ATM 211

Stability Exercise

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

On the reverse side of this page is the text output from a sounding from 00Z on 5 May 2007 for Lamont, OK. *First, copy the temperature and dew point data (no need to plot winds for this assignment) onto your laminated Skew-T as you’ve done before.*

1) Draw a parcel path lifted from the surface to 100 mb. Remember to follow the mixing ratio from the surface for the dewpoint, and the dry adiabatic lapse rate from the surface for the temperature (until you reach the LCL).

2) What is the pressure level of the following:

LCL: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

LFC: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

EL: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) How deep is the surface mixed layer? (i.e., to what pressure level does the mixed layer rise?) *Note: The dew point doesn’t always perfectly follow a mixing ratio line in a mixed layer.*

4) In this particular sounding, the surface-based CAPE is 3760 J/kg. What specific attributes does this sounding have that make the CAPE so high?

5) The CINH is very low, which represents a relatively weak cap. What feature accounts for this cap? Why?

6) Is ***strong*** atmospheric forcing for ascent necessary to “break the cap” and tap into the high CAPE? Explain your answer.

74646 LMN Lamont Oklahoma Observations at 00Z 05 May 2007

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PRES HGHT TEMP DWPT RELH MIXR DIREC SPEED THTA THTE THTV

(mb) m C C % g/kg deg knot K K K

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1000.0 16

967.0 317 27.8 20.8 66 16.28 165 14 303.9 352.5 306.8

935.1 610 25.1 18.8 68 14.86 170 27 304.0 348.5 306.7

925.0 705 24.2 18.2 69 14.43 175 28 304.1 347.2 306.7

903.0 914 22.3 17.9 76 14.52 175 28 304.2 347.7 306.9

872.0 1219 19.6 17.5 88 14.65 185 26 304.4 348.3 307.1

850.0 1441 17.6 17.2 98 14.75 195 27 304.6 348.8 307.3

842.0 1522 17.2 17.2 100 14.89 197 28 305.0 349.7 307.7

812.3 1829 15.2 14.8 98 13.23 205 30 306.0 345.9 308.4

807.0 1885 14.8 14.4 97 12.94 206 30 306.1 345.2 308.5

800.0 1958 14.2 10.5 78 10.06 207 30 306.3 336.8 308.1

796.0 2001 16.2 6.2 52 7.52 208 31 308.8 332.2 310.2

789.0 2076 16.6 0.6 34 5.09 209 31 310.1 326.2 311.0

783.6 2134 16.1 0.2 34 4.97 210 31 310.1 325.9 311.1

755.7 2438 13.5 -2.1 34 4.35 215 32 310.5 324.4 311.4

728.7 2743 10.9 -4.4 34 3.79 210 31 310.9 323.1 311.6

700.0 3079 8.0 -8.0 31 3.00 220 29 311.3 321.1 311.9

676.4 3353 6.1 -11.2 28 2.42 240 29 312.2 320.3 312.7

651.1 3658 4.0 -14.7 24 1.88 245 30 313.3 319.6 313.6

603.5 4267 -0.2 -21.8 18 1.11 240 29 315.3 319.2 315.5

559.2 4877 -4.5 -28.9 13 0.63 245 29 317.2 319.5 317.3

522.0 5428 -8.3 -35.3 9 0.37 242 34 318.9 320.3 319.0

500.0 5760 -11.1 -34.1 13 0.43 240 37 319.4 321.1 319.5

478.3 6096 -14.1 -35.4 15 0.40 240 34 319.8 321.3 319.9

463.0 6342 -16.3 -36.3 16 0.37 240 36 320.1 321.5 320.1

400.0 7420 -24.5 -37.5 29 0.38 240 45 323.1 324.5 323.1

389.1 7620 -26.2 -38.6 30 0.35 240 45 323.4 324.7 323.5

363.0 8121 -30.5 -41.5 33 0.28 242 45 324.1 325.2 324.2

339.0 8605 -34.1 -53.1 13 0.08 243 44 325.6 326.0 325.6

313.6 9144 -38.8 -54.0 19 0.08 245 44 326.4 326.7 326.4

300.0 9450 -41.5 -54.5 23 0.08 250 43 326.8 327.1 326.8

295.0 9564 -42.5 -55.5 23 0.07 253 44 326.9 327.2 326.9

286.0 9772 -44.1 -53.1 36 0.10 258 45 327.5 327.9 327.6

273.9 10058 -46.4 -57.2 28 0.06 265 47 328.3 328.6 328.3

261.0 10379 -48.9 -61.9 21 0.04 262 48 329.2 329.3 329.2

250.0 10660 -51.3 -64.3 20 0.03 260 49 329.7 329.8 329.7

200.0 12070 -62.9 -70.9 33 0.01 265 54 333.0 333.1 333.0

186.5 12497 -62.3 -72.5 24 0.01 260 39 340.7 340.7 340.7

150.0 13820 -63.7 -78.7 11 0.01 240 31 360.1 360.2 360.1

125.1 14935 -62.3 -85.4 3 0.00 235 35 381.8 381.8 381.8

100.0 16320 -61.1 -88.1 2 0.00 225 14 409.4 409.4 409.4