EASTERN UNIVERSITY, SRI LANKA

THIRD EXAMINATION IN SCIENCE - 2003/2004

SECOND SEMESTER

(JUNE/JULY 2005)

PH 306 ENVIRONMENTAL PHYSICS

Time: 01 hour.

Answer ALL Questions

You may find the following information useful.

Velocity of light $c = 3 \times 10^8 ms^{-1}$

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01. Briefly explain the ozone formation in the atmosphere and how ozone layer prevents the harmful ultraviolet (UV) radiation reaching the Earth's surface. Name the group of man-made chemicals that contributes mostly to the destruction of ozone in the stratosphere and explain the mechanism of destruction.

If sunlight consists of radiation of wavelength $\lambda = 250nm$:

i. Calculate the energy of one photon.

ii. Is this sufficient to break the chemical bond of ozone, which has a dissociation energy of $2.5 \times 10^{-19} J$?

02. (a) Distinguish between the purpose and mode of action of a flat-plate collector and a photovoltaic cell, each of which has been designed for exposure to solar radiation. Outline the physical principles involved in the generation of power from wind. Discuss briefly the economic, environmental and other factors involved the growth of wind powered electricity generation in Sri Lanka.

(b) Define the term thermal resistance of building materials.

Consider the wall of a house built of a certain type of brickwork having thermal conductivity $0.84 Wm^{-1}K^{-1}$ and $225mm$ thick. The temperature on the inside of the building is 22^oC while on the outside it is 2^oC. Ignoring other effects, calculate the rate of flow of thermal energy through $1m^2$ of the wall.