

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**

Wednesday 9 January 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

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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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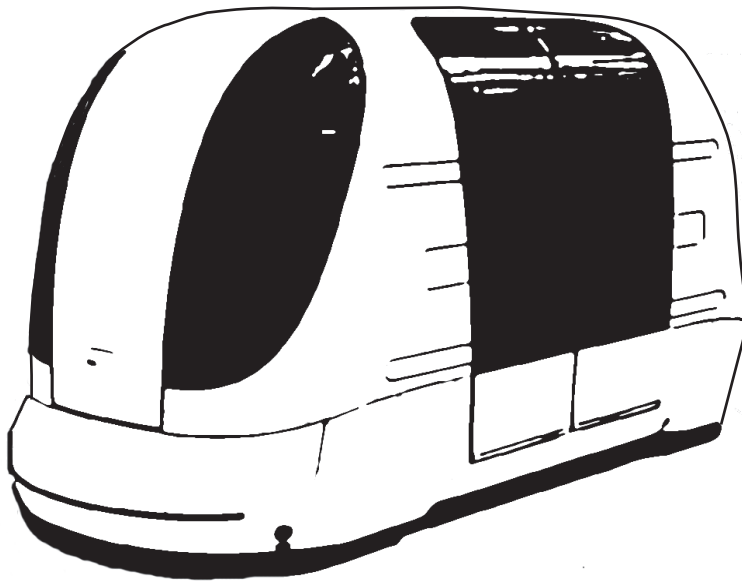


Case Study – The PodRide

Enviro-Journey has designed an environmentally friendly and rapid mode of transport called the PodRide. The PodRide uses an elevated 'guideway' to transport passengers between stations.

The PodRide is currently powered by a lead acid battery but the vehicle has been adapted for future battery developments and for other power sources such as hydrogen fuel cells and lithium-ion battery systems.

This product is going through an extensive trial period at a UK airport to assess its social and environmental impact.



Instructions

You are to investigate the viability of the PodRide. Your study should identify the steps Enviro-Journey needs 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 for manufacturing the main parts of the PodRide including those used in the power source
- high volume production processes (chassis, body panels and tyres)
- potential social and environmental impact.



Answer ALL questions. Write your answers in the spaces 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 There are four types of intellectual property; patent, copyright, design and trademark.

(a) Below are four descriptions. Put a cross ☒ in the box that correctly describes the term **trademark**.

(1)

A	Protects the retail marketplace and price of a product	<input type="checkbox"/>
B	Protects signs and symbols that can distinguish the goods and services of one company from those of another	<input type="checkbox"/>
C	Protects material such as art, music and sound recordings	<input type="checkbox"/>
D	Protects the visual appearance or 'eye appeal' of the product	<input type="checkbox"/>

(b) Which intellectual property would Enviro-Journey use to protect the laser sensor system of the PodRide?

(1)

(c) State **three** ways that Enviro-Journey could check whether the idea has already been patented.

(3)

1

2

3

(d) State what the symbol ® means.

(1)



(e) Draw a straight line to connect each intellectual property with the **three** most appropriate aspects.

(6)

Intellectual property

Aspect

Patent

Design

Improvements to mountain bike handles which do not affect function

The texture of the outer shell of a mobile phone

A new inventive step to improve car manufacture

The shape of a new desk lamp

The locking mechanism of a child's car seat

The way a bicycle can be folded to allow it to be carried

(Total for Question 1 = 12 marks)



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

(a) Research

State **two** outcomes from research activities that would limit development of the PodRide.

(2)

1

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2

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(b) Development

The company has built a test facility for the PodRide.

Describe **two** benefits of using such a test facility.

(4)

1

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2

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(c) Financial

Complete the tables below by:

(i) identifying the correct name of the fund provider described.

(2)

Fund Provider	Description
	A speculator who makes money available for innovative projects
	An individual or institution that legally owns one or more shares of stock in a public or private organisation

(ii) describing each fund provider.

(4)

Fund Provider	Description
Bank	
Private Funding	

(Total for Question 2 = 12 marks)



3 Enviro-Journey used a range of materials during the manufacture of the PodRide.

(a) Draw a straight line to connect the type of material with specific material.

(4)

Type of material

Specific material

Metal

Acrylonitrile Butadiene
Styrene (ABS)

Polymer

Glass reinforced plastic (GRP)

Ceramic

Glass

Composite

Stainless steel

(b) Name **two** characteristics of a polymer that make it suitable for vacuum forming the body panels of the PodRide.

(2)

1

2



(c) (i) Define the term **smart material**.

(2)

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(ii) Give **two** examples of smart materials.

(2)

1

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2

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(Total for Question 3 = 10 marks)



4 The PodRide uses rechargeable batteries as a power source.

(a) Describe **two** advantages of using lithium-ion batteries in place of lead acid batteries.

(4)

1

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2

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(b) The PodRide can be adapted to use hydrogen fuel cells.

Outline **one** impact this would have on the environment.

(2)

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(Total for Question 4 = 6 marks)



5 Enviro-Journey manufactured the body panels of the PodRide using the process of vacuum forming.

Describe the process of vacuum forming. You may use diagrams.

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(Total for Question 5 = 8 marks)



6 Enviro-Journey is very concerned about the social and environmental issues of the PodRide.

(a) Describe the positive social impacts of using the PodRide.

(6)

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(b) Explain the environmental benefits of using this type of transport system.

(6)

Dotted lines for writing the answer.

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS



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