

STEP II, 2019, Q10 EC

As with so many questions, the big stumbling block for students was drawing a good diagram from the information, including all the relevant forces.

With “show that” questions it is beholden on candidates to explain their working. Equations which just appear and lead to the correct answer are not sufficient. In mechanics, it would be very helpful for students to say, for example, “Taking moments about point A for the rod” or “Resolving for the string -rod system vertically” to give some sense of where an equation arises.

The flow of logic is a fundamental idea in mathematics, but it was clear in this question that it was not familiar to the vast majority of students. The questions effectively asked “if <given condition> show that <mechanical outcome>”. Most students reversed this to show that “if <mechanical outcome> then <given condition>”. In this question, most arguments were reversible, but it still demonstrated a fundamental misunderstanding of what was being asked.

The other issue which flummoxed students was dealing with inequalities. There are different rules of algebra associated with inequalities and this is something which is frequently tested in STEP. Candidates would benefit from thinking carefully about things like when can one inequality be substituted into another, or when can an inequality be squared. The intuition from equalities was too often applied without thinking.



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