Digital Electronics 2004

p2q2
SWM

(a) The minimum sum of products can easily identified from the table:

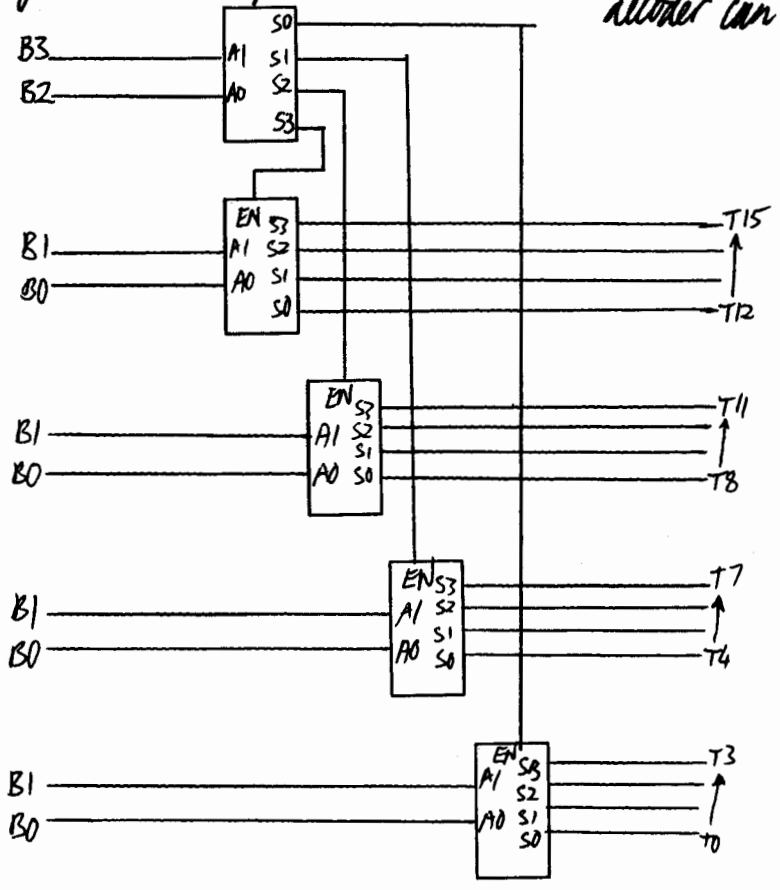
$S0 = EN.\overline{A1}.\overline{A0}$

$S1 = EN.\overline{A1}.A0$

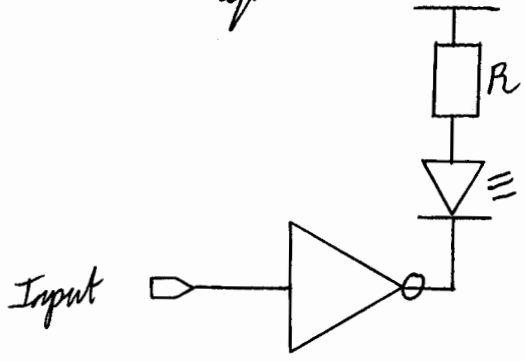
$S2 = EN.A1.\overline{A0}$

$S3 = EN.A1.A0$

(b) Assuming the selector inputs are B0→B3 & the outputs are T0→T15 a 4→16 line decoder can be constructed as follows:



(c) The circuit required to drive the LED is:



If the supply voltage is 5V, the output is 0V & the drop across the LED is 1·5V the drop across R will be 3·5V.
The max. current is 20mA. $V=IR$ so $R = \frac{V}{I} = \frac{3 \cdot 5}{20 \times 10^{-3}} = 175\,\Omega$

(d)