associated with spore production and dispersal. The shape of the capsule is linear. Its wall is multilayered thick differentiated into outer epidermis and inner hypodermal regions. Epidermal cells are cutinised. It bears functional stomatas also. Hypodermal cells are green, They take part in food manufacturing.

The centre of the capsule remains occupied by a strand like columella. It is 16 cells high and the cells are arranged in 4 vertical rows. The cells are parenchymatous