Minimum Connector – Q2 [5 marks](17/6/21)

Exam Boards

OCR : D (Year 1)

MEI: MwA

AQA: D (Year 1)

Edx: D1 (Year 1)

Minimum connectors M_1 & M_2 have been found for two networks. A new network N is then formed by joining together M_1 & M_2 by the arcs AB and CD, where A & C are nodes in M_1 and B & D are nodes in M_2.

The tree T is then formed from M_1 and M_2, together with the shorter of AB and CD. Is T always, sometimes or never a minimum connector for N? [5 marks]

Solution

If CD (say) is very large (compared with the other arcs in N), then

T will be a minimum connector for N, using AB (as one of AB and CD has to be included). [2 marks]

But if AB and CD are both shorter than any of the other arcs in N, then T won't be a minimum connector for N, as one of the arcs of M_1 or M_2 will have been replaced. [2 marks]

So the answer is: sometimes. [1 mark]