1 Artificial Intelligence I (SBH)

(*a*) A planning problem has start state $\{\neg A, \neg B, \neg C, \neg D, \neg E\}$ and goal $\{D, E\}$. The following actions are available:

$\neg A$	$\neg B$	A, B	$\neg C$	$C, \neg D, \neg E$
a1	a2	a3	a4	a5
A	B	D	C, B	E
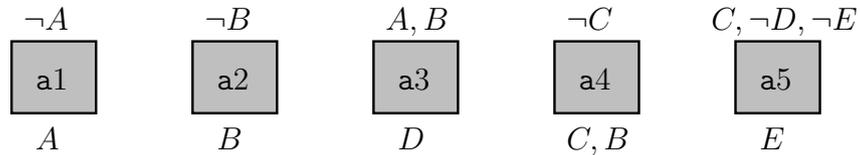
Give a detailed explanation of how the *Partial Order Planning Algorithm* can be used to solve this problem. [8 marks]

(*b*) In order to include heuristics in your planning system you decide also to construct the planning graph for the problem in Part (*a*). Provide a description of the first two state levels and the first action level in the planning graph, and explain why each item is included in each level. [4 marks]

(*c*) You now wish to add a further action level and a further state level to the graph. Explain what new items will be added to each new level and why. You need not mention items that are identical to those in earlier levels, only those that are added now for the first time. [3 marks]

(*d*) Provide an example of how each of the five possible kinds of mutex link will appear in the graph constructed in Part (*b*) and Part (*c*). [5 marks]