Write your name here

Surname	Other names

Edexcel
Principal Learning

Centre Number | | | | | |

Candidate Number | | | | |

Engineering

Level 2

Unit 8: Exploring Engineering Innovation, Enterprise and Technological Advancements

Thursday 23 May 2013 – 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

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 – The SolRsurf

Jenny has designed an environmentally friendly laptop called SolRsurf. The SolRsurf is powered by an on board solar panel to allow the product to be used without having to rely on mains electricity.

This product is still at the concept stage, therefore Jenny needs to develop her ideas and carry out research. The design and look of the product will be her own work. Jenny will need to protect her idea.

She wants the SolRsurf to be manufactured using high volume production processes.

Instructions

You are to investigate the viability of the SolRsurf. Your study should identify the steps Jenny will need to undertake if the product is to be a success.

Your study should investigate the following areas:

- intellectual property
- research and development, including testing
- financial support
- a range of suitable materials and their properties
- a range of renewable energy sources
- design considerations for moulding methods
- high volume production processes including automated circuit board production
- social and environmental impact.

Answer ALL questions. Write your answers in the space provided.
Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Jenny is considering registering her intellectual property rights. There are four types of intellectual property.

(a) Identify the intellectual property that would protect the visual appearance of the SolRsurf.

(1)

A	Patent	☒
B	Design	☒
C	Copyright	☒
D	Trademark	☒

(b) Which intellectual property would Jenny use to protect the 'SolRsurf' name?

(1)

.....

(c) State **two** ways that Jenny could check whether her design has already been registered.

(2)

1 .....

.....

2 .....

.....

(d) State **four** types of literary work that **copyright** protects.

(4)

1 .....

2 .....

3 .....

4 .....

(e) Define the term **intellectual property infringement**.

(2)

.....

.....

.....

.....

(f) Give **two** examples of trademark infringement.

(2)

1 .....

.....

2 .....

.....

(Total for Question 1 = 12 marks)

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

(a) Development

State **two** factors that must be considered when testing the safety of the SolRsurf product.

(2)

1 .....

.....

2 .....

.....

(b) Research

Describe **two** different research methods that Jenny could use when developing the SolRsurf.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(c) Financial

(i) Describe **one** advantage of gaining financial support from friends and family.

(2)

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(ii) Describe **one** disadvantage of gaining financial support from friends and family.

(2)

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(Total for Question 2 = 10 marks)

3 Jenny needs to identify appropriate materials and their characteristics before safely and cost effectively producing the SolRsurf.

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

(4)

Property	Description
Toughness	The ability of a material to break without significant deformation
Plasticity	The ability of a material to withstand a sudden impact or force
Brittle	The ability of a material to resist a load without breaking
Strength	The ability of a material to deform to a stretched state when a load is applied and retain its change in shape after the load is removed

(b) Flat bar is an example of the form of supply of a material.

Identify **two** other forms of supply.

(2)

1 .....

.....

2 .....

.....

(c) (i) Define a non-ferrous metal.

(1)

.....

.....

(ii) Name a non-ferrous metal.

(1)

.....

.....

(d) Rubber is an elastomer.

Define an **elastomer**.

(2)

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(Total for Question 3 = 10 marks)

4 Jenny's product uses a casing which contains a number of photovoltaic cells to power the SolRsurf.

(a) Describe **two** different renewable forms of energy, apart from solar power, that could be used in the environment.

(4)

1 .....

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.....

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2 .....

.....

.....

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(b) The casing needs to be injection moulded.

State **four** features that will need to be considered to allow the casing to be successfully moulded.

(4)

1 .....

.....

2 .....

.....

3 .....

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4 .....

.....

(Total for Question 4 = 8 marks)

5 The SolRsurf contains a number of electronic circuit boards in the main body of the laptop. The process used to locate the components and solder them in place is called surface mount technology.

Describe the process of surface mount technology and explain the advantages of using this technology. You may use diagrams.

(Total for Question 5 = 8 marks)

6 Jenny is concerned about the impact the SolRsurf will have on the environment.

Explain the impacts of the following on the environment and how Jenny can minimise their effect.

(a) Protective packaging and assembly documentation.

(6)

(b) Distribution of the product to the end user.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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