

Overview of Logic Methods (2 pages; 16/7/15)

Possible methods for demonstrating logical relations:

(i) Truth tables (see **Truth Tables - Exs**)

- straightforward, but may not be the quickest method
- nested truth tables are recommended

(ii) Venn diagrams

- also usually straightforward

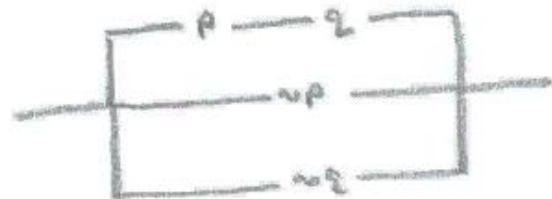
(iii) Boolean Algebra (see **Boolean Algebra - Exs**)

- may require some ingenuity (or trial and error) in order to arrive at the required result
- as well as using the standard rules of Boolean Algebra, the contrapositive proposition and/or 'Modens Ponens' can sometimes provide a shorter method (see **Logic: Implication**)

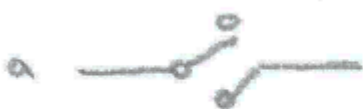
(iv) (electrical) circuit diagrams

- circuits can either be simple **switching circuits**, as shown below:

$$(P \wedge Q) \vee \sim P \vee \sim Q$$



- sometimes the actual switches are drawn, as below:

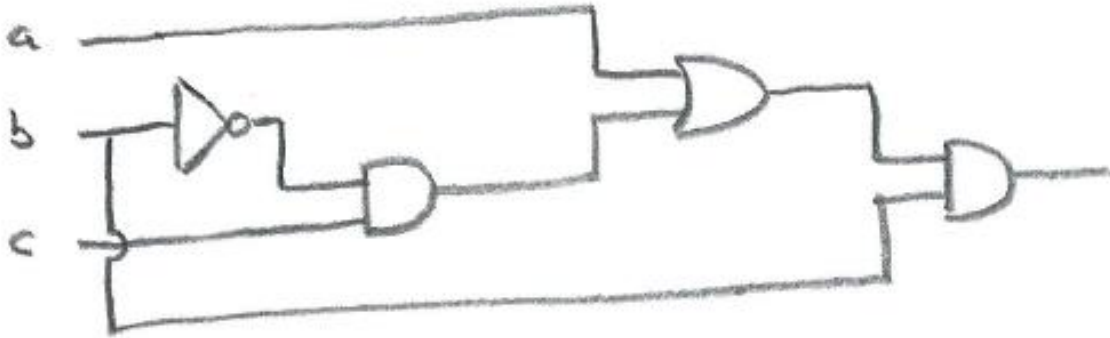


$\sim a$



(In these diagrams the lever is hovering between the on and off positions, intending to indicate that either position is possible.)

- or **combinatorial circuits** (sometimes called **combinational circuits**), as shown below:



- all possible combinations of inputs are investigated, to determine the output(s) in each case