COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering

Instructor: Dr. Amr Bayoumi

Course Title: Solid State Electronics

Course No.: EC210 **Effective Mass Part II**

Date: April 28, 2016

Hint: use MKS system

Question 1 :

If the energy (E) versus the wave number (k) relation of electrons in one dimensional crystal is
given by $E(k) = 2 - \cos(k a)$, where a is the distance between every two atoms (i.e. periodic potential
well period):

a) Plot the E-k diagram between $k=-\pi/a$ and $k = +\pi/a$ radians/m

b) Calculate the group velocity at $k=0$, $k =+\pi/a$ radians/m

c) Calculate the effective mass at $k=0$, $k=+\pi/a$ radians/m

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