

UCCS PES/ENSC 1600: Solar Energy Fall Term 2019

Chapter 2 Part I

due: Monday, Sept. 30th by (12:15 pm MDT)

Please do assignment on **separate 8.5 x 11 inch sheets of paper**, & show all your work/calculations, etc. use plenty of neat space thanks

2.3 a. Calculate the: "Solar Declination" for the Spring and Fall 2019 Equinoxes.

i. use table: 2.1 to find *day number*: "N"

ii. plug in result from part: **2.3 a. "i "** into equation: 2.5

eq. 2.5:

$$\delta = 23.45 \sin \left[\frac{360}{365} (284 + N) \right]$$

2.3 b. Calculate the "Solar Declination" for the Summer and Winter 2019 Solstices.

i. use table: 2.1 to find *day number*: "N"

ii. plug in result from part: **2.3 b. "i "** into equation: 2.5

2.4 a. Calculate the "Sunrise and Sunset Times" and: "Day Length" for the: Spring and Fall Equinoxes at: +45 degrees N latitude and: 35 degrees longitude.

a. find: **longitude correction** from equation: 2.3 or: **-4 (SL – LL)** (answer is in: minutes)

b. use table: 2.1 to find: **day number**: "N"

c. find: "B" using equation: 2.2:

$$B = (N - 81) \frac{360}{364}$$

d. plug in value of: "B" into the *equation of time*: 2.1: pg. 52

e. find: **declination** from equation: 2.5

$$\delta = 23.45 \sin \left[\frac{360}{365} (284 + N) \right]$$

f. use equation: 2.17 pg. 61 to find: **day length**, use *declination* from item: e, and use: 45 degrees for: (L)

g. Sunrise: 12:00 - 6:00 + 0:08 - 0:20 =

h. Sunset: 12:00 + 6:00 + 0:08 - 0:20 =