ST EDWARD'S
OXFORD

Lower Sixth Entrance Assessment

November 2013

ENGLISH AS AN ADDITIONAL LANGUAGE

Time: 1 hour

Candidate Name: ……

Task 1: Reading comprehension

(25 marks)

Read the two articles below

CUER: the UK's number one solar car team

Cross a Desert... Using only the Sun... and Beat the rest of the world to the Finish Line. This is our Challenge.

Cambridge University Eco Racing are the UK's Number One Solar Car Team and we are launching our revolutionary new design to win the World Solar Challenge 2013, a Solar Marathon, across the Outback.

We are a team of 60 students from Cambridge University that design, build and race solar powered vehicles. Since we were founded we have raced in the World Solar Challenge in 2009 and 2011.

Our competitors are teams run by large corporations, leading foreign research universities and consortiums of manufacturers. Every two years, they bring solar-electric racing cars, using the newest technologies and cutting edge design, and compete to be the fastest to cross the Australian Outback.

This year we have come up with an innovative, radical and game changing new design, unlike anything that has come before. Industry experts and leading academics in the field have expressed their confidence that we stand a very good chance of winning the race.

We have partnered with leading British, European and International companies to produce the components we require to complete our car, but we do still need funds to buy the necessary materials. In addition funds raised will help us prepare both team and car for the expedition out to Australia and will provide us with the equipment we need to survive and race in such harsh conditions.

Risks and challenges

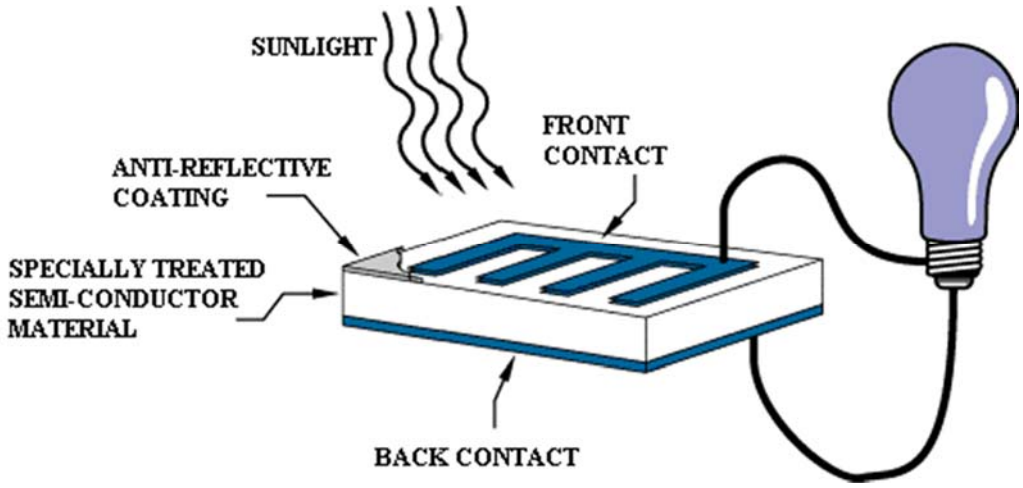
Bringing together such a large project in a short space of time will be challenging. However, the fact that we have already accomplished this 2 times in a row (albeit for more standard designs), demonstrates that we have the experience required. We are already well on the way with the manufacture of our largest components.

We are competing against large teams with multi-million pound budgets. During the race they will have a large amount of resources they can deploy to help them perform to the best, whatever the conditions (bushfires, tornados, thunderstorms). The more funding we receive the better we can train, equip and support the team through the race across the Outback.

How do Photovoltaics Work?

Photovoltaics is the direct conversion of light into electricity at the atomic level. Some materials exhibit a property known as the photoelectric effect that causes them to absorb photons of light and release electrons. When these free electrons are captured, an electric current results that can be used as electricity.

The photoelectric effect was first noted by a French physicist, Edmund Bequerel, in 1839, who found that certain materials would produce small amounts of electric current when exposed to light. In 1905, Albert Einstein described the nature of light and the photoelectric effect on which photovoltaic technology is based, for which he later won a Nobel prize in physics. The first photovoltaic module was built by Bell Laboratories in 1954. It was billed as a solar battery and was mostly just a curiosity as it was too expensive to gain widespread use. In the 1960s, the space industry began to make the first serious use of the technology to provide power aboard spacecraft. Through the space programs, the technology advanced, its reliability was established, and the cost began to decline. During the energy crisis in the 1970s, photovoltaic technology gained recognition as a source of power for non-space applications.



The diagram above illustrates the operation of a basic photovoltaic cell, also called a solar cell. Solar cells are made of the same kinds of semiconductor materials, such as silicon, used in the microelectronics industry. For solar cells, a thin semiconductor wafer is specially treated to form an electric field, positive on one side and negative on the other. When light energy strikes the solar cell, electrons are knocked loose from the atoms in the semiconductor material. If electrical conductors are attached to the positive and negative sides, forming an electrical circuit, the electrons can be captured in the form of an electric current -- that is, electricity. This electricity can then be used to power a load, such as a light or a tool.

A number of solar cells electrically connected to each other and mounted in a support structure or frame is called a photovoltaic module. Modules are designed to supply electricity at a certain voltage, such as a common 12 volts system. The current produced is directly dependent on how much light strikes the module.

Answer the following questions on the two articles above:

1. What do the CUER team hope to achieve? (2 marks)
2. Who have they received help from? (2 marks)
3. What difficulties will they face in Australia? (2 marks)
4. In your own words and in simple terms, explain how the sun can be used to create electricity (12 marks)

5. Why do you think there is now so much interest in solar energy? (7 marks)

Task 2: Writing

(25 marks)

Some people would argue that too much time and money is spent on sport. What is your opinion? Write about 250 words. Think about the following aspects when planning your essay:

- The benefits to health
- The social advantages and disadvantages of sport
- The financial aspects