GEOGRAPHY 4337 - MID-TERM (33% of course grade)

A. Complete the following statements: (1 point each) [5 minutes]

1. In a cloudless sky, incoming solar radiation _________________ with altitude.

2. Infrared radiation flux is maximum at ___________ μm wavelength.

3. Atmospheric pressure at 3 km altitude is about __________% of its sea level value.

4. The diurnal temperature range on mountains _________________ with latitude.

5. Summit temperatures are generally _________________ than temperatures in the free air.

6. For stable conditions, westerly airflow towards a north-south mountain range is _________________ (in the N. Hemisphere).

B. Define the following terms: (2 points each) [10 minutes]

1. Optical air mass

2. Solar constant

3. Temperature inversion

4. Environmental lapse rate

5. Mass-elevation ("Massenerhebung") effect
c. **Short Answers:** (30 points) [25-30 minutes]

1. Explain why mean temperature decreases with altitude (5 points)

2. Explain what determines whether an air flow will cross a topographic barrier (5 points)

3. Provide diagrams of the mountain/valley wind regimes and explain their origins (5 points)

D. **Short Essays (continued)**

2A. **EITHER** Account for the paradox that mountain summits tend to be colder than the free air in view of the potential for elevated surfaces to act as heat sources.

2B. **OR** Discuss the factors controlling lee wave occurrences and their characteristics. Allowing for scale differences, what similarities/contrasts exist between these features and synoptic-scale lee cyclogenesis?