

## Answers week 4

### Exercise 1

a) 1ns and 3 ns respectively

b)  $RC=170$  ps, ok substantially faster than 1ns

$\tau_{drift}=830$  ps, not ok. Roughly the same as the process you are trying to measure. It is likely that the fast decay time measured is affected by the diode response time. The real decay time could be much faster.

c) Drift velocity  $3 \cdot 10^4$  m/s, still room to improve it by a factor 3 by increasing reverse bias.

18.1-2 (P) page 800

a) 0.90 A/W

b) 0.70 A/W

c) 5.9 A/W

18.2-2 (P) page 801

Conductivity increase 167%

18.3-1 (P) page 801

$\eta = 1/3$

$\mathfrak{R} = 0.42$  A/W

18.4-1 (P) page 801

$\eta = 0.48$

$I=15$  nA

18.5-7 (P) page 802

The total SNR is 3000 based on:

Photocurrent RMS= 10nA

Dark current RMS= 0.4 nA

Johnson-Nyquist RMS= 1 nA