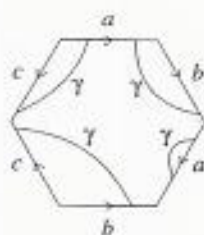


**Question 6 (Unit 2) - 12 marks**

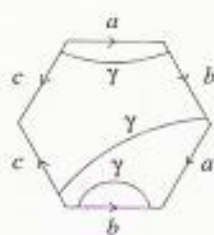
In order to answer part (i) of this question, you will find it helpful to refer to Section 2.4 of the first Exercise Booklet for Geometric Topology.

- (i) Find a neighbourhood for each of the following curves  $\gamma$ , and mark this neighbourhood on a sketch. In each case state, giving reasons, whether  $\gamma$  is orientation-preserving or orientation-reversing.

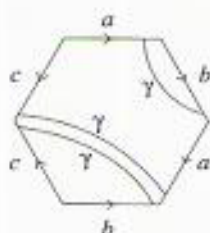
(a)



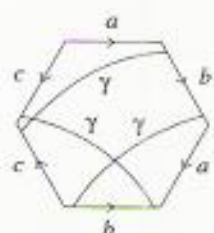
(b)



(c)



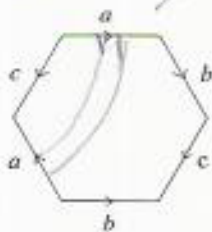
(d)



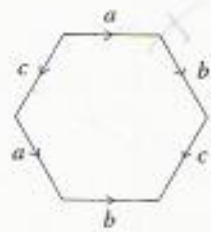
[8]

- (ii) Two of the surfaces represented by the following diagrams are non-orientable. Identify them by sketching a Möbius band in each.

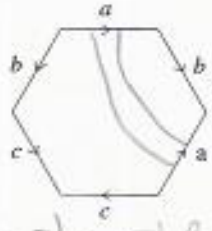
(a)



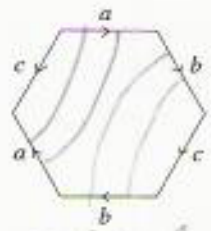
(b)



(c)



(d)



[4]