Answers Calculus class week 2

1. Exercise 17.1-4 (p.690)

a) -

b)

material	n	Θ_c	η_3 (%)
GaAs	3.5	16	2
GaN	2.5	24	4
Polymer	1.5	42	13

c) None. The light cone in GaAs that escapes both refraction at both GaAs-polymer and polymer-air interface is the same as the light cone escaping a single GaAs-air interface.

2. Problem 17.2-5 (p.747)

a) Center frequency: 345 THz (870nm)

Bandwidth: 2.7 THz

γ_p=260 cm^{-1}

b) 7*10^8

c) 43 Tbit/s

Note: 4 kHz is incredibly small and doesn't reflect reality. In dense wavelength division multiplexing the channels are normally separated by 50 GHz. Using this channel width the b-c answers would be:

b') 52

c') 3.4 Mbit/s

3. Problem 17.3-2 (p.747)

Ans: 70

4. Problem 17.3-3 (p.747)

Ans: 24 cm^{-1}