

3. A boat at  $A$  starts to sail with constant speed  $u$  along a straight course, where  $A$  is a point on a straight river bank and the boat's course makes an angle  $15^\circ$  with the river bank. A boy can run and swim with speed  $v_1 = 4 \text{ ms}^{-1}$  and  $v_2 = 2 \text{ ms}^{-1}$  respectively. He starts to run at  $A$  when the boat starts. His running path is along the river bank then he swims in the river along a straight course. Assume that the river water is at rest, find the maximum speed of the boat such that the boy can meet the boat. You are suggested to consider the velocity vector of the boy relative to the boat.