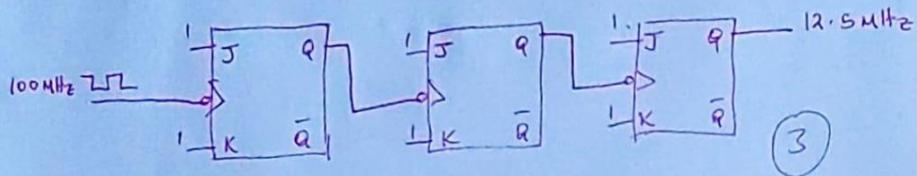


Q5

a) $\log_2 \left[\frac{100}{12.5} \right] = 3$ flip-flops (Ans 8-10) ①

In asynchronous mode, ripple counter can be used

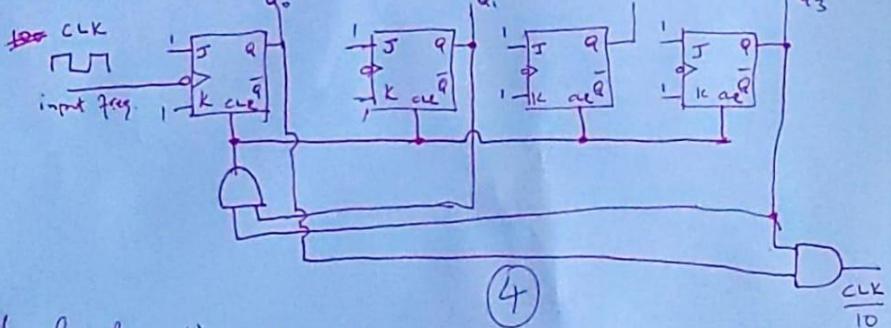


Alternatively! use a synchronous counter counting 0 to 7 and outputting a pulse when 7 is detected

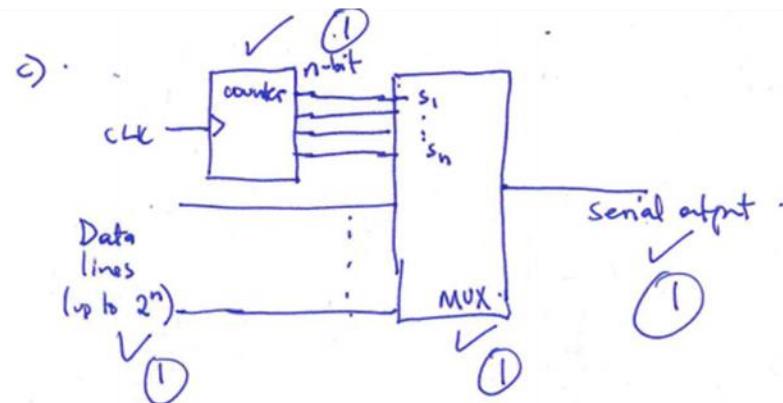
b) A pulse required every $\frac{10}{1} = 10$ cycles. (MOD10 counter)

alternative A # of FFs = $\lceil \log_2 10 \rceil = 4$ ②

Using a ripple counter ① (output a pulse at 1001, reset at 1010)



Alternative B - Use a synchronous counter



c) 3-bit shift-left register using T-flip-flops.

