Problem Set 12
Physics, summer 2020/21

1) **(2p.)** What is the maximum strength of the B-field in an electromagnetic wave that has a maximum E-field strength of 1000 V/m?

2) **(3p.)** Calculate the wavelengths of:
   a) a 1530-kHz AM radio signal,
   b) a 105.1-MHz FM radio signal,
   c) and a 1.90-GHz cell phone signal.

3) **(3p.)** During laser vision correction, a brief burst of 193-nm ultraviolet light is projected onto the cornea of a patient. It makes a spot 0.80 mm in diameter and evaporates a layer of cornea 0.30μm thick. Calculate the energy absorbed, assuming the corneal tissue has the same properties as water; it is initially at 34ºC . Assume the evaporated tissue leaves at a temperature of 100ºC.

4) **(2p.)** Determine the amount of time it takes for X-rays of frequency 3×1018Hz to travel
   a) 1 mm and
   b) 1 cm.

Sylwia Majchrowska
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