MEC316 Tutorial Sheet 1

1) Describe briefly the main reasons why solar cells have not provided, so far, a viable method for producing domestic electricity.

2) Give examples of solar cell materials that are capable of detecting light in (i) the visible part, (ii) near infrared part, and (iii) infrared part of the spectrum.

3) What is meant by the terms AM0, AM1 and AM1.5 and why do they differ?

4) Draw a cross-section of a multi-junction solar cell, carefully defining the various parts that comprise it.

5) What are the advantages of a multi-junction solar cell compared to a single junction cell – what are the disadvantages?

6) Give a brief description of the terms crystalline, poly-crystalline and amorphous as used to describe silicon solar cells.

7) What are the various components that would be required to make up a photovoltaic system.

8) Draw a cross-section and plan view of a typical crystalline silicon solar cell, labelling all the important features.

9) Describe briefly the basic principle of operation of a crystalline p-n junction solar cell.

10) Describe how we can obtain (i) large voltages and (ii) high currents, using silicon solar cells.

11) What is meant by the term concentrator cell and what are its advantages.

12) Given a certain level of illumination, how would you maxmise the power delivered by a single solar cell?

13) Do solar cells work better in a hot climate or a cold climate, and explain why.

(No worked solutions to these questions as the answers are in the lecture notes)