EASTERN UNIVERSITY, SRI LANKA

THIRD EXAMINATION IN SCIENCE - 2008/2009

SECOND SEMESTER (Special Repeat)

(January 2012)

PH 306 ENVIRONMENTAL PHYSICS

Time: 01 hour.

Answer ALL Questions

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1. Sketch the temperature profile of the atmosphere as a function of height to 300 km altitude and explain the significance of each layer.

   If the tropopause is at a pressure of 150 mb and the stratopause is at 1 mb

a. Calculate the total mass per unit cross-section of the stratosphere

b. How thick would the stratosphere be if it was brought to ground level at standard temperature 273 K and at the pressure 1 atm

2. Define and briefly comment on the following terms.

   i. Solar constant

   ii. Planetary albedo

   iii. Ozone depletion

The Beer-Lambert law is given by: $I_t = I_o \exp(-\sigma N x)$

Where I_t-transmitted flux light at a set wavelength,

I_o-incident light flux

N-concentration of the target gas

x-path length of the radiation through the gas and

σ-photo-absorption cross section.

Calculate the percentage increase in $260nm$ UV radiation reaching the Earth's surface at the South Pole when the "ozone hole" is 50% that of the normal concentration of $3.2\times10^{16}\,m^{-3}$. Assume that the photo-absorption cross-section for $260nm$ UV light is $10^{-21}\,m^2$ and the depth of the stratosphere is $40km$.