

Write your name here

Surname

Other names

Edexcel
Principal Learning

Centre Number

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Candidate Number

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Engineering

Level 2

**Unit 8: Exploring Engineering Innovation,
Enterprise and Technological Advancements**

Thursday 24 May 2012 – Afternoon

Time: 1 hour 30 minutes

Paper Reference

EG208/01

You do not need any other materials.

You are not allowed to bring your pre-release work into this examination.

Total Marks

| |
|--|
| |
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Case Study – Solar Powered Lawnmower

SolarNRG is an eco-friendly manufacturing company that has designed a new product. Although the idea is not new, the design and look of the product are its own.

The new product is called the *SolarCut* which is a lawnmower powered by an on board solar panel. This allows grass to be cut without the need for mains electricity.

The lawnmower is designed to be environmentally friendly and provide enough power to be able to cut the lawn of an average family home.

SolarNRG wants the SolarCut to be manufactured using high volume production processes.



Instructions

You are to investigate the viability of the SolarCut product. Your study should identify the steps SolarNRG will need to undertake if the product is to be a success. Your study should investigate the following areas:

- intellectual property
- research and development activities
- financial review
- range of materials and their properties
- high volume production processes (wheels, grass storage box, handle and starter lever)
- potential impact of solar power on a range of environments
- social and environmental impact



Answer ALL questions. Write your answers in the space provided.

1 There are four main types of intellectual property.

(a) Complete the tables below by:

(i) identifying the correct name of the intellectual property described

(2)

| Intellectual property | Description |
|-----------------------|---|
| | Protects the technical and functional aspects of products or processes |
| | Protects the signs and symbols that can distinguish the goods and services of one trader from another |

(ii) describing each intellectual property

(4)

| Intellectual property | Description |
|-----------------------|-------------|
| Design | |
| Copyright | |

(b) SolarNRG will be supplying an instructional DVD with SolarCut.

Which intellectual property would SolarNRG use to protect this DVD?

(1)

(c) Which UK organisation should SolarNRG use to register its ideas?

(1)



(d) Give **two** reasons why SolarNRG should register intellectual property.

(2)

1

.....

2

.....

(e) Identify **two** visual features, other than shape, that could be protected as a registered design.

(2)

1

.....

2

.....

(Total for Question 1 = 12 marks)



2 Before the SolarCut can be sold, a number of research, development and financial activities need to be carried out.

(a) Research

Give **four** different market research activities that could be used to determine whether the product might be successful when it reaches the market.

(4)

1

2

3

4

(b) Development

Describe **two** different types of pre-production tests that could be carried out on the SolarCut.

(4)

1

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2

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(c) Finance

SolarNRG has been granted a loan of £100 000 by a bank and been given a grant of £50 000 by the Government.

If the SolarCut is not a success, what would be the financial implications to SolarNRG in relation to these funds?

(4)

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(Total for Question 2 = 12 marks)



3 SolarNRG needs to know about the different materials that are available before it produces the SolarCut.

(a) Draw a straight line to connect each material to the most appropriate description.

(5)

Material

Description

Brass

Grey colour, strong in compression, ferrous

ABS

Yellow/gold colour, copper and zinc alloy, non-ferrous

Copper

Black colour, lightweight, expensive

Cast iron

Available in a variety of colours, high-impact strength, can be moulded, warm to touch

Carbon fibre

Reddish brown colour, very soft and ductile, good electrical conductor, non-ferrous



(b) State the correct name of each physical property described below.

(2)

| Physical property | Description |
|-------------------|--|
| | The ability of a material to return quickly to its original shape after being bent or deformed |
| | The ability of a material to resist wear or abrasion |

(c) Name **one** specific polymer that is suitable for making the wheels of the SolarCut.

(1)

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.....

(d) Define each of the following:

(i) a ceramic material

(2)

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.....

.....

(ii) a composite material

(2)

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.....

(Total for Question 3 = 12 marks)



4 SolarNRG uses photovoltaic cells as a means of providing electricity to operate the SolarCut.

Describe **different** advantages of using photovoltaic cells in the:

(a) home

(2)

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(b) workplace

(2)

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(c) built environment

(2)

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(Total for Question 4 = 6 marks)



6 The SolarCut is powered by a sustainable source of energy.

(a) Identify **two** other sustainable sources of energy, apart from photovoltaic cells.

(2)

1

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2

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(b) Compare and contrast the two sustainable sources of energy identified in (a).

(4)

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