Q25

(a) (i) a fraction is converted into binary or into a fraction using floating point.
with a sign as one bit and 8 bits for the 2nd part and the 3rd part fraction would as total bits to = 32.

$\underset{1}{S}$ $\underset{2 \rightarrow \quad 8}{EEEEEEE}$ $\underset{9 \rightarrow \quad 32}{FFFFFFFFFFFFFFFFFFFFFFF}$

each letter represents a bit.

(ii) 45 into a hexidecimal would be FFF

$45_{10} = FFF$

(iii) $\underset{14 \rightarrow}{1110} - 0111$ $\underset{0111}{\text{ones compliment}} = 1000$
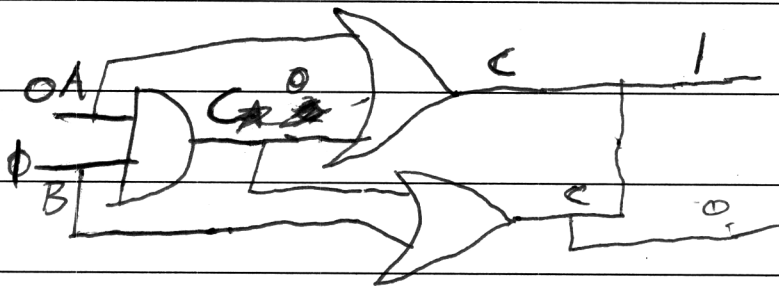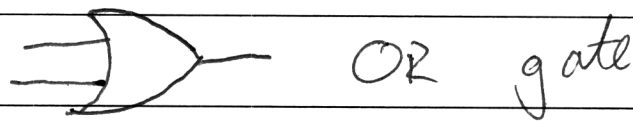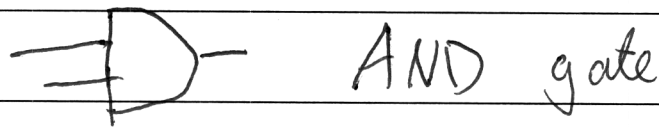
two's compliment = 1001.

1110 ~~FFFF~~
1001
———
0111
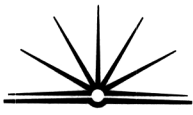
= 0111
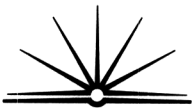
(b)(i) a flip-flop changes the flow of the data into the opposite of the data e.g. a 1 bit would change to a 0 bit,
a 0 bit would change to a 1 bit.

(ii)

  AND gate

  OR gate

(C) If data stream was sent to the central computer then the finger print scanner would check if the current finger print would match others stored finger prints and then allow the door to be open. If data stream was sent to the door then the door would not open at all because the finger print was not scanned so therefore the system wouldn't work. The better system would be if the data stream was sent to the central computer so it would be checked and confirmed access. The header information and data characters stored would be use to confirm the access.