

**MET 101: Meteorology**  
**Dew, Frost, Frozen Dew and Black Frost Homework Problem**

The data in the chart below represent the temperature (T) at 5 PM, the dew-point temperature (Td) at 5 PM and what the expected minimum (overnight) temperature is going to be near the ground for various clear winter mornings in a United States city.

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	Morning 1	Morning 2	Morning 3	Morning 4	Morning 5
5 PM Temperature (T)	10/C (50/F)	10/C (50/F)	10/C (50/F)	10/C (50/F)	10/C (50/F)
5 PM Dew-point Temperature (Td)	2/C (35/F)	-7/C (20/F)	1/C (34/F)	-4/C (25/F)	3/C (38/F)
Expected Minimum (Low) Temperature	4/C (40/F)	-3/C (27/F)	-1/C (30/F)	-6/C (24/F)	2/C (35/F)

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**Assumptions:**

- 1) Assume that the dew-point temperature remains constant throughout the night.
- 2) Assume that the temperature during the evening and overnight hours will drop from the 5PM temperature down to the expected minimum (low) temperature which normally occurs in the morning around sunrise.

**Directions:** Answer the five questions below keeping in mind that there is only one correct morning for each question. You should explain the answers to each question by discussing whether or not the temperature fell down to (reached) the dew-point temperature (Td) **and** whether or not the dew-point temperature (Td) is above or below freezing. You must use the word deposition in one of the explanations as well as the word condensation in two of the explanations and the word freeze in two of the explanations.

- 1) On which morning would there be the greatest likelihood of observing frost? Explain why:
  
- 2) On which morning would frozen dew likely form? Explain why:
  
- 3) On which morning would there be black frost with no sign of frost, dew or frozen dew? Explain why:
  
- 4) On which morning would you probably only observe dew on the ground? Explain why:
  
- 5) On which morning would you **not** expect any frost, dew, frozen dew or black frost to form? Explain why: