Philadelphia University **Student Name:**
Faculty of Engineering **Student Number:**

Dept. of Communications & Electronics
First Exam, First Semester: 2006/2007

Course Title: Optical Communications	**Date: 7/12/2006**
Course No: (630433)	**Time Allowed: 1 Hours**
Lecturer: Dr. Abdel-Rahman Al-Qawasmi	**No. of Pages: 1**

(يرجى كتابة الاسم والرقم الجامعي على ورقة الاسئلة والاجابة)

Question 1 ***(7marks)***

a- A light-emitting diode radiates 3 mW. This power travels through a group of components with losses -11dB, -7dB and -5 dB, compute:
1- The dBm value of radiated power
2- Compute the output power.

b- Compute the frequency of a wavelength 0.8 μm traveling through a material with refractive index n=1.5.
c- Find the number of photons incident on a detector in 1 ns if the optic power 2 μW and the wavelength is 0.8 μm. (h=6.626 10^{-34} j x s, C=3 10^{8} m/s).

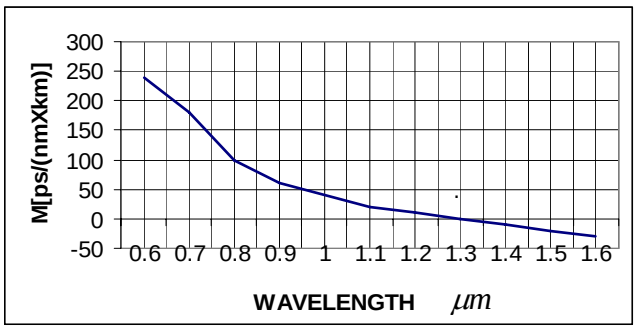
Question 2 ***(6marks)***

a- Write two advantages of Fibers.
b- Find the transmission angle for a light ray that proceeds from air into glass, where n_{air}=1 and n_{glass}=1.45.
c- Briefly, define the following: (Focal plane), (GRIN rod lens) and (Dispersion).

Question 3 ***(7marks)***

a- Complete the following table and compute the frequencies and data limits for a 5-km.

Source	$\lambda(\mu m)$	$\Delta\lambda(nm)$	$\Delta(\tau / L)$ (ns / km)	*Optic* $f_{3-dB\times L}$ $(GHz \times km)$	$R_{NRZ} \times L$ $Gbps \times km)$	$R_{NR} \times L$ $Gbps \times km)$	*Electrical* $f_{3-dB\times L}$ $(GHz \times km)$
LED	0.95	21					
LD	0.80	0.5					



b- A uniform collimated beam is focused by a lens whose focal length is 15 mm and whose diameter is 9 mm. The wavelength is 0.8 μm. Compute the focused spot size.