



# THE OPEN UNIVERSITY OF SRI LANKA

M.Sc. In Environmental Sciences Level 10 (2018-2019)

ZYPA 604 NEPA 604 / NEP 2207 / NEP 2216- Climate Change -

OBT 1

Date: 20 04-2019

Time. 13.00 hrs 14. 30

## Answer Any Three(03) Questions only

1. (i) Draw a diagram to show how the temperature varies with altitude. The atmosphere above the earth surface is divided in to various spheres. Name these spheres and boundaries showing clearly the location of these spheres and boundaries in your diagram.  
 (ii) Give the reasons for the variation of temperatures in each sphere  
 (iii) The seasons attributed to the tilt of the earth rotational axis to the plane defined by the earth's orbit. Why?  
 (iv) What would be the seasons if there were no axial tilt? Briefly explain this.
  
2. (i) The atmosphere is relatively transparent to solar radiation. Elaborate this statement.  
 (ii) For entire globe, why must incoming radiation balance outgoing radiation? What would be the implications for the global climate if this energy balance did not prevail?  
  
 (iii) There are two primary forms of radiation relevant to energy balance properties of the climate system. Name these and explain their role in the energy budget.  
  
 (iv) Explain the occurrence of maximum and minimum temperatures of the earth from the above energy budget.
  
3. (i) Temperate countries use enclosures with glass roofs to grow tropical plants, called greenhouses where inside is kept warm. Explain the mechanism of the greenhouse and similarity of this to the greenhouse effect works on the earth.  
 (ii) The natural water vapour, carbon dioxide and some of the minute gases present in the atmosphere kept the temperature of the earth above what it would have been without these gases. Explain this.  
  
 (iii) Explain the enhanced greenhouse effect giving the reasons for the enhancement.  
  
 (iv) Even though water vapour is one of the heat absorbing gases, why is it not considered as a greenhouse gas for mitigation purposes?

4. (i) Explain Scales of Time and space with refer to atmospheric processes and events.  
(ii) By giving examples explain the processes and their results at various scales.  
(iii) How is the energy transfer take place between the earth surface and the atmosphere?  
(iv) What is meant by Climatic Factors? Explain the role of latitude to the climate of a place
5. (i) Name the components in the Climate System. Which component of the climate system characterizes climate. Briefly explain the external factors (called 'forcings') that affect climate.  
(ii) Briefly explain the Hydrological cycle  
(iii) Draw a diagram and explain the convection cells that distribute heat over the whole earth assuming smooth non-rotating earth.  
(iv) What will happen to these convective cells when the earth is rotating?

Draw a diagram of the cross section of this tropospheric circulation and explain it briefly.