You are allowed ten minutes before the start of the examination to acquaint yourself with the instructions below and to read the question paper.

Do not write anything until the invigilator informs you that you may start the examination.   You will be given five minutes at the end of the examination to complete the front of any answer books used.
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April 2010

THE UNIVERSITY OF READING

MSc/Diploma
Applied Meteorology and other MSc / Diploma Programmes

Paper MTMA40

Vegetation, Agriculture and the Atmosphere

Two hours
_____

Answer any **TWO** questions

The marks for the individual components of each question are given in [ ] brackets.   The total mark for the paper is 100.

1. Define reference crop evapotranspiration and state what climatic data are required to estimate this using the Penman-Monteith equation.

    [10 marks]

    Explain how estimates of reference crop evapotranspiration are useful in understanding the timing of the growing season for vegetation throughout the world. Illustrate your answer with examples from THREE different climates. For each of these climates, discuss what other climatic variables affect the growing season and suggest what types of crops and vegetation might be growing in each location.

    [40 marks]

2. (a) One definition of water use efficiency (WUE) of a crop is grammes of CO_2 uptake per gram of water lost by evapotranspiration. Describe how micrometeorological measurements can be used to estimate WUE (as defined above) of crops. Discuss how environmental and plant physiological factors affect such values of WUE

    [25 marks]

    (b) Describe how weather variables can affect the development and spread of fungal diseases in plants.

    [25 marks]

3. (a) Outline the difference between tactical and strategic decision making in agriculture, giving two examples of each. Describe what time scales of weather or climatic information are required in each case.

    [25 marks]

    (b) Describe why statistical methods (such as cumulative probability distributions) are of value in decision making in agricultural meteorology. Discuss how such analyses can be used to inform the choice of crop species and cultivar suitable for a location.

    [25 marks]

    (End of Question Paper)